Understanding the Prevalence of Students with Visual Impairments Receiving Special Education Services and State-Level Factors

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The prevalence of students with visual impairments varies across the United States, yet limited analysis exists on how individual state factors may influence the number of students receiving services. Using an explanatory-sequential mixed methods research design, the following study attempted to address gaps in knowledge through three main research tasks. First, a national state survey collected population data on students with visual impairments for the 2017-18 school year. Second, several regression models were developed to correlate states' prevalence rates with specific factors (e.g., state eligibility criteria, demographics, and economic variables). Third, approaches to collecting consistent total population data were explored through focus groups with state level administrators familiar with students with visual impairments. Twenty-three of the 50 states that responded to the national state survey reported total population data for students with visual impairments in their state. On average in the 2017-18 school year, states supported 3.6 times the number of students with visual impairments reported in their federal Child Count data reports. Multiple regression analyses indicated that requiring specific assessments as part of the eligibility process may strongly correlate to states' number of students with visual impairments reported in Child Count and explain the degree of difference between Child Count and total population reports. Child Count prevalence rates were higher in states that housed a preparation program for teachers of students with visual impairments. In the focus groups, state administrators agreed that a federal

mandate is needed to require every state to collect total population data on students with visual impairments. The results exposed many states in the United States did not know the total population of students with visual impairments during the 2017-18 school year. The ramifications of preparing for and supporting an unknown population of students with disabilities were discussed, along with the factors correlating to the known prevalence of students with visual impairments. Federal mandate for total population data collection is unlikely in the near future. Therefore, key factors and logistics administrators should consider for states to collect their own total population were outlined. Implications for future research were also discussed.

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Preface

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1.0 Introduction

Special education services provide students with disabilities individualized education and accommodations to promote equal access to the general education curriculum and improve post-secondary outcomes (Sansosti & Sansosti, 2012; Sapp & Hatlen, 2010). Students with disabilities who receive instruction in and support during the transition from school to post-secondary life also have improved outcomes compared to students who do not receive such support (Alwell & Cobb, 2009; Cobb & Alwell, 2009; Shogren et al., 2015). For students with visual impairments (VI), the expanded core curriculum (ECC) promotes access to and independence in school and community settings, as well as instruction and support for the transition to post-secondary options (Lohmeier et al., 2009; Sapp & Hatlen, 2010; Wolffe et al., 2002). Mastering ECC skills provided through special education services, can mean the "difference between life and a successful life" (Sapp & Hatlen, 2010, p. 342) for students with VI. To receive the potentially life-changing instruction, however, students with VI first must be formally identified by the educational system as having a visual disability.

1.1 Eligibility Criteria for Special Education Services

The Individuals with Disability in Education Act (IDEA) placed the burden on local school districts and early intervention programs to locate, identify, and evaluate students who may have disabilities (IDEA, 2004). IDEA defined 14 disability areas which may qualify a student for special education services: autism, deaf-blindness, deafness, developmental delay, emotional disturbance,

hard of hearing, intellectual disability, multiple disabilities, orthopedic impairment, other health impairment, specific learning disability, speech or language impairment, traumatic brain injury, and visual impairment including blindness. IDEA provided a framework for state education agencies (SEAs) and local education agencies (LEAs) to identify students with disabilities with outlined eligibility criteria for each disability category. SEAs and LEAs typically develop their own unique variations on the federal definitions (McNicholas et al., 2018; Mercer et al., 1996; Tallmadge et al., 1985). As a result, eligibility criteria for specific disabilities varied significantly from state to state, or between districts in the same state (MacMillan et al., 1998). These variations in eligibility criteria created educational and public health issues. Differences in criteria resulted in students receiving special education services based on the state they live in rather than the severity of their disability or diagnosis (Palmer et al., 2005; Sullivan, 2013).

1.1.1 Visual Impairment Eligibility

Special education federal regulations set up in IDEA (2004) can be influenced at any time by policy memos, which may provide updated guidance to SEAs and LEAs. For the disability area of VI, two guidance documents (Musgrove, 2014; Ryder, 2017) issued by the Office of Special Education Programs (OSEP) may be redefining what visual impairments are in relation to special education services. Most recently, Ryder (2017) provided guidance that students with convergence insufficiency cannot be explicitly excluded from VI eligibility and state eligibility criteria should be amended if needed (Ryder, 2017). Prior to this guidance, convergence insufficiency was part of a group of visual conditions informally considered by the field to not meet the eligibility criteria of VI. Understanding potential variations in eligibility criteria is important, given how much variation exists among states. Even though all state definitions are ultimately tied to the definitions

set up in IDEA, federal and state policy changes may result in eligibility criteria modifications at any time.

Only two national reviews of state eligibility criteria in the area of VI have been published in the last 35 years. Zambone and Allman (1988) surveyed states to determine if early childhood vision services were provided through mandated or permissive policies. They surveyed states on early childhood services for infants/toddlers birth to two years old and preschool services, for children three to five years old. The analyses were limited, however, because Zambone and Allman (1988) received responses from just 28 states and the Virgin Islands. More recently, Project FORUM, a collaboration between the National Association of State Directors of Special Education (NASDSE) and OSEP, collected information on eligibility requirements for all disabilities across all states (Muller & Markowitz, 2004). Their reports, however, were limited to narrative descriptions indicating the number of states using specific criteria (e.g. 21 states require an eye report from an ophthalmologist) without specific listings of which states maintained each requirement. Given the potential educational and public health implications, the age and limitations of these two reviews warranted an updated analysis of state eligibility criteria for VI.

1.2 Relationship between Eligibility Criteria and Prevalence

There are known relationships between states' eligibility criteria and prevalence, yet no published analysis explored the relationship between eligibility criteria and prevalence for students with visual impairments and blindness (VI). The benefits of such an analysis include identifying correlations between prevalence and components of eligibility criteria as well as identifying practices or policies which may be most beneficial to students with VI. This type of analysis is

critical, given that federal law places the burden on SEAs and LEAs to identify students with disabilities.

1.2.1 Recent Research Regarding Students with Visual Impairments

As a pilot for the current study, a review of eligibility criteria for the category of visual impairments including blindness was conducted of the 50 United States and Washington, D.C. (which for the purposes of this report will be referred to as the 51 states; Schles, 2019). Results indicated there were statistically significant correlations between components of eligibility criteria and states' prevalence of students with VI during the 2016-17 school year. Limited conclusions should be drawn from the research given it only considered data for one school year, and many states did not have data on their total population of students with VI. For example, (with 48 out of 51 states reporting), only 15 states had total population data on students with VI birth-22 years old with information available by age group (birth-2; 3-5; and 6-22 years old). Having information for students with VI by age is necessary, as services and needs often vary by age (early intervention, birth-2 years old; preschool, 3-5 years old; and school-aged/K-12, 6-22 years old). An additional 6 states have total population data on students with VI aged birth-22 years old, with limited or no available information on the breakdown of students by age. Nine states knew how many school age (3-22 years old) students with VI were in their state. One state only had data for students 6-22 years old, while another state only had information on children birth-5 years old. In five states, the only available data on their total population of children with VI are for those receiving early intervention services (birth-2 or 3 years old). Lastly, 11 states had no total population data for their children and youth with VI, regardless of their age (Schles, in press). Given the limitations of available data, any research into understanding the population of students with VI in the US must

address these substantial gaps. A few state demographic variables were included in analyses (e.g., per capita income, childhood poverty rates), however, representative aspects of state demographics may have been omitted. Future research in this area should include a more comprehensive consideration of state level demographic variables. Addressing these gaps allow for more thorough and accurate analysis in future program planning and research for students with VI.

1.3 Conclusion

Recent research has provided a foundation for understanding possible variations in special education eligibility criteria for students with visual impairments. More research is needed, however, so practitioners and researchers can better understand factors relating to the identification of students with visual impairments for special education services. Possible areas of exploration include identifying additional state-demographic factors that may be considered for analyses as well as better understanding the availability of population data for students with visual impairments.

2.0 Review of the Literature

Given the existing gaps in the literature, the following research questions were asked. (1) What quantitative methodological approaches have been used to assess the impact of states' special education eligibility criteria and other state-specific variables on the prevalence of a disability? (2) How do researchers break down components of a disability category's eligibility criteria for analysis? (3) What state level variables do researchers include in their analysis other than disability specific eligibility criteria?

2.1 Method

A review of the literature was conducted in May 2019 using ERIC, PsychInfo, and Google Scholar to find articles which fit the research questions. The following terms were used to identify studies which addressed the research questions: "disability identification," "special education eligibility," "child count," "prevalence," "incidence," "state criteria," "prevalence factors," "statistical analysis," as well as United States, USA, and/or U.S.A. The terms were used in isolation and in different combinations until no new results were found. As potential articles were identified for inclusion, the author conducted ancestral reference list searches for additional articles which may have fit the research questions.

Studies were included in this review if they met the following inclusion criteria (a) the prevalence of students with disabilities listed in IDEA was the outcome variable (b) analyzed eligibility criteria across 50 or 51 states (including Washington, D.C.) in the US, (c) included

statistical analysis to understand potential relationships between the reported number of students with disabilities and state eligibility criteria or state-level demographic variables and (d) were published in peer-reviewed journals. Due to the nature of the research question, articles were limited to studies conducted after the implementation of P.L. 94-142. The use of quality indicators for special education research were outside the scope of the inclusion criteria. In order to thoroughly answer research question 3, the author was concerned that using quality indicators as inclusion criteria may artificially restrict the state demographic variables identified in the review.

During the first stage of research, database searches yielded a total of 680 articles, dissertations, and reports. These publications were reviewed based on their title and short synopses (when available). Publications which appeared to meet the research questions were flagged for stage two; review of their abstracts. From the database searches and ancestral/reference lists, a total of 96 article abstracts were reviewed, resulting in 52 publications which were identified for further consideration in stage three. Stage three involved reading the publications' method sections and coding articles to determine which publications met all inclusion criteria. Immediately, nine studies were excluded because they did not relate to the research questions (e.g., research exploring potential racial disproportionality; Morrier & Hess, 2012; or exploring the impact of variations in eligibility criteria outside of the US; Fletcher et al., 1989), therefore not meeting inclusion criteria (a). Seven studies were excluded because they did not meet inclusion criteria (b); requiring analysis to include no fewer than 50 states (e.g., Sullivan, 2013; Palmer et al., 2005). A total of 20 publications were excluded because they did not include statistical analysis, failing to meet inclusion criteria (c). Of these 20 studies, 11 were removed because they only explored prevalence of students with disabilities (e.g., Hallahan et al., 2007) or descriptively reported eligibility criteria (e.g., Maki et al., 2015) omitting any in depth or correlational research. The remaining nine studies

were excluded because they applied qualitative approaches to exploring the influence of eligibility criteria and/or state factors on prevalence (e.g., Thorpe & Chiang, 1996). Inclusion criteria (d) resulted in three more studies being eliminated, because they were dissertations and not peer-reviewed articles.

Once all inclusion and exclusion criteria were exhausted, 14 studies were included in the current review (Barton et al., 2016; Coutinho & Oswald, 1998; Lester & Kelman, 1997; McLaughlin & Owings, 1992; MacFarlane & Kanaya, 2009; Mandell & Palmer, 2005; Noel & Fuller, 1985; Oswald, 1995; Oswald & Coutinho, 1995; Patrick & Reschley, 1982; Phillips & Odegard, 2017; Skiba et al., 1994; Velazquez-Ramos et al., 2018; Wiley & Siperstein, 2011). Based on the research questions and inclusion criteria, studies included in this review were coded for the following; sample attributes (students' age range, data sources, and disability), eligibility criteria variables, demographic variables, economic variables, statistical tests reported, and if researchers conducted any additional analyses. All 14 studies were summarized in Appendix A.

2.2 Results

2.2.1 Data Sources and Sample Population

2.2.1.1 Data Sources

All 14 studies obtained student population and prevalence statistics from the US Department of Education's Child Count data. Eligibility criteria were obtained either through direct solicitation of states' department of educations, states' department of education's websites, or from other researchers who had already collected and coded the criteria. Researchers who

included state demographics and economic information in their analyses reported gathering data from the National Center for Education Statistics and/or the US Census.

2.2.1.2 Age

All 14 studies used available Child Count statistics for school-aged children with the disability/disabilities in question in their analyses. Since implementation of P.L. 94-142 the definition of "school aged" has changed. As a result, some analyses included children 6-17 years old or 6-21 years old, while the most recent studies used the current definition of 3-21 years old as school aged children. One study did conduct separate analyses by age (3-5 years old, and 6-21 years old), with the rationale that in practice preschool and K-12 special education services are different (Barton et al., 2016), even though the students in both groups are served under the same IDEA Part B regulations.

2.2.1.3 Students' Disabilities

There was diverse representation of disabilities across studies, however analyses overwhelmingly focused on the prevalence of students with emotional/behavioral disabilities (EBD) and specific learning disabilities (SLD). Nine of the 14 studies focused on the prevalence of one disability, while five studies (Coutinho & Oswald, 1998; Lester & Kelman, 1997; McLaughlin & Owings, 1992; Noel & Fuller, 1985; Wiley & Siperstein, 2011) reported separate analyses for two or more disability categories. The following summarizes the representation of students' disabilities. The prevalence of students with specific learning disabilities (Coutinho & Oswald, 1998; Lester & Kelman, 1997; McLaughlin & Owings, 1992; Noel & Fuller, 1985; Phillips & Odegard, 2017; Velazquez-Ramos et al., 2018) and emotional/behavioral disorders (Coutinho & Oswald, 1998; McLaughlin & Owings, 1992; Noel & Fuller, 1985; Oswald &

Coutinho, 1995; Skiba et al., 1994; Wiley & Siperstein, 2011) were analyzed in six studies each. Four studies analyzed the prevalence of students with intellectual disabilities (ID; Coutinho & Oswald, 1998; Oswald, 1995; Patrick & Reschley, 1982; Wiley & Siperstein, 2011). Three articles analyzed the prevalence of students with autism (Barton et al., 2016; MacFarlane & Kanaya, 2009; Mandell & Palmer, 2005). One study analyzed the prevalence of students in each of the following disability categories: multiple disabilities (McLaughlin & Owings, 1992) and "hard disabilities," combining visual impairment, orthopedic impairment, hearing impairment, and deaf-blindness (Lester & Kelman, 1997). Three research teams explored the prevalence of all students with disabilities (Coutinho & Oswald, 1998; McLaughlin & Owings, 1992; Noel & Fuller, 1985).

2.2.2 Variables

The variables analyzed across studies were best divided into three categories. First, special education eligibility variables representing specific components of eligibility criteria. Second, state demographic variables capturing differences across states. Demographic variables included the states' classification by geographic region, teacher preparation, and access to healthcare. Third were variables capturing states' economic status such as per capita income and per pupil expenditure (PPE).

2.2.2.1 Eligibility Criteria Variables

Six studies in the current review included eligibility criteria variable(s) in their analyses (Barton et al., 2016; MacFarlane & Kanaya, 2009; Oswald, 1995; Patrick & Reschley, 1982; Phillips & Odegard, 2017; Skiba et al., 1994). All researchers identified and coded each state for specific components of eligibility criteria, based on the nuances of the disability in question. The

majority of studies included multiple components of eligibility criteria, however, one team coded states' criteria for only one component (Phillips & Odegard, 2017). Across the remaining five studies, the most common components include assessment procedures or requirements (3 studies; Barton et al., 2016; Patrick & Reschley, 1982; Skiba et al., 1994), type of definition used for the disability (4 studies; Barton et al., 2016; MacFarlane & Kanaya, 2009; Patrick & Reschley, 1982; Skiba et al., 1994), and specific threshold or qualifying cut off requirements (2 studies: Oswald, 1995; Patrick & Reschley, 1982). Half of these studies reported statistically significant findings correlating students' prevalence of disabilities with eligibility criteria. Statistically significant components were assessment procedures (Barton et al., 2016; Patrick & Reschley, 1982) or disability definition (MacFarlane & Kanaya, 2009).

2.2.2.2 State Demographic Variables

Ten of the 14 studies included demographic variables in their research (Coutinho & Oswald, 1998; Lester & Kelman, 1997; McLaughlin & Owings, 1992; Mandell & Palmer, 2005; Noel & Fuller, 1985; Oswald, 1995; Oswald & Coutinho, 1995; Patrick & Reschley, 1982; Velazquez-Ramos et al., 2018; Wiley & Siperstein, 2011). While an array of demographic variables were included, there were inconsistent findings in the statistical significance of the variables across research teams and types of disabilities. Variables representing the racial or ethnic diversity (overall diversity or the proportion of a states' population identified as a specific racial group) were the most common demographic considered, in all 10 studies. Only six of the 10 found race/ethnicity to have a statistically significant relationship with the prevalence of students with disabilities (Coutinho & Oswald, 1998; Noel & Fuller, 1985; Oswald, 1995; Patrick & Reschley, 1982; Velazquez-Ramos et al., 2018; Wiley & Siperstein, 2011). The next most frequently used demographic variable attempted to capture geographic differences across states. This included

levels of urbanicity within states (e.g. percentage of the states' population that lived in rural or urban settings) across four studies (Coutinho & Oswald, 1998; Lester & Kelman, 1997; McLaughlin & Owings, 1992; Noel & Fuller, 1985; Patrick & Reschley, 1982). Three research teams incorporated the geographic region of the US in which the state was located (Lester & Kelman, 1997; Oswald, 1995; Oswald & Coutinho, 1995). Across these six articles, geography was found to be a statistically significant variable in four studies.

Several demographic variables were included in just a few studies in the current review but are still worth noting. Access to health care, including number of pediatricians in the state, school-based health clinics, and/or health insurance coverage, were all found to be statistically significant (Mandell & Palmer, 2005; Velazquez-Ramos et al., 2018). Noel & Fuller (1985) included variables relating to states' teacher preparation programs. They found the number of degrees awarded for teachers of students with SLD did correlate with prevalence. Two research teams considered the level of conservatism and/or liberalism within states and found statistically significant relationships (Lester & Kelman, 1997; Wiley & Siperstein 2011). States' level of conservatism was measured by the number of people who voted for the Republican candidate in the most recent presidential election, while liberalism was measured by states' abortion rates. Additional state demographic variables across studies are summarized and reported in Appendix A. Variables in bold indicate researchers identified statistically significant relationships between the variable and prevalence of students with disabilities.

2.2.2.3 Economic Variables

Eleven of the 14 studies included consideration of economic variables in their research (Barton et al., 2016; Coutinho & Oswald, 1998; Lester & Kelman, 1997; McLaughlin & Owings, 1992; Mandell & Palmer, 2005; Noel & Fuller, 1985; Oswald, 1995; Oswald & Coutinho, 1995;

Patrick & Reschley, 1982; Velazquez-Ramos et al., 2018;Wiley & Siperstein, 2011). Like demographic variables, research teams reported inconsistent findings across economic variables. Poverty rates and PPE were the most common economic variables represented across studies. Seven articles noted PPE correlated with prevalence (Barton et al., 2016; Coutinho & Oswald, 1998; McLaughlin & Owings, 1992; Mandell & Palmer, 2005; Noel & Fuller, 1985; Oswald & Coutinho, 1995; Patrick & Reschley, 1982). Two studies did not report statistically significant correlations for PPE and prevalence (Oswald, 1995; Wiley & Siperstein, 2011). Poverty rates were also frequently included in analyses (8 of 11 studies), though poverty was defined a few different ways. Three research teams used a poverty statistic representing the entire states' population regardless of age (Coutinho & Oswald, 1998; Lester & Kelman, 1997; Velazquez-Ramos et al., 2018). None of these teams found poverty to be statistically significant. The five remaining teams focused on children living in poverty. Three teams used the percentage of children living in poverty (McLaughlin & Owings, 1992; Noel & Fuller, 1985; Wiley & Siperstein, 2011). The remaining researchers utilized states' statistics on students who qualified for free and reduced priced lunch as their representation of childhood poverty rates (Barton et al., 2016; Mandell & Palmer, 2005). Only two of these five studies found statistically significant relationships between childhood poverty and disability prevalence (Barton et al., 2016; Wiley & Siperstein, 2011). Per capita income was the third most widely used economic variable; however, only half of the researchers found statistically significant relationships (significant: Coutinho & Oswald, 1998; McLaughlin & Owings, 1992; Patrick & Reschley, 1982; not significant: Oswald, 1995; Oswald & Coutinho, 1995; Wiley & Siperstein, 2011). Additional economic variables are reported in Appendix A.

2.2.3 Statistical Methods Employed

Several statistical methods were utilized across the 14 studies. Overwhelmingly, researchers selected a combination of bivariate correlations and regressions, including analysis of variance (ANOVA) calculations. Slightly more than half of the studies reported using bivariate (Pearson's) correlations to understand the relationships between the variables in their analyses (Barton et al., 2016; McLaughlin & Owings, 1992; Noel & Fuller, 1985; Oswald, 1995; Oswald & Coutinho, 1995; Patrick & Reschley, 1982; Velazquez-Ramos et al., 2018; Wiley & Siperstein, 2011). Six articles referenced one or more tests to compare the means of two groups. This includes χ^2 (Mandell & Palmer, 2005; Skiba et al., 1994) and the student-newman-keuls (SNK) means-comparison (Oswald, 1995; Oswald & Coutinho, 1995). Two research teams each reported using *t*-tests (MacFarlane & Kanaya, 2009; Phillips & Odegard, 2017), and/or *F*-tests (MacFarlane & Kanaya, 2009; Oswald, 1995). MacFarlane & Kanaya (2009) also reported Cohen's d & partial η^2 statistics to determine the effect size of their calculations.

Eleven of the 14 studies used regression (including ANOVA) models to identify potential correlations between the prevalence of students with disabilities and state level factors. While McLaughlin & Owings (1992) reported using an ANOVA, Skiba et al. (1994) specified using the ruskal-wallis one-way analysis of variance. Three teams reported using either multiple regression analyses (Lester & Kelman, 1997; Patrick & Reschley, 1982) or logistic regression (Mandell & Palmer, 2005). One research team (Barton et al., 2016) reported using backwards regression to develop their final model. An additional five teams reported using stepwise regression (Coutinho & Oswald, 1998; Oswald, 1995; Oswald & Coutinho,1995) or hierarchical (multiple) regression (Velazquez-Ramos et al., 2018; Wiley & Siperstein, 2011) to develop their regression models.

Lastly, Noel & Fuller (1985) used multivariate regression to develop their statistical models, exploring state and district level factors in their analysis.

In considering the statistical methods employed, there were two additional reported techniques worth noting. Patrick & Reschley (1982) and Noel & Fuller (1985) conducted factor analyses, combining variables for their regression models. To create a more nuanced comparison between states, two research teams divided their state level variables into quartiles to be able to compare states by their demographics (McLaughlin & Owings, 1992; Oswald & Coutinho, 1995).

2.2.3.1 Additional Analyses

Eight of the fourteen studies attempted to address research questions beyond direct correlations in prevalence and state level variables at one point in time. Of these eight, five examined the change in prevalence over time, either by creating separate models for different years, or comparing prevalence at multiple points in time (McLaughlin & Owings, 1992; MacFarlane & Kanaya, 2009; Noel & Fuller, 1985; Phillips & Odegard, 2017; Lester & Kelman, 1997). Two studies explored correlations in the prevalence of students with disabilities and least restrictive environment (LRE) placements (Coutinho & Oswald, 1998; Lester & Kelman, 1997). An additional two studies conducted in-depth analyses of their final models by attempting to understand differences between states while controlling for regional or demographic differences (Oswald, 1995; Oswald & Coutinho, 1995).

2.2.4 Quality Indicators

Thompson and colleagues (2005) identified four components to analyze correlational research in special education to determine quality; measurement, quantifying effects, avoiding

common analysis errors, and use of confidence intervals. To determine the overall quality of the articles in this review, all studies were reviewed in the areas of measurement reliability, quantifying effects (interpreting results and connecting to prior literature), and common analysis errors. Few researchers reported any procedures assessing measurement reliability. This may be because all researchers primarily used publicly available often government issued data (e.g. US Census or OSEP) and may not have felt the need to address reliability of the data. Three of the six studies that coded for components of states' eligibility criteria in analysis specified interrater reliability measures in coding states' criteria (Barton et al., 2016; MacFarlane & Kanaya, 2009; Skiba et al., 1994). All 14 studies included *p*-values and often R^2 values in how they quantified their results. Most studies provided a reasonable explanation of their results and connections with relevant literature. A few studies (Patrick & Reschley, 1982; Wiley & Siperstein, 2011) provided in depth explanation of their results and significant connections to existing literature, however, three studies did not provide enough interpretation or connection to prior literature to meet this quality indicator (McLaughlin & Owings, 1992; Oswald, 1995; Skiba et al., 1994). In the third category of common analysis errors, the most common error was regression model development practices which are no longer recommended such as stepwise and/or backwards regression analysis (Barton et al., 2016; Coutinho & Oswald, 1995; Oswald, 1995; Oswald & Coutinho, 1995; Wiley & Siperstein, 2011). An additional three studies did not detail their model development process or the description of the process was unclear (Lester & Kelman, 1997; McLaughlin & Owings, 1992; Mandell & Palmer, 2005). Across the studies, two studies may be considered of low or questionable quality, for not meeting the majority of the quality indicators described above (McLaughlin & Owings, 1992; Oswald, 1995).

2.3 Discussion

The purpose of the current literature review was to summarize research across special education and apply the findings to understanding the prevalence of students with visual impairments. The following question was the primary focus of the literature search: what quantitative methodological approaches have been used to assess the impact of states' special education eligibility criteria and other state-specific variables on the prevalence of a disability? Overwhelmingly, researchers used regression models, as well as bivariate correlations and comparison of means tests to explore factors correlated with the prevalence of students with disabilities. The results of research question 2 indicate researchers who incorporated states' eligibility criteria into analysis did so by deconstructing eligibility criteria into meaningful components. In addition to considering eligibility criteria, demographic and economic factors such as geographic region, PPE, and childhood poverty rates should be included in future analyses regarding the prevalence of students with VI (research question 3).

2.3.1 Identifying State-Level Factors Correlating with Prevalence

Several demographic and economic variables should be included in future prevalence research for students with VI. Based on the results of the literature review, geographic variables such as states' geographic region within the US and/or the level of urbanicity within states should be taken into account. It was noteworthy that all healthcare related variables (students with autism, Mandell & Palmer, 2005; students with SLD, Velazquez-Ramos et al., 2018) were statistically significant. Given that blindness/visual impairments are biological or medically based disabilities, it may be beneficial to include a variable capturing healthcare in future research. Additionally,

Noel & Fuller (1985) identified a few teacher preparation variables which correlated to prevalence. Teachers of students with VI (TVIs) require a very specific, specialized education degree, and several states do not have TVI teacher preparation programs. It is possible states without TVI preparation programs may have fewer TVIs and therefore lower prevalence of students with VI. Six studies in the current review reported statistically significant correlations between prevalence and race/ethnicity. However, race/ethnicity is not a recommended variable in future research at this time, due to the limited degrees of freedom available in the regression models and research teams noted a high correlation between race/ethnicity and other state level variables, such as urbanicity, poverty or wealth, and/or geographic region (Noel & Fuller, 1985; Oswald, 1995; Wiley & Siperstein, 2011).

Three economic variables should be included in all future research; PPE, per capita income, and poverty rates. Half of the studies in the current review reported PPE to be statistically significantly correlated with prevalence (Barton et al., 2016; Coutinho & Oswald, 1998; McLaughlin & Owings, 1992; Mandell & Palmer, 2005; Noel & Fuller, 1985; Oswald & Coutinho, 1995; Patrick & Reschley, 1982) while only two did not (Oswald, 1995; Wiley & Siperstein, 2011). Including per capita income, while significant in only three out of six studies (Coutinho & Oswald, 1998; McLaughlin & Owings, 1992; Patrick & Reschley, 1982), may be an important variable as it may characterize states' relative wealth and residents' access to public and private resources. While poverty should be included as a variable in future research, the metric representing poverty should focus on children living in poverty (e.g., percentage of children living in poverty or number of children receiving free or reduced-price lunch). This is due to the fact that the focus will be on students with VI, not the entire state population, and that the three studies that used a poverty

metric representing children and adults found no statistical significance (Coutinho & Oswald, 1998; Lester & Kelman, 1997; Velazquez-Ramos et al., 2018).

2.3.2 Validity of Prevalence Data

Across all studies, federal Child Count data were used as the prevalence of students with disabilities. Since the prevalence of students identified with disabilities was the outcome variable for analyses, the accuracy of the Child Count data were key to the validity of each study. Five of 14 research teams, however, noted concerns with the accuracy of the data, while the remaining nine did not address the integrity of the data. One concern noted was the gap between educational and clinical diagnoses for autism; students may be identified by doctors or their school as having autism, but not necessarily identified in a timely manner by both fields (MacFarlane & Kanaya, 2009). Taking this argument one step further, Mandell & Palmer (2005) noted a limitation of Child Count data were that true prevalence of children with disabilities cannot realistically be known. Another potential confounding factor is that Child Count statistics only considers the students' primary disability. Students with autism and low incidence disabilities often have more than one diagnosis. For students with autism, they may have a primary diagnosis of multiple disabilities or developmental delay rather than autism (Barton et al., 2016; McLaughlin & Owings, 1992). The validity of Child Count data were questionable as a total prevalence measure of students with specific disabilities because participation in annual reporting is voluntary even though federally mandated (Moore, 2009). Furthermore, if a state, school, or district serves a small number of students in any category, the data are suppressed to protect student confidentiality (OSEP, 2016; e.g. Virginia Department of Education, n.d.). Inconsistencies in data reporting were noted by Phillips & Odegard (2017) who reported in their case study analysis that one state (Texas) had a

lack of compliance in year to year reporting data on students with dyslexia. Connecting to the field of educating students with visual impairments, concerns of primary disability and inaccuracy of Child Count data as a measure of prevalence are well documented (Erin, 2007; Kapperman & Love, 1999; McMahon, 1997; Muller, 2006). Researchers in the current literature review likely used Child Count data as they are the only annual, national statistics on students by type of disability available. There remains, however, significant concerns about the validity of each study since their outcome variable does not necessarily accurately represent the proportion of students served with the disability in question.

2.3.3 Limitations

There are limitations which may impact the implications of the current review. First, the topic of prevalence of childhood disabilities is broad and complex. It is possible relevant studies were missed during the search phase due to the number of different terms used in published studies. Second, the articles reviewed only represented five of the 14 disability areas defined by IDEA (2004). The primary purpose of this review was developing a plan for analyzing the eligibility criteria and prevalence of students with VI. Consequently, caution should be taken when making connections to VI as eligibility criteria varies significantly across disabilities. Lastly, quality indicators were not incorporated into the inclusion criteria because this was a methodological review. Therefore, low-quality studies which the VI field would not benefit from replicating may have been included in the analysis.

2.3.4 Next Steps

State eligibility criteria influence the identification of students with disabilities for special education services. Therefore, practitioners and researchers must have a clear understanding of the relationship between federal and state guidelines and the direct ramifications for students. Based on the current review, future analyses should include accurate prevalence data to best understand the relationship between eligibility criteria and prevalence, given the limitations of Child Count statistics (Erin, 2007; Kapperman & Love, 1999; McMahon, 1997; Muller, 2006). State eligibility criteria are the guidelines which determine students' eligibility for special education services. However, these criteria are not applied in a bubble and the potential influence of systemic factors (e.g. PPE, poverty rates, and geographic location) should be taken into account.

2.4 Research Questions

Given the gaps in the literature surrounding state eligibility criteria and the prevalence of students with visual impairments, the following research questions are being asked:

(1) What are the differences between the number of students with a primary disability of visual impairment as reported in federal Child Count data and the total number of students being served in each state in the area of visual impairments including blindness during the 2017-18 school year?

(2) Since the differences between Child Count and the total number of students with visual impairments impact professionals' ability to plan for and support students…

(2A) What components should a model data collection plan include to facilitate states collecting data on their population of students with VI?

(2B) What are practitioners' perceptions on why different variables at the state level appear to influence the prevalence of students with a primary disability of VI compared to the total population of students with VI?

(3) Since states vary in their eligibility criteria and influential demographic variables…

(3A) Are there statistically significant relationships between the number of students identified with visual impairments as their primary disability and state-specific variables during the 2017-18 school year?

(3B) Are there statistically significant relationships between the total number of students identified with visual impairments and state-specific variables during the 2017-18 school year?

(3C) Are there statistically significant relationships between the ratio of the two population counts and state-specific variables during the 2017-2018 school year?

3.0 Method

3.1 Introduction to Study Design

The following study followed primarily an explanatory sequential mixed methods research design (Creswell & Creswell, 2018). In explanatory sequential mixed methods research, quantitative data are collected and analyzed, then focused qualitative data collection and analysis are conducted to shed light on the quantitative results. This was an appropriate approach to address the research questions because it draws on the strengths of both research designs while minimizing the limitations of each (e.g. quantifying the average statewide prevalence of students with VI in the US while also bringing to light individual experiences of state-level administrators working with students with VI). Figure 1 is a visual conceptual framework for the study. An iterative process was followed with the interpretation of quantitative and qualitative results informing each other during data collection, synthesis, and interpretation of results.

The focus of this study was twofold: understanding the prevalence of students with VI identified for special education services and understanding the state level factors correlated to the prevalence of students with VI identified for special education services in the US. A prior study by the author found that while all states are federally mandated to report the number of students with a primary disability of visual impairments, only 29 states knew the total number of school age students with VI receiving special education services in their state (Schles, in press). More precisely, administrators and practitioners in several states did not know how many students with VI were receiving services in their state due to a lack of systems in place to understand the

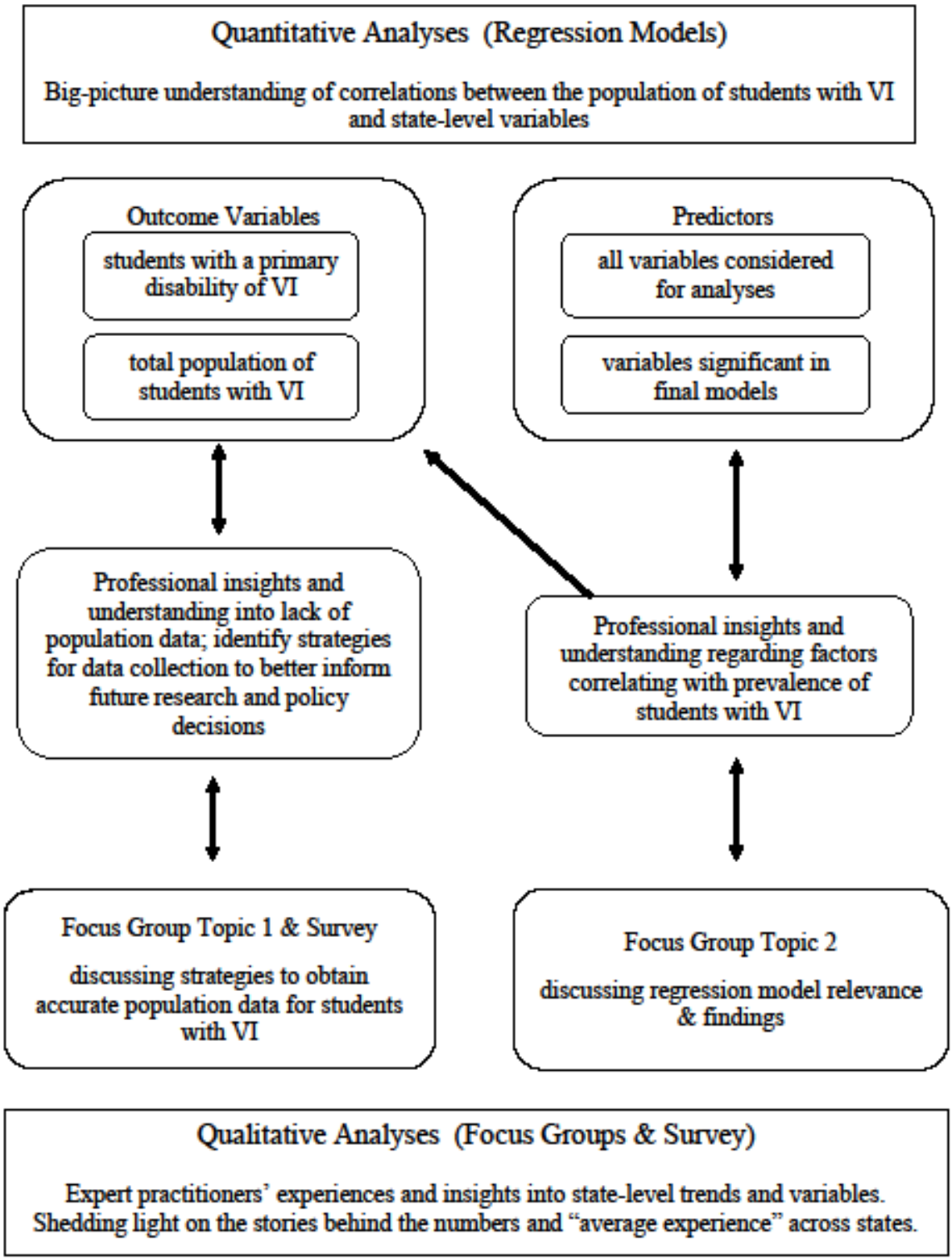


Figure 1 Research Design Conceptual Framework

statewide population of students. Limited conclusions may be drawn from research on the prevalence of students with VI until a significant majority of the US states have data available for analyses. As a result, the qualitative focus group survey and discussion topic 1 were designed to identify recommendations from experts in the field on how data can be collected on states' total population of students with VI. Focus group discussion topic 1 targeted state-level administrators' experiences with statewide data collection systems as well as identifying potential recommended practices in implementing statewide population count data collection. Meanwhile, focus group discussion topic 2 targeted understanding the results of prior regression model predictor variables. Focus group discussion topic 2 asked experts in the field to share their interpretations of why different variables correlated with the prevalence of students with VI (by primary disability and total population data) during the 2016-17 school year. The qualitative data were essential to understanding the "story behind the numbers," supporting comprehensive analyses of regression results from a variety of perspectives. Additionally, focus group discussion topic 2 included an opportunity for participants to recommend state-level variables they thought might have been key factors potentially influencing prevalence of students with VI at the state level and should have been included in future research.

3.1.1 Integration of Mixed Methods Data

A sequential mixed method designed was selected for the current study to ensure an iterative process and integrated consideration of quantitative and qualitative data. The initial quantitative data from the pilot study on the 2016-17 school year provided the foundation for the qualitative focus group component of the current study. However, running the 2017-18 school year national state survey in the current study allowed for the identification of errors in 2016-17 school

year data reporting and analyses. As a result, the statistical models for the 2016-17 school year changed after the focus group meetings were completed, and the revised data rendered three variables no longer statistically significantly correlated to the prevalence of students with VI identified for special education services. The three variables no longer significant were: legal location of eligibility criteria, percentage of children 5-17 years old living at or below the poverty line, and cortical visual impairment/ specifying certain visual conditions. Because these variables were now moot, only the variables discussed in the focus group meetings that remained statistically significant after errors were corrected were coded and discussed in the current analysis. Just as the quantitative data informed the analysis and interpretation of the qualitative data, the results from the focus group discussions allowed for a more nuanced interpretation of the 2017-18 school year quantitative results.

Overall, the study had three primary components. Component 1 the national-state survey to collect total population data on students with VI for 2017-18 school year and compare to Child Count data (to inform RQ1). Component 2 encompassed focus group meetings and a written survey with invited state-level administrators for students with VI (to inform RQ2). Component 3 was comprised of regression model analyses to understand variations in prevalence for students with VI (to inform RQ3).

3.2 State Survey Method

3.2.1 Survey Sample and Data Collection Procedures

The population of this survey consisted of the 50 states and Washington, D.C. (referred to as 51 states in this report). The targeted information in each state was the number of children and youths (birth through 22-years-old) eligible for special education services as students with visual impairments including blindness at a single point in time during the 2017-18 school year. Survey data collection ran from October 8, 2019, through February 26, 2020. Survey responses were primarily solicited via email using the professional contacts and networks the author established through the pilot study and formal data requests to state departments of education where required. For states without known contacts, the author sought the highest-ranking vision professionals in states' departments of education. Additionally, the author reached out to colleagues who might have known the best person to complete the survey in each state (see Appendix B for sample email). Contacts were also identified through the American Printing House for the Blind's (APH) of Ex Officio Trustees directory and the National Center on Accessible Educational Materials' State Contacts directory (APH, n.d.; NCAEM, n.d.). These individuals were likely to know who could answer the questions for their state. If potential respondents were not permitted to reply to the survey, or no respondent in a state was identified, a formal data request to states' departments of education was made.

3.2.2 Survey Instrument

The national-state survey was first tested in a pilot study conducted by the author in 2018 (Schles, in press). Respondents to the current survey were asked to confirm the federally reported Child Count numbers for children with visual impairments including blindness for their state. Respondents were asked to provide data across the following groups: 3-22 years old, 3-5 years old, and 6-22 years old in their state during the 2017-18 school year. See survey question 1 Appendix C; all Child Count data were drawn from the US Department of Education's website (US Department of Education, 2020). If the values the respondents shared did not match the federal report, respondents were asked to provide the correct number of students based on their state data. Survey questions 2A/B used explicit language to collect data on the total number of students with VI (birth-22 years old) to clearly differentiate from Child Count statistics. Based on feedback from survey data collection in 2018, respondents had the option to indicate if the information they provided was an exact or estimated count, as well as to provide a partial count of their population if they do not have any total population data. A checkbox was included so respondents could indicate if their state did not have any information regarding the total number of students with visual impairments including blindness. Survey question 3A asked respondents to share how their total population data were collected and verified. Survey question 3B provided respondents with the option of sharing their data collection form or template if they used one for their states' annual population count. An optional fourth question provided respondents with an open-ended space to share additional information.

3.2.2.1 Survey Reliability and Validity

The national state survey was piloted in 2018 and designed to gather information about the 2016-17 school year. Prior to the survey's national release, two experts in the field were asked to review the survey and provide feedback. Combined, the experts had over 80 years of experience in the field, including experience as state-level administrators within two different states' departments of education. The reviewers found the survey to be valid and accurate, though each had specific suggestions to improve the reliability of survey responses. As a result of their feedback, language to clarify that Child Count data collection was the same as the more commonly referred to "December 1 Count" was emphasized throughout the survey. Additionally, while the survey repeatedly referred to the 2016-17 school year, language was added to clarify the 2016-17 school year refers to the December 1 Count that occurred between October and December in 2016. The option of specifying whether the total population counts were exact or estimated numbers was incorporated, as well as the fact that total population counts do not have to be formal state statistics but rather could be informal program data. The more colloquial term "vision services" was removed from the survey and the federal term, "students with visual impairments including blindness" was written consistently in the survey. One piece of feedback, that early intervention services should be referred to as birth to 3 years old, not birth to 2 years old, was not incorporated into the survey during pilot testing. This suggestion, however, was incorporated into the current survey because during the pilot testing it became clear that in practice, professionals and administrators vary in referring to these services as birth to 2 or birth to 3 years old. The age range used to describe children with VI receiving early intervention services varied across respondents. All respondents were referring to the same population across states as IDEA Part C services span from birth until a child is 2 years, 11 months, 29 days old. As a result, in the current survey,

respondents had the option to specify if their early intervention data covered children who were birth to 2 or birth to 3 years old.

As a result of the pilot test in 2018, a few changes were made to the survey to improve the reliability of responses. Several states had neither an exact nor estimated total population count of students with VI in their state, but respondents did have partial data beyond Child Count data that they wanted to share. A new, third option for total population counts allowed respondents to document partial population counts and report what portion of their student population their data represented. Next, some respondents confused Child Count data and total population data in the survey during the pilot (n = 8). While the majority (n = 5) clarified their mistake when requested, a few respondents remained insistent that Child Count data were a total population count of students with visual impairments (Schles, in press). Given the known systemic issue in special education and the misconceptions on what data Child Count represent, it was anticipated the same misconception and data entry error would occur during the current survey. This was addressed as the PI immediately reviewed survey responses as they were returned and asked for clarification on any surveys which appeared to have Child Count and/or total population data entered in the incorrect field. Lastly, the pilot study included an open ended question inquiring how the differences between Child Count and total population data impacted their ability to support students with VI in their state. A portion of survey respondents (n = 8) in the pilot study did not understand (as indicated by saying they did not understand or providing an illogical response to the question). This question was removed from the current survey to improve overall survey reliability and shorten respondents' time commitment to the survey. Additionally, it was anticipated that the qualitative component of the proposed study (focus group topic 1) covered this information in much more detail.

Data validity was addressed in a few ways. Federally verified Child Count data was provided to each state's respondent in the survey. However, some states differed from the federal report, so respondents had the option to provide their own Child Count statistics. Notations were made regarding respondents' reporting differences in state versus federally reported Child Count data. Second, survey questions 3A and 3B inquired how states collected their total population counts. This provided some insights into the accuracy of the data.

3.2.3 Survey Data Analysis

To address research question 1 the survey results were analyzed using the following procedures. Descriptive statistics were calculated for the results of survey questions 1 and 2A/B. The comparison between Child Count and total population data were calculated by dividing the total population of students with VI by the Child Count statistic in each state. Responses to survey questions 3 and 4 were summarized to further understand patterns in how states collected population data. Any additional information respondents shared was reviewed and incorporated into analysis when appropriate.

3.3 Quantitative Component Method

3.3.1 Sample

The population for analysis was the 51 states, aligned with the survey portion of the study. The targeted information for each state was the special education eligibility criteria and state level

demographic information on the per pupil expenditure, percentage of children living in poverty, per capita income, geographic region, and vision specific variables such as if the state maintains a school for the blind, or houses a teacher preparation program for teachers of students with visual impairments. Each state's visual impairment, including blindness, special education eligibility criteria was previously located online and downloaded between June 18-28, 2018 (except Connecticut which was unavailable). The eligibility criteria collected and coded by the author in 2018 was used in the current study as it is applicable to the 2017-18 school year. Efforts were made to collect and code Connecticut's eligibility criteria, but it was not located by the time of data analysis began. See Appendix D for examples of states' eligibility criteria.

3.3.2 Outcome Variables

Three separate regression models, with the same predictor variables and different dependent variables, were the analytical focus of the current study. To address research question 3A, the outcome measure of the percentage of children in the state with VI as their primary disability (using federal Child Count statistics) was calculated as follows: the total special education population (3-21 years old) divided by the number of children with VI as a primary disability and multiplied by 100. This resulted in the percentage of children in each state who received special education services with VI as a primary disability. To address research question 3B, the outcome measure of the percentage of total number of children with VI in the state was calculated using the same formula described above, with the modification of using the total number of children eligible due to VI. To address research question 3C, the outcome measure was the ratio between states' Child Count statistic and total population of students with VI (range: 0-1).

3.3.2.1 Data Substitutions in Outcome Variables

In the 2017 school year OSEP did not release any Child Count data for four states: Maine, Minnesota, Vermont, and Wisconsin. In place of OSEP's missing data on the total number of students in each state receiving special education services, data from the National Center on Education Statistics (NCES) on the number of students in each state with individualized education plans were used in place of Child Count data. To determine if the substitution was appropriate, comparisons were made between the total number of students receiving special education services in each state based on OSEP and NCES data reports for the 2017-18 school year. Across the 51 states in analyses, OSEP and NCES data were identical for seven states, and had a difference of less than 10 students in fourteen states. Of the thirty-seven states with differences in OSEP and NCES reporting, the average difference was 0.0016%, (min 0.000004%, max 0.008%). Seven states did not have data available for comparison as OSEP suppressed data for four states, and NCES suppressed data for three states. Of the 44 states with data, the similarities between NCES and OSEP data were determined to be strong enough that NCES data could be used in place of missing OSEP Child Count data. Three of the four states with suppressed Child Count data self-reported the number of students with a primary disability of visual impairment in their state during the 2017-2018 school year. To determine if state respondents' self-reported Child Count statistics for the number of students with visual impairments were an appropriate substitution for the missing OSEP Child Count data, comparisons were made between OSEP reporting for the 2014, 2015, and 2016 school years, to the state reported data for the 2017 school year. If the difference between historical data reported by OSEP and state respondents was less than 5%, self-reported child count data from state surveys was used in place of the missing data from OSEP. In Maine, the number of students 6-22 years old were not released by OSEP. OSEP reported 45, 39, and 42 students

(average, 42 students) with visual impairments in Child Count across 2014-2016 school years. The respondent from Maine self-reported 40 students with visual impairments for the 2017 school year. This was determined to be a reasonable substitution for the missing data from OSEP since the difference between 40 students and the average of 42 students was a 4% difference in student population. Similarly, Minnesota's Child Count data for children 3-5 years old were not released by OSEP. OSEP reported 51, 50, and 59 students (average, 53 students) with visual impairments in Child Count across 2014-2016 school years. The respondent from Minnesota self-reported 55 students with visual impairments for the 2017 school year. This was determined to be a reasonable substitution for the missing data from OSEP since the difference between 53 and 55 students was a 0.4% difference in student population. In Wisconsin, OSEP had not released Child Count data for the 2016 and 2017 school years for all children 3-5 years old and 6-22 years old. OSEP Child Count statistics for the 2014 and 2015 school years reported an average of 505 students with visual impairments in Child Count (498 and 511 students respectively). The respondent from Wisconsin self-reported a total of 466 students with visual impairments for 2017 Child Count data. While it was reasonable to expect differences between multiple years of data collection, the difference between 466 and 505 students (8.4% difference), was larger than 5% and determined to be too large of a difference to be a cautious substitution for the missing OSEP Child Count data, so the substitution was not made.

3.3.3 State Eligibility Criteria Coding

Eligibility criteria to identify students with visual impairments, including blindness, vary significantly across states. While several states' criteria was just one sentence long (e.g. California and Pennsylvania), other states had criteria ranging from a few paragraphs (e.g. Michigan and

Virginia), or several pages in length (e.g. Florida and Oklahoma). Twenty-one separate variables representing possible components of the eligibility criteria were created and defined, while an additional nine variables represent state-specific demographics (see Table 1). When a state had eligibility criteria in both state regulations and department of education policy or guidance documents, the criteria from the state regulations were coded. These procedures were established because state regulations take legal precedence over policy and guidance recommendations. The variables for analysis are described through six broad categories; legal components, qualifying conditions, assessment components, eligibility team member requirements, state demographics, and state vision-specific demographic variables, described below. See Appendix E (Tables E1 and E2) for a complete codebook of the variables.

Table 1 Regression Variables Grouped by Conceptual Category

Legal Components	Qualifying Conditions	Assessment Components	Eligibility Team	State Demographics	State Vision Demographics
Alignment with federal definition	Eligibility based on the better eye	Eye report	Teacher of students with visual impairment	Per capita income	University Preparation program for teachers of students with visual impairments
Legal placement of criteria	Low vision (mentioned)	Acuity threshold	Orientation and mobility specialist	Per pupil expenditure	University Preparation program for orientation and mobility specialists
	Low vision acuity (defined)	Functional vision assessment	Vision professional	Percentage of children 5-17 years old living at or below the poverty line	School for the blind (Y/N)
	Legal blindness (mentioned)	Learning media assessment		Geographic region	School for the blind vs school for the blind and deaf
	Visual field restriction	Expanded core curriculum assessment			Number of optometrists per capita
	Degree of visual field restriction	Orientation and mobility assessment			
	Progressive condition	Adverse educational impact			
	Cortical visual impairment				
	Binocular vision issue				

3.3.3.1 Legal Components

Two variables capture the legal aspects of state eligibility criteria: the degree to which the state eligibility criteria aligned with the federal definition and whether the eligibility criteria were defined in state regulation or originated from the states' departments of education. Given the variety across eligibility criteria, six unique categories were developed to code each states' eligibility criteria in relation to the federal definition.

3.3.3.2 Qualifying Conditions

Nine unique variables represented the different qualifying visual conditions or acuities listed in eligibility criteria. Seven variables were coded as dichotomous (yes / no) based on whether or not the states' criteria mentioned the condition. These variables were; eligibility based in the better eye; a quantified level of low vision or legal blindness; specified visual field loss or restrictions; cortical or other neurologically based visual impairment; a progressive visual condition in which the student did not meet the criteria at this time but will in the future; and any type of binocular vision issue. The two remaining variables in this group were coded as categorical. The first variable related to visual acuity thresholds a state may have (e.g., acuity must be worse than 20/40 or 20/70), or if low vision was specified but no threshold visual acuity was provided. The second variable related to visual field restriction thresholds (e.g. visual field limited to 70° or 20°). When two values were provided for visual field loss (e.g. degrees of visual field restrictions qualified a student as visually impaired or legally blind), the broader, more inclusive of the two values was coded. For example, South Dakota provided the general statement that partial sight included "restricted visual field," while blindness was defined as "limited field of vision in which the widest diameter subtends an angular distance of no greater than twenty degrees" (South Dakota

Department of Education, 2016). Therefore, for South Dakota, the broader, more general statement with no specified value of visual field restriction was coded.

3.3.3.3 Assessment Components

There were assessments unique to students with visual impairments which some states required to determine eligibility. While preferred practice is to complete these assessments simultaneously and document the results in a single report, the field has historically conducted the assessments separately and for different purposes. For example, a functional vision assessment (FVA) is mostly used for eligibility; while the learning media assessment (LMA), expanded core curriculum (ECC) assessment, and orientation and mobility (O&M) assessment are most commonly used to determine levels of special education services. Seven different variables representing assessment components were created. The first two variables related to required medical assessment or documentation. This was included if the state required an eye report from a medical professional and if the state required students to meet a minimum threshold acuity but did not require an eye report. Four variables documented if a state required any of the assessments specific to students with visual impairments by name; FVA, LMA, ECC assessment, and O&M assessment. If a screening, rather than a full assessment, was specified in regulations or guidance documents, it was coded as a required assessment because this indicated the state maintained some standard for testing in relation to VI eligibility (e.g. Louisiana Board of Elementary and Secondary Education, 2017; Tennessee Department of Education, 2017). In relation to the federal definition, which requires the visual condition to "adversely [affect] a child's educational performance" for students to qualify as VI, one variable was created to document if a negative educational impact needed to be documented. States' eligibility criteria were coded into the following categories for

the seven assessment components: *no, conditionally* (that is, only in certain circumstances or for certain students), and *yes*.

3.3.3.4 Eligibility Team Members

IDEA (2004) required special education eligibility teams to include students' parent/guardian, general education teacher, special education teacher, psychologist, and school administrator. Some states have taken extra steps to ensure one or more vision professionals are also present when making VI eligibility decisions for students. Categorical variables (*no, conditionally, yes*) were created to document if a state required a teacher of students with visual impairments (TVI; sometimes referred to as a vision specialist) or an orientation and mobility specialist (O&M specialist). An additional categorical variable (*no, conditionally, yes*) was created to capture if states required any professional trained in visual impairments on the team (e.g. TVI, O&M specialist, ophthalmologist, or vision professional not otherwise specified).

3.3.4 State Demographic Variables

Based on prior research in other disability areas several state demographic variables have been identified for inclusion in the current analysis. The following demographic information for each state was included in the analysis given the potential association with prevalence of childhood disabilities: per pupil expenditure (PPE), percentage of children (5-17 years old) living at or below the poverty line, per capita income, and geographic region as defined by the US Census Bureau. Data on PPE, children living at or below the poverty line, and per capita income were collected from the American Community Survey FY 2017 (5-year data).

3.3.5 State Vision Specific Demographic Variables

Five variables capturing vision-specific demographics at the state level were created. Three of the variables were coded as dichotomous (yes/no). This includes; if there is a school for the blind in the state and if personnel preparation programs for TVIs and/or O&M specialists were active in the state as of 2015. As analyses in the current study focused on the 2017-18 school year, it was theorized any regional influence of a program that became inactive in 2014 or earlier would have trickled off by 2017. A second, categorical variable representing specialized state schools was coded as no, school for deaf & blind, blind only, to capture if states that many have combined the state schools for the blind and schools for the deaf. Lastly, a variable representing the number of optometrists per capita in a state was calculated. This variable was developed using the US Department of Labor Occupational Employment Statistics reporting for the number of optometrists in each state on May 2018 divided by the total number of people in each state on July 1, 2017 . This number was then multiplied by 100, to obtain a percentage and adjust the decimal location due to the values being very small.

3.3.6 Reliability

A master's student in the Vision Studies Program acted as a secondary coder for the purposes of reliability during the pilot study data collection and coding of states' eligibility criteria in 2018. Training involved reviewing all eligibility criteria codes and discussing examples and non-examples for each variable. A diverse selection of state eligibility criteria was reviewed by the primary and secondary coders until 100% agreement was reached, then the secondary coder worked independently to code all eligibility criteria. Using the test-and-retest approach, 99.6%

agreement was reached between the two coders. That is, across 1050 individual observations, agreement was met on 1046 values. To ensure all numerical data in the current study were accurately recorded in the current dataset, a new secondary coder was recruited for coding reliability in fall 2019. She was a certified teacher of students with visual impairments, currently enrolled in an orientation and mobility program, with six years' experience in the field. She verified the coding of all Child Count statistics; PPE; number of children living in poverty; average per capita income; geographic division; and data collected during the survey and entered in the final dataset for statistical analyses for the 2017-18 school year. Interobserver agreement was calculated between the PI and secondary coder on the development of the four new vision variables: presence of a school for the blind; type of school for the blind, and presence of a TVI and/or O&M program in the state. Across these four variables an average IOA of 97.5% was achieved; 100% agreement on O&M program variables, 98% agreement on school for the blind variable; and 96.1% agreement on type of school for the blind and TVI program variables.

3.3.7 Quantitative Component Research Design

Stata SE 16 was used to calculate all statistical models. A paired *t*-test was run to determine if reported differences between Child Count data and total population counts are statistically significant (Research Question 1). Variables were checked for normal distribution through visual analysis of scatter plots and histograms, and prior to conducting multiple regression analyses, correlation matrices with variables were analyzed to understand potential relationships between variables. *P*-values of $p < 0.05$ were described as statistically significant, and values of $p < 0.1$ were noted and retained in the model as variables approaching significance (Henkel, 2017; Labovitz, 1968).

Given the potential for creating an underpowered model, each variable was individually regressed with the outcome variables. Only statistically significant variables and variables approaching significance were included in the final models. If the model was still underpowered, the author considered the statistically significant variables in each of the six conceptual groupings (legal components, qualifying conditions, assessment components, eligibility team members, state demographics, and vision-specific variables), and selected the variable(s) which were most representative of their category. This process was used to avoid stepwise regression analysis, and to develop the most theoretically sound models. Figure 2 graphicly represents the regression process with the general regression equation.

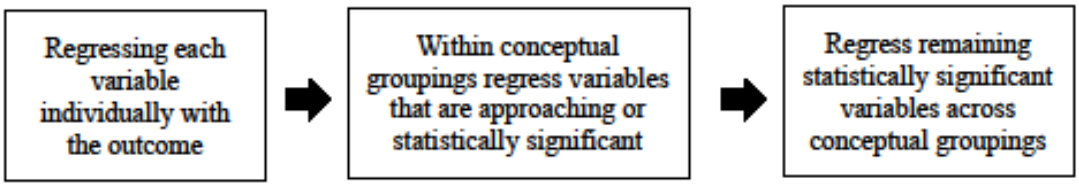


Figure 2 Regression Model Development Process

Note: Each variable within the conceptual codes were considered separately.

Three regression models were developed, addressing research questions 3A, 3B, and 3C for the 2017-18 school year.

Model 1 (research question 3A): $\hat{Y}$ *(Proportion of students with VI as a primary disability)* =

$\beta_0 + \beta_1$ *(legal components)* $+ \beta_2$ *(qualifying conditions)* $+ \beta_3$ *(assessment components)* $+$

β_4 *(team members)* $+ \beta_5$ *(state demographics)*

Model 2 (research question 3B): $\hat{Y}$ *(Total proportion of students with VI)* $= \beta_0 + \beta_1$ *(legal components)* $+ \beta_2$ *(qualifying conditions)* $+ \beta_3$ *(assessment components)* $+ \beta_4$ *(team members)* $+ \beta_5$ *(state demographics)*

Model 3 (research question 3C): $\hat{Y}$ *(Ratio of Proportion of students with VI as a primary disability to the Total proportion of students with VI)* $= \beta_0 + \beta_1$ *(legal components)* $+ \beta_2$ *(qualifying conditions)* $+ \beta_3$ *(assessment components)* $+ \beta_4$ *(team members)* $+ \beta_5$ *(state demographics)*

Although depicted together in the overall equation, each variable within the conceptual codes was considered separately.

3.3.7.1 Statistical Assumptions and Residuals

Scatter plots were visually analyzed for homoscedasticity, though there were limitations to these analyses since most variables were dichotomous or categorical and did not generate a continuous scatter plot. Residuals of the final models were examined. To assess for normality, no more than 5% of the residuals of the data points fell more than two standard deviations from the mean. Additionally, a LOWESS curve was used to check fit of regression models.

3.4 Qualitative Component Method

A series of electronic focus group meetings via live video chat were selected as the most appropriate qualitative research method to provide insights into the quantitative analyses in this mixed method study. Focus groups were selected rather than individual interviews. This way, participants could share and reflect on the differences and similarities between their and colleagues' experiences and procedures across states.

3.4.1 Participant Recruitment

Professionals in the field were individually identified and invited by the PI for participation in the focus group component of the study. Individuals were primarily identified based on their responses to the pilot study's national-state survey and email correspondence demonstrating a level of understanding and interest in the nuances of statewide data collection for the total population of student with VI. It was the PI's initial goal to have equal representation of participants from states with and without statewide total population systems; to capture the most accurate picture of what is happening across the US since based on 2016 school year data only about half of states knew the total population of students with VI in their state (Schles, in press). However, during initial recruitment attempts almost all administrators in states without statewide data collection systems declined to participate. As a result, recruitment shifted to administrators from a demographically diverse sampling of states that maintained statewide data collections for students with VI. Recruitment occurred via email in October 2019, with all participants finalized by October 31, 2019. Appendix F is a sample recruitment email introducing potential participants to the research and study activities.

Per conversation with the University of Pittsburgh's Human Research Protection Office, the study was except from IRB approval. Since this study does not constitute human subject research for the purposes of IRB, participants were asked if they could be identified by state (not personal name) in the dissemination of the results or if they would prefer to be referred to anonymously (e.g. a state in the Northeast versus Maine). A blank consent form is available in Appendix G.

3.4.1.1 Focus Group Participants

In total, nine participants were recruited for the focus group. Eight participants were currently employed in the field, and one was recently retired. Participants represented the following agencies: two participants from statewide services for the blind/visually impaired (not housed within a state department of education); four participants from schools for the blind; three participants from state departments of education. Across these agencies, two participants worked specifically for state instructional materials/resource centers (IRCs), housed within larger agencies. Because states vary widely in systems, resources, and human infrastructure supports for students with VI, it is also worth describing the general job titles held by participants. Five participants were statewide coordinators of students with VI (school aged and/or early intervention) or state-level coordinators of students with low incidence disabilities; two participants were directors/coordinators for IRCs; and two participants were superintendents or directors of state schools for the blind. State agency names and participants' job titles were broadly summarized to generic descriptions both to protect participants' identity and because specific titles and roles vary significantly between states. Geographically, participants represented the following regions in the US: 3 participants from the west (Pacific and Mountain/Southwest regions), 2 participants from the Midwest, 1 participant from west south central region, and 3 participants from the mid-/south-Atlantic states on the east coast.

3.4.2 Research Design and Focus Group Meeting Logistics

The research design of the focus group component of the study involved a written survey to inform focus group discussion, 3 focus group meetings, and member checking. A visual representation of the overall qualitative study components and timeline are presented in Figure 3.

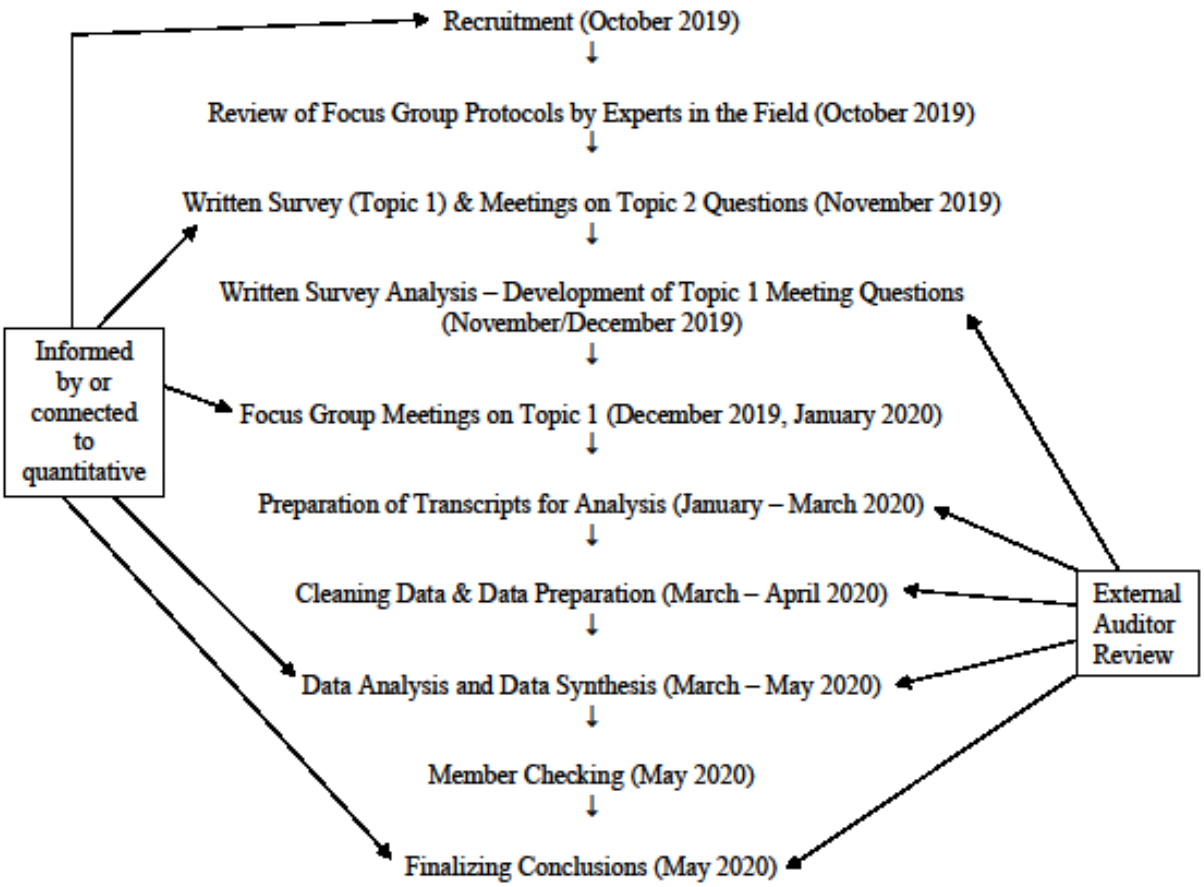


Figure 3 Timeline of Focus Group Activities

3.4.2.1 Statewide Data Collection Procedures Discussions (Focus Group Discussion Topic 1)

Prior to focus group meetings, participants completed a written survey to provide background information on their experiences in data collection for students with VI. The purpose of the survey was to allow for foundational knowledge and experiences to be collected by the PI, which would then be used to inform prompting focus group questions. The written survey and focus group discussion questions developed based on the written survey are available in Appendices H and I. A total of 6 meetings were held to discuss Topic 1. Questions 1 and 2 in Appendix I were discussed in Meeting 2 (meetings averaged 59 minutes long, range 45-70

minutes), Questions 3 and 4 were discussed in Meeting 3 (meetings averaged 50 minutes long, range 45-60 minutes). Approximately 1 week before each meeting the discussion questions were sent to participants, should they want to review the conversation topics in advance. Due to technical difficulties, the first 20 minutes of Meeting 3 Group 2 was not recorded, therefore part of the discussion in that meeting was focused on repeating and recapping participants' perspectives that were not initially captured on the recording for transcription.

3.4.2.2 Perspectives on Regression Models (Focus Group Discussion Topic 2)

Focus group topic 2 discussions related to participants' experiences and insights into why certain state level variables correlated with the prevalence of students with VI (see Appendix J). Like focus group meetings on topic 1, an iterative process was applied. A handout, reviewed for reliability as described below, was developed to explain regression model results from the pilot study's analyses of the 2016 school year (see Appendix J). The handout was sent roughly one week before the meeting to all participants so that participants could review the materials in advance. Eight of the nine participants met across three meetings. See Table 2 for participant grouping. In each meeting the questions in the handout were discussed until participants did not have any additional thoughts to share. Meetings averaged 70 minutes long, range 50 to 90 minutes.

3.4.2.3 Scheduling and Meeting Logistics

Participants were located across four time zones in the United States; therefore, the focus groups were conducted via Zoom video chat software and recorded. To schedule each focus group meeting, the PI sent a Doodle poll to all focus group participants to share their availability (typically meeting options covered a 5-8 day span, 1-hour time slots from 8am to 8pm EST). To generate the most diverse conversation and prevent participants from falling into group dynamic

behavioral patterns, as well as to work around participants' schedules, efforts were made to change the participant grouping for each of Meetings 1, 2, and 3 (see Table 2). Approximately 1 week before each meeting, the handout with the meeting's focus was emailed to participants. A reminder email with the handout was also sent to participants 24-48 hours prior to each meeting.

At the end of each meeting, participants were given the option to request an individual interview with the PI and/or send follow up emails after focus group meetings if any additional thoughts or concerns came up after the meeting ended. No participants requested an individual interview. The PI asked for verbal confirmation throughout the focus group discussions if participants had any additional thoughts on a topic before asking the next question. Given all of these considerations, it was believed full saturation was reached on all conversation points as participants did not have any additional information to contribute.

Table 2 Participant Groupings Across Focus Group Meetings

	Meeting 1 (Topic 2)	Meeting 2 (Topic 1)	Meeting 3 (Topic 1)
Group 1	Participants: C D H	Participants: C D G	Participants: A D E
Group 2	Participants: A B G	Participants: E (H, I)	Participants: F G
Group 3	Participants: E F (I)	Participants: A B F	Participants: B C H

Note: Participants in parenthesis indicates the participant indicated they would attend but did not show to up the meeting.

3.4.2.4 Coding Strategy

To address research questions 2A and 2B, focus group transcripts were coded for member meaning, specifically participant views' as state-level administrators. Following the mixed-methods explanatory sequential design of this study, the primary purpose of the focus group conversations was to shed light on the quantitative data collected and analyzed for the 2016 and

2017 school years. As a result, a balance of a priori goals and inductive exploration was applied to coding (Saldaña, 2015). Data cleaning and preparation were guided and informed by the existing quantitative data (e.g., regression model variables, national state survey responses from 2016 and 2017 school years) as well as participant responses to the focus group written survey. Focus group discussions around each research question or theme (e.g., why O&M specialists participating on eligibility teams correlated with higher prevalence rates of students with VI in a state, and thoughts on an ideal approach to data collection), were individually prepared by the PI for analysis. Once data preparation was complete, a primarily inductive approach, described below, was applied so that data analysis would be grounded in participants' perspectives. All qualitative coding was conducted using NVivo 12 Pro software.

The initial coding followed an open coding approach to understand the data through participants' perspectives (Emerson et al., 2011). The open coding was completed by chunking the transcript into individual thoughts or ideas (based on topic and/or syntax). When possible, a word, phrase, or sentence from within each "chunk" were selected as the in vivo code to represent the entire chunk thought. All codes identified in the first round of coding were reviewed for similarities. In round two coding, synthesis of the first round codes were reviewed to identify potential 'super codes' representing organizational categories. Throughout first and second round coding, a research journal was maintained by the PI to track all coding decisions. Analytic memos were also written as needed around each topic (regression model variables and primary topics around statewide total population data collection), particularly during second round coding to help inform the development of super codes, organizational categories, and overall synthesis. The qualitative codebook for topic 1 (total population data collection) is available in Appendix K. The

content and themes for topic 2 (regression model variables) were less complex, and therefore reported directly within the text of the results.

3.4.2.5 Reliability and Credibility

Reliability and credibility (also referred to as validity or trustworthiness) of the focus group procedures and data analysis were addressed in several ways. The focus group survey, Topic 1 Handout, and draft focus group questions were reviewed by two doctoral-level professionals with experience in state-level issues for students with VI prior to their use with participants. Each reviewer approved of the drafted focus group materials and provided suggestions for improvement or clarification. In addition to identifying a few grammatical errors, the following revisions were made in the focus group written survey based on reviewer feedback. Question 5 was expanded to specify "platforms & procedures" regarding states' data collection systems. A new question was created to ask if states' population was publicly available and a new question was created to ask if states included students with VI on 504 plans in the population counts. Finally, clarification was added that all references to students with visual impairments included students with deaf-blindness. All transcription of focus group conversations were processed through Verbit.ai (https://verbit.ai/) and then proofread by the PI before data preparation and coding began.

3.4.2.5.1 External Audit

An external auditor reviewed all qualitative analysis run by the PI. Much like a financial auditor, the external auditor in qualitative research provides an objective, outside perspective on the processes and analysis of a study (Creswell & Creswell, 2018). The external auditor for the current study was a doctoral candidate with experience and training in multiple formats of qualitative research, and not otherwise involved in the current study. An audit trail was developed

for the study by the PI; a directory and folder with all data and decision making (e.g., raw data, data reduction, data synthesis, and process notes) were provided to the external auditor (Lincoln & Guba, 1985). For each component of the study audited, the external auditor was asked to develop a summary and response letter outlining his findings. To keep the workload manageable, the qualitative analysis was chunked into study components, and provided to the external auditor in smaller sections. Focus group survey analysis; perspectives on regression variables (individually); and approaches to statewide population data collection, were handled separately. To ensure continuity between the small parts and across the overall study, the external auditor also reviewed the overarching connections identified by the PI across all study components. Across the three audits, the external auditor found clear connections between participant comments, initial coding, and synthesis of the data for all components of the audit. The auditor's primary suggestions for improvement focused on the presentation of data to help ensure participants' perspectives were succinctly conveyed. The external auditor's summary findings are reported in Appendix L. In Appendix L, audit letter 1 reviews the focus group written survey, letter 2 reviews topic 2 discussion audit on regression variables synthesis, and letter 3 reviews focus group topic 1 on data collection strategies.

3.4.2.5.2 Member Checking

All focus group participants were invited to participate in member checking of the PI's main findings from the focus group discussions. The purpose of member checking is to increase credibility of the research findings and limit possible researcher bias as the researcher may unintentionally interpret qualitative data through their own experiences rather than the experiences of the participants (Miles et al., 2014). Member checks were conducted following Synthesized Member Checking procedures defined by Birt and colleagues (2016). Synthesized Member

Checking (SMC) procedures were selected because the structured approach allowed for participants to review key quotations from original focus group data, interpreted data, and add comments confirming or refuting the synthesis. For each major theme identified in analysis, a summary of the theme and relevant anonymous quotations from focus group conversations were presented to the participant, along with any graphics developed. Appendix M is the member checking handout template provided to participants approximately 4 to 6 days in advance of meeting with the PI. Participants were advised that figures and summary statements in the member checking handout were draft versions subject to minor revisions and open to adjustment based on their feedback.

Five of nine participants engaged in member checking. Due to the upheaval connected with the COVID-19 pandemic, participants were given the option to either have a virtual meeting with the PI or respond to member checking documents via email. Five participants elected virtual meetings with the PI (Participants A, B, C, D, and E). Meetings ranged from 35 to 65 minutes long (averaging 48 minutes). Two participants elected to respond to the member checking via email (Participants F and H) but did not complete the member checking form. While all participants committed to member check during initial recruitment and at the end of the last focus group meeting in January 2020, two participants (Participants G and I) did not respond to email requests from the PI, presumably due to the COVID-19 pandemic.

The participants who engaged in member checking overwhelmingly agreed with the synthesized themes developed by the PI. For each theme and figure developed from the focus group conversations, participants were asked to rate on a scale of 1 (completely disagree) to 5 (completely agree) if the theme or figure made sense to them and if the theme or figure accurately captured their views. For the themes and figure developed around the conversation on O&M

specialists in eligibility meetings and prevalence of students with VI, participants averaged a 4.70 (responding with 4s and 5s). For the themes and figure developed around the conversation on per capita income and prevalence of students with VI, participants averaged a 4.93 (responding with 4s and 5s). For the themes and figure developed around the conversation on documented adverse education impact and prevalence of students with VI, participants averaged a 4.85 (responding with a 3 and 4s, and 5s). Participants completely agreed (all responded with 5s) with the themes and figures identified for both the conversation on variables that should be considered in future research on the prevalence of students with VI and the summary components and considerations in a model data collection system.

4.0 Results

4.1 Survey Response Results

Respondents from 50 of 51 states responded to the survey (for the purpose of this study Washington, DC was counted as a state). New Hampshire was the only state to not return the survey (data request was confirmed received, but never returned, even after follow-up). Sixty individuals contributed survey answers in the 50 returned surveys; 40 surveys were completed individually, and 10 surveys were completed by two individuals. Email correspondence with respondents indicated that many more individuals contributed to the surveys, however only 60 individuals were documented on the survey forms. Of the 60 respondents, two were non-government employees, working for non-profit organizations which held contracts to provide educational vision services in their state. An additional five respondents worked for government organizations that were not part of state departments of education (e.g. Bureau for the Blind, Family and Social Services Administration). Table 3 is a summary of the respondents.

Data requests submitted to Hawaii, New Jersey, and Washington, D.C. Departments of Education for data on their school-aged populations of students with VI were denied. The data request to the Hawaii Department of Education was denied because full IRB review was needed by the state for any data request involving students with disabilities even though only deidentified, aggregated state-level data was being requested. The data request to the Washington D.C. Department of Education was denied because they prioritized data requests and based on their review of the application and resource constraints they were unable to fulfill the request. The data request to the New Jersey Department of Education was denied because the state did not maintain

total population data on students with visual impairments. The initial data request to the Tennessee Department of Education was denied, then reconsidered when the PI detailed how the request did not violate the state guidelines for student confidentiality.

Table 3 Summary of Survey Respondents

Job Title or Department	Number of Respondents
Data request or data specialist	21
State vision consultant, vision bureau lead, or vision coordinator (non-profit organization)	12
Low incidence educational consultant or specialist	7
School for the blind (superintendent, principal or outreach director)	7
Instructional resource center coordinator or director	5
Early intervention specialist	5
Other	3
Total	60

Note: Due to the significant variation of job titles and responsibilities across states, respondents were grouped by the nature of their position.

4.1.1 Survey Question 1

Survey question 1 asked respondents to verify their states' Child Count data for students with a primary disability of VI as reported by OSEP. Thirty-four states verified or reported small differences compared to OSEP's reporting of state Child Count statistics for students with VI (see Table 4). Twenty-five states confirmed the data reported by OSEP. Respondents from three of the four states with OSEP suppressed Child Count data reported their count of students with VI as a primary disability. Nine states reported relatively small differences (ranging from 1 to 48 students),

with two of these respondents noting only differences for the 3-5 year old and 6-22 year old reports, but not the total number for students 3-22 year old. Based on conversations the PI had with state department of education employees, it is highly likely these differences can be accounted for by 5-year old kindergarteners sometimes being included in the 3-5 year old reports and sometimes included in the K-12 group (which by OSEP's report are only students 6-22 year old). Eight respondents mistakenly entered the information for their states' total population of students with VI, rather than only students with a primary disability of VI. Six of the eight errors were clarified, two survey participants did not respond to follow up for clarification. Eleven returned surveys did not include a response to question 1, either because the respondent did not have access to their state's Child Count data, or the question was left blank without comment.

Table 4 States' Child Count Statistics for Students with VI for the 2017 School Year as Reported by the US Department of Education and Verified by the States.

State	US Department of Ed			State Verification		
	3-5 year	6-22 year	3-22 year	3-5 year	6-22 year	3-22 year
Alabama	46	482	528	?	?	?
Alaska	9	40	49	✓	✓	✓
Arizona	99	504	603	✓	✓	✓
Arkansas	17	228	245	?	?	?
California	295	2982	3277	✓	✓	✓
Colorado	49	284	333	✓	✓	✓
Connecticut	21	117	138	✓	✓	✓
Delaware	12	66	78	✓	✓	✓
District of Columbia	1	22	23	NR	NR	NR
Florida	109	1243	1352	?	?	1304
Georgia	55	712	767	?	?	768
Hawaii	10	37	47	NR	NR	NR
Idaho	9	79	88	?	?	?
Illinois	96	945	1041	✓	✓	✓
Indiana	60	908	968	✓	909	969
State	US Department of Ed			State Verification		
	3-5 year	6-22 year	3-22 year	3-5 year	6-22 year	3-22 year

Table 4 continued

Iowa	7	76	83	?	?	?
Kansas	13	205	218	15	235	254
Kentucky	85	497	582	?	?	?
Louisiana	34	499	533	✓	✓	✓
Maine	5	n/a	n/a	7	40	47
Maryland	30	275	305	✓	✓	✓
Massachusetts	75	574	649	✓	✓	✓
Michigan	62	710	772	*	*	*
Minnesota	n/a	428	n/a	55	✓	483
Mississippi	30	321	351	✓	✓	✓
Missouri	51	434	485	41	444	✓
Montana	7	52	59	✓	✓	✓
Nebraska	22	205	227	✓	✓	✓
Nevada	16	126	142	?	?	✓
New Hampshire	19	107	126	?	?	?
New Jersey	16	381	397	?	?	?
New Mexico	30	184	214	?	?	?
New York	83	1226	1309	✓	✓	✓
North Carolina	64	579	643	72	578	650
North Dakota	8	44	52	✓	✓	✓
Ohio	80	861	941	✓	✓	✓
Oklahoma	45	577	622	19	603	✓
Oregon	70	282	352	✓	✓	✓
Pennsylvania	157	1054	1211	✓	✓	✓
Rhode Island	3	57	60	19	82	101
South Carolina	49	390	439	?	?	?
South Dakota	7	44	51	✓	✓	✓
Tennessee	34	546	580	*	*	*
Texas	421	3024	3445	✓	✓	✓
Utah	35	196	231	?	?	?
Vermont	1	n/a	n/a	?	?	?
Virginia	55	591	646	✓	✓	✓
Washington	47	394	441	✓	✓	✓
West Virginia	55	265	320	✓	✓	✓
Wisconsin	n/a	n/a	n/a	36	430	466
Wyoming	5	45	50	✓	✓	✓

Note: n/a indicated the US Department of Education did not report the data because it was flagged due to questionable data quality. A check mark (✓) indicated the state verified the US Department of Education's numbers as accurate. A question mark (?) indicated the respondent did not know or

did not verify the state's Child Count statistics. An asterisk (*) indicated the respondent entered a population count other than their state's Child Count statistic. NR indicates no response was received from the state.

4.1.2 Survey Question 2A

Survey question 2A asked respondents to report the total number of students with VI in their state regardless of primary disability label. Thirty respondents provided an exact, estimate or partial count of the total number of students with visual impairments (see Tables 5 and 6): 13 provided an exact count; 11 reported close estimates; and six provided partial counts of the number of students with VI (see Table 5). Nineteen respondents left the question blank or reported they did not know the total number of students with VI in their state. Reported partial counts and their sources are documented in Table 6. Ten respondents initially reported Child Count data instead of total population data in response to question 2A. Five of the ten respondents did not reply to emails from the PI requesting clarification. In two states, two different respondents within the state reported notably different total population counts of students with VI. Since the PI could not determine which data was the accurate count, neither total population count was reported or used in this study.

Table 5 Exact or Estimated Total Population of Children and Youths with Visual Impairments and Comparison to Child Count

State	Exact / Estimated Total Population				Comparison of Child Count to Total Population
	Early Intervention	3-5 years old	6-22 years old	3-22 years old	
Alabama[1]	98	128	914	1042	1.97
Alaska	?	?	?	?	
Arizona[1]	?	108	1560	1668	2.77
Arkansas[2]	?	?	?	600	2.45
California	?	?	?	?	
Colorado[2]	150	?	?	1118	3.36
Connecticut[1]	52	?	?	903	6.54
Delaware[1]	40	?	?	?	
District of Columbia[1]	18	declined	declined	declined	
Florida[1]	?	208	2815	3023	2.24
Georgia	?	?	?	?	
Hawaii	declined	declined	declined	declined	
Idaho[1]	75	105	340	445	5.06
Illinois	?	?	?	?	
Indiana[1]	69	82	1168	1250	1.29
Iowa[2]	78	82	405	487	5.87
Kansas[2]	?	18	381	399	1.83
Kentucky[1]*	?	?	?	1647	
Louisiana	?	?	?	?	
Maine[2]	17	40	251	291	~
Maryland[2]	?	?	?	1850	6.07
Massachusetts	?	?	?	?	
Michigan[2]	39	?	?	?	
Minnesota	?	?	?	?	
Mississippi[1]	?	51	521	572	1.63
Missouri[1]	10	?	?	?	
Montana	?	11	134	145	2.46
Nebraska[2]	34	86	750	836	3.68
Nevada	?	?	?	?	
New Hampshire	NR	NR	NR	NR	
New Jersey	?	?	?	?	
New Mexico[1]	91	86	494	580	2.71

Table 5 continued

State	Exact / Estimated Total Population				Comparison of Child Count to Total Population
	Early Intervention	3-5 years	6-22 years	3-22 years	
New York	?	?	?	?	
North Carolina[1]	321	?	?	?	
North Dakota	?	?	?	?	
Ohio	?	?	?	?	
Oklahoma	?	?	?	?	
Oregon	?	?	?	?	
Pennsylvania[1]	?	?	1792	?	
Rhode Island[2]	?	47	191	238	3.97
South Carolina	?	?	?	?	
South Dakota[2]	?	?	?	288	5.65
Tennessee	?	?	?	?	
Texas[1]	393	1005	7327	8332	2.42
Utah[1]	240	?	?	?	
Vermont[1]	?	31	241	272	~
Virginia[1]	?	172	1330	1502	2.33
Washington[2]	346	?	?	1757	3.98
West Virginia	?	?	?	?	
Wisconsin	?	?	?	?	
Wyoming[2]	5	28	189	217	4.34
Total States Reporting	18	17	18	24	

Note: A question mark (?) indicates the respondent stated the total population size is unknown or no response was obtained.

[1]: State reported exact total population of students with BVI in the state.

[2]: State reported close estimate of the total population of students with BVI in the state.

declined: the state respondent declined request for data.

*The total number reported for Kentucky indicates an exact population count for children birth-22 years old.

~ : indicates Child Count not available for comparison to total population data.

NR: no response was received from New Hampshire

Table 6 Partial Counts of Students with Visual Impairments and Additional Information

State	Partial Counts of Students with VI			
	Early Intervention	3-5 years	6-22 years	3-22 years
Alaska[1]	12	9	106	115
Calilfornia[2]	201			
Minnesota[2]	20			
New Jersey[3]	163	103	1823	1926
North Dakota[1]		43	154	197
Oklahoma[4]		57	695	752
Texas[5]		14	1679	1693
Utah[3]		57	297	354
Wisconsin[4]		103	1079	1182

[1] APH Census, number of children with legal or functional blindness.

[2] Number of children in early intervention services with a primary disability of VI.

[3] Number of students directly served by the responding agency.

[4] Partial count of all students with VI in the state; state allows local education agencies to voluntarily report students' secondary disabilities.

[5] Number of children with 504 plans for vision-related needs in Texas.

4.1.3 Survey Question 2B

Survey question 2B asked respondents to report how many young children with VI there were in their state. Twenty-three respondents provided an exact, estimated or partial count of the number of young children with VI receiving Part C, early intervention services in their state (see Table 5 and 6). In some states, early intervention services (Part C) run from birth to 2 years old (and 364 days) and in other states early intervention services cover birth-3 years old. In all states school-age services begin at 3 years old. Nineteen states reported an exact or estimated total

number of young children with VI. Four states reported a partial count of young children with VI. Most respondents reported serving children birth to 3-years-old, while California, Idaho, Indiana, Missouri, Minnesota, North Carolina, Texas, Washington, and Wyoming reported serving children birth to 2-years-old.

4.1.4 Survey Question 3A

Survey question 3A asked respondents to report how the total population data they shared in questions 2A and/or 2B were collected. Forty returned surveys included comments for question 3A. Nine respondents described their states' Child Count data collection procedures and five described strategies used within Part C programs. Three respondents reported partial counts based on the annual APH census (which only counts students meeting the legal or functional definition of blindness) and described their states' APH census procedures. The procedures described by the remaining 25 states can be summed up into three categories: interagency collaboration (three states); total population counts managed by state departments of education (nine states); and population counts managed by state-level vision programs (13 states). Within the nine states that had total population data collection systems managed by state departments of education, respondents in two states noted that reporting on secondary disabilities was voluntary, not required in their state, therefore they only had partial counts of the total number of students with VI. Across the 13 states with counts conducted by state vision programs, seven were maintained by the states' vision programs, two were managed through the state instructional materials resource center, and four were managed through the school for the blind.

4.1.5 Survey Question 3B

Survey question 3B asked respondents to share any forms or templates they used to collect statewide total population data on students with VI in their state. The options for response were "Yes (attach form with your survey response)," "No (no template and/or no statewide data collection procedures)," and "No (unable to share template)." Respondents from 15 states shared data collection forms. However, many misunderstood the question, as indicated by their sharing student population data collection forms that did not relate to a state's total population of students with VI. Seven shared Child Count forms or procedures, and an additional three shared APH Census forms and/or Deaf-Blind Child Count forms. Two states shared manuals for their states' student databases. The manuals for both of these states described separate reporting for students' primary and secondary disability labels, but limited students to having only one secondary disability. The three respondents that shared forms or templates for total population data collection were also members of the focus group component of this study. Since these forms were also shared for the focus group survey, the results will only be reported in the focus group results section for succinctness. Of the respondents that checked that they did not have a template to share, 13 indicated they did not use a form for their data collection, or they did not have statewide data collection procedures. Of the respondents from the eight states that indicated they were unable to share their template, five indicated that they use a database that could not be shared. Two used a list of student names; one was described as "dynamic" and only documenting students currently receiving services; not archived from year to year. The last respondent indicated they could not share a template because they did not have any statewide data collection procedures. Respondents from the remaining 12 states did not answer to the question.

4.1.6 Survey Question 4

Survey question 4 was an open-ended question offering respondents a space to share any additional information they wanted to report. Respondents from 12 states included comments in question 4. Twelve additional respondents indicated they did not have any additional comments to share, and 25 left the question blank. Of the 12 who responded, 9 respondents included contact information or a few more details on how population data was collected and reported, in the event additional clarification was needed. Comments from the other three states indicated they hoped to have statewide total population data or described processes in the works to maintain such data at the state level in the future.

4.1.7 Difference between Child Count and Total Population Reports

Twenty-two states had sufficient data to compare the number of students with a primary disability of VI (Child Count data) with the total number of students with VI (regardless of primary disability status) in the 2017-18 school year. On average, states were supporting 3.58 times the number of students reported in Child Count. The differences ranged from 1.29 to 6.54 times. To determine if the differences in population reports were random or statistically significant, a paired *t*-test was run. The difference between the two population counts for the 2017-18 school year was statistically significant ($t = -10.48$, $p < 0.001$).

4.2 Statistical Analysis

4.2.1 Descriptive Statistics

The descriptive statistics reported below encompassed the 48 states with the necessary data for inclusion in regression Model 1 (the largest dataset; using Child Count data as the outcome). Connecticut was omitted, as no eligibility criteria were available, as well as Vermont and Wisconsin, for which VI Child Count data were unavailable. While the author did analyze the descriptive statistics for each predictor variable in each model separately, only the descriptive statistics for the predictors in Model 1 (48 states) were reported for succinctness and ease of reading.

4.2.1.1 Legal Components of Eligibility Criteria

Across the 48 states, significant variations existed in the eligibility between states compared to the federal definition. In fact, 44% of states (n = 21) used completely different language from the federal definition and included specific eligibility criteria not present in IDEA. Conversely, 10 states (21%) used verbatim or similar language to the federal definition and do not specify any eligibility criteria. Regardless of alignment with the language of IDEA's definition of VI for the purpose of special education services, 12 states (25%) have no quantifiable eligibility criteria to qualify students while 36 states (75%) included some specified eligibility criteria. Additionally, across states, there was a slight favoring of having eligibility criteria in state regulations compared to being defined by the state department of education (28 compared to 20 states).

4.2.1.2 Qualifying Conditions

States greatly varied in their specification of qualifying conditions in eligibility criteria. There was a discrepancy between states regarding whether eligibility should be based on vision in the better eye (24 states) or not (24 states). Of the 48 states in analysis, 48% (*n* = 23) maintained a visual acuity threshold that students needed to meet to quality, and 54% (*n* = 26) included reduced visual fields as a qualification. Progressive visual conditions were the most common specific diagnoses outside of acuity or visual field loss in 44% (*n* = 21) states. While sometimes specified, cortical visual impairment (CVI; 21%, *n* = 10) and binocular vision conditions (6%, *n* = 3) were less common.

4.2.1.3 Assessment Components

The most universal assessment requirement, with 94% of states (*n* = 45), was the requirement of a negative or adverse educational impact due to the visual condition, though 6% (three states) did not maintain the requirement. Fifty-two percent (*n* = 25) of states required an eye report in all or certain conditions. An additional 21% (*n* = 10) of states required students to meet a minimum threshold acuity without requiring an eye report; the only reliable, medically-based source of an acuity measure. In practice, FVAs were more commonly referenced than LMAs, particularly around eligibility decisions, and this is reflected in the current review. Forty percent of states (*n* = 19) required FVAs to inform eligibility either in all situations or in certain conditions, while twenty-five percent of states (*n* = 12) required an LMA in all or certain conditions. Only one state required an ECC assessment, and only four states required an O&M assessment, with an additional six states requiring an O&M assessment only in certain situations.

4.2.1.4 Eligibility Team Member Requirements

Across states there were limited formal requirements mandating the presence of a vision professional for eligibility team decisions related to students with VI. O&M specialists were the least likely professional to be required to attend an eligibility meeting (either for all students or conditionally) in just 12% of states (n = 6), almost double that number (21%, n = 10) required O&M assessments which can only be conducted by O&M specialists. TVIs were required to participate in eligibility meetings twice as often as O&M specialists, (either for all students or conditionally) in 27% of states (n = 10 always, and n = 3 in certain situations).

4.2.1.5 State Demographic Variables

Significant variations existed across state demographics. Across states, the percentage of children between the ages of 5-17 years old living at or below the poverty line ranged from 9.4% to 29.4% (M = 18.6%, SD = 4.8%). Inequities across states were also reflected in the range of per pupil expenditures (PPE), with a mean value of approximately $12,270 and range from approximately $7,000 to $23,000 per year (SD = $3,550). States' average per capita income ranged from approximately $22,500 to $50,800 (M = $30,780, SD = $5,110).

4.2.1.6 Vision-specific Demographic Variables

Exploration into states' vision-specific demographics revealed limited resources across the US. For example, less than one-third of states had a university-based orientation and mobility certification program (n = 15 with; n = 33 without). Twenty-seven (56%) states had a TVI preparation program, while 21 states (44%) did not. Thirty-seven states maintained a school for the blind. Eleven of these schools were schools for the deaf and blind, while 26 were schools specifically for students with VI. An additional 11 states (23%) did not have any type of school

for the blind. Lastly, states ranged in the per capita availability of optometrists (0.004 to 0.028; M = 0.013, SD = 0.004).

4.2.2 Regression Analysis

Three main statistical models were developed to better understand if eligibility criteria and state demographic variables correlated with states' prevalence of students with VI. The first model explored correlations with an outcome of VI as a primary disability (Model 1; RQ 3a). The second model explored correlations with an outcome of states' prevalence of students with VI regardless of primary disability status (Model 2; RQ 3b). The third model explored correlations with the ratio of the two prevalence counts (Model 3; RQ 3c). Model 1 used OSEP Child Count statistics as the outcome variable, except for Maine and Minnesota for which state-reported data were used. Model 2 used the data collected through the national state surveys as the outcome variable. Model 3 used the ratio of the two population counts to explore the relationships between states with large versus small differences in their Child Count and total population data for students with VI. The descriptive statistics for the outcome variables used in Models 1, 2, and 3 are presented in Table 7.

Table 7 Outcome Variables Descriptive Statistics

Variable (Model; *n*)	Mean (SD)	Min	Max
Percentage of students with VI reported in Child Count data (Model 1, *48*)	0.37% (0.13)	0.13%	0.69%
Percentage of total students with VI reported by state survey (Model 2; *22)*	1.12% (0.37)	0.54%	1.86%
Ratio of the percent of total students with VI to the percent of students with VI reported in Child Count data (Model 3; *21)*	0.36% (0.16)	0.16%	0.78%

Note: For Maine and Minnesota NCES data replaced missing OSEP data on the total number of students receiving special education services in the state, and state reported VI Child Count data replaced suppressed OSEP data.

4.2.2.1 VI Child Count Population as Outcome (Model 1; RQ 3a)

Given the large number of covariates and likelihood of an underpowered model if all covariates were included, each covariate was individually regressed with the outcome variable to determine if any statistically significant relationships ($p < 0.05$) or relationships approaching significance ($p < 0.1$) existed. Post-hoc tests were conducted for each categorical variable to determine the statistical significance of the covariate. This process identified the following variables as statistically significant: regulations ($p < 0.048$), eye report (post hoc test, $p < 0.0118$), functional vision assessment (post hoc test, $p < 0.0003$), learning media assessment (post hoc test, $p < 0.0254$), orientation and mobility assessment (post hoc test, $p < 0.0035$), teacher of students with visual impairments (post hoc test, $p < 0.0199$), orientation and mobility specialist (post hoc test, $p < 0.0019$), per pupil expenditure ($p < 0.004$), percentage of children living in poverty ($p < 0.001$), per capita income ($p < 0.001$), geographic region ($p < 0.0084$), presence of a school for the

blind ($p < 0.031$), type of school for the blind (post hoc test, $p < 0.001$), and existence of a TVI preparation program ($p < 0.001$). The likelihood for an underpowered or overfitted model still existed given the relatively small sample size ($n = 48$). Statistically significant covariates were divided by conceptual groupings and regressed with the outcome variable to better explore relationships between the variables. Therefore, a conceptual edit was made to drop the orientation and mobility assessment variable as it is common practice in the field to use eye reports, FVAs, and LMAs to inform eligibility decisions, while O&M assessments generally inform service delivery decisions. Table 8 summarizes the regression analysis for the models developed. These models were: Model A legal components grouping; Model B assessment components; Model C team member requirements, Model D state economic demographics, Model E state economic and demographic variables. Models F.1 and F.2 tested state vision-specific demographics, with school for the blind and type of school for the blind (respectively) tested individually with the presence of a TVI preparation program due to collinearity between the school for the blind variables. Across these regression analyses within conceptual groupings there were only three statistically significant eligibility criteria variables. They were regulations, FVA and orientation and mobility specialists (tested together in Model G). Model H brought together all statistically significant state demographic variables of the percentage of children living in poverty and presence of a TVI preparation program, both of which remained significant. In the final model (Model I), all variables from Models G and H were brought together. Model I accounted for approximately 55% of the variance in prevalence across states of students with VI as a primary disability. In Model I the variables of FVA (post hoc test, $p < 0.038$), and presence of a TVI preparation program ($p < 0.007$)

Table 8 Regression Model 1, Prevalence of Students with VI as a Primary Disability

Variable Name		Model A	Model B	Model C	Model D	Model E
Regulations		0.0752*				
Eye Report	*Conditional*		0.0169			
	Required		0.0359			
Functional Vision Assessment	*Conditional*		0.1178*			
	Required		0.1186*			
Learning Media Assessment	*Conditional*		-0.0012			
	Required		0.0121			
Teacher of Students with VI	*Conditional*			0.0695		
	Required			0.0637		
O&M Specialist	*Conditional*			0.1003		
	Required			0.2941*		
Per Capita Income					-0.000005	
Per Pupil Expenditure					-.000005	
Percentage of Children Living in Poverty					0.0086*	0.0074~
Geographic Region	*Midwest*					0.0567
	South					0.1144~
	West					0.0292
Intercept		0.3360***	0.2998***	0.3331***	0.4537**	0.1681*
	N	48	48	48	48	48
	R^2	8.3%	31.6%	28.2%	31.3%	28.3%
	Adjusted R^2	6.3%	21.6%	21.5%	26.6%	21.6%

Table 8 (continued) Regression Model 1, Prevalence of Students with VI as a Primary Disability

Variable Name		Model F1	Model F2	Model G	Model H	Model I
Regulations				0.0604˜		0.0330
Functional Vision Assessment	*Conditional*			0.1230**		0.1051*
	Required			0.0697		0.0771˜
O&M Specialist	*Conditional*			0.1039˜		0.0528
	Required			0.2717*		0.2253
Percentage of Children Living in Poverty					0.0095**	0.0029
TVI Prep Program		0.1058**	0.1074**		.0994**	0.0878**
School for the Blind		0.0489				
School for the Blind	*Deaf & Blind*		0.0289			
	Blind		0.0568			
Intercept		0.2701***	0.2698***	0.2892***	0.1347*	0.2066**
	N	48	48	48	48	48
	R^2	24.5%	25.2%	44.1%	34.1%	55.2%
	Adjusted R^2	21.1%	20.1%	37.4%	31.1%	47.4%

Note: Cell entries are estimated regression coefficients. ˜ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 were statistically significant. The requirement of an O&M Specialist to be a part of the eligibility team (post hoc test, $p < 0.0935$) approached statistical significance. Two variables, the percentage of children 5-17 years old living at or elow the poverty line ($p < 0.41$) and regulations ($p < 0.298$) were no longer statistically significant. Residuals of the model were visually analyzed and relatively normally distributed.

To understand the relationships identified in the regression model, prototypical states were developed to calculate the average number of students with VI as a primary disability in each 'average' state. The three variables in the model that were not statistically significant were held constant for the development of the prototypical states. Since more than half of states issued

eligibility criteria from state departments of education (n = 28) and did not require an O&M specialist to participate in eligibility meetings (n = 42) both variables were held at zero. The national state average of children living at or below the poverty line in 2017 was 18.1%, so that value was used for all prototypical states. In prototypical State A, where FVAs were not required and there was no TVI preparation program, 364 students with VI would be expected to be reported in Child Count. In State B, which also did not require FVAs, but did have a TVI preparation program, about 1.3 times the number of students with VI would be reported in Child Count with 483 students. In State C, where FVAs were required in certain conditions and there was a TVI preparation program, even more students (n = 630) would be anticipated in Child Count reports. All combinations of TVI preparation programs and FVA requirements are documented in Table 9.

Table 9 Estimated Number of Students with VI Reported in Child Count Based on State Functional Vision Assessment Requirements and TVI Preparation Program Status

Functional Vision Assessment	TVI Prep Program	
	No	Yes
Not Required	364 students	483 students
Required in Some Conditions	512 students	630 students
Always Required	472 students	591 students

4.2.2.2 Total Population as Outcome (Model 2; RQ 3b)

Using the procedures outlined above, each variable was individually regressed with the outcome variable. No statistically significant relationships were found between the variables and the outcome variable, the total number of students with VI receiving special education services in a state. This may have been in part due to the lack of power in the model, as only 22 states had reported population data.

4.2.2.3 Ratio of VI Child Count Population and Total Population as Outcome (Model 3; RQ 3c)

Following the same model development procedures outlined above, eight variables were found to be statistically significantly correlated with the outcome of the ratio of the two population counts. These variables were: regulations ($p < 0.086$); eye report (post hoc test, $p < 0.0368$); functional vision assessment (post hoc test, $p < 0.0291$); learning media assessment (post hoc test, $p < 0.0055$); orientation and mobility assessment (post hoc test, $p < 0.026$); PPE ($p < 0.054$); percentage of children living at or below the poverty line ($p < 0.013$); and state average per capita income ($p < 0.046$). The likelihood for an underpowered or overfitted model existed given the small sample size ($n = 21$). Statistically significant covariates were divided by conceptual groupings and regressed with the outcome variable to better explore relationships between the variables. Therefore, the same conceptual edit made in Model 1 described above, was made to drop the orientation and mobility assessment variable. Table 10 summarizes the regression analysis for the models developed within Model 2. These models were: Model A legal components grouping; Model B assessment components; Model C state economic demographics, Model D all significant variables combined, and Model E final model. In Model B, even after the orientation and mobility assessment variable was removed, the remaining three variables (eye report, functional vision assessment, and learning media assessment), were still overfitted in the model, and none of the variables were statistically significant. The eye report and learning media assessment variables were close to approaching statistical significance (post hoc test, $p < 0.11$ and post hoc test, $p < 0.12$ respectively), while functional vision assessment was not approaching statistical significance (post hoc test, $p < 0.6$). Therefore, the functional vision assessment variable was dropped and only the eye report and learning media assessment variables were included in

Model B. None of the state demographic and financial variables were significant once included together in Model C. Model D brought together all of the variables that were statistically significant or approached statistical significance in Models A-C (regulations, eye report, and learning media assessment variables). Once included in a model with other variables, regulations was no longer statistically significant and dropped from the model. Model E represented the final regression model which included the eye report (post hoc test, $p < 0.091$) and learning media assessment (post hoc test, $p < 0.017$) variables, and accounted for approximately 58% of the variation between states' percentage of students with VI as a primary disability and total percentage of students with VI, regardless of primary disability status.

Table 10 Regression Model 3, Ratio of the State VI Prevalence Rates for Students with VI

Variable Name		Model A	Model B	Model C	Model D	Model E
Regulations		0.1363˜			0.0519	
Eye Report	*Conditional*		0.2811*		0.2915*	0.2811*
	Required		-0.0273		-0.0169	-0.0273
Learning Media Assessment	*Conditional*		0.2688˜		0.2168	0.2688˜
	Required		0.2664**		0.2404**	0.2664**
Per Capita Income				-0.000001		
Per Pupil Expenditure				-0.00001		
Percentage of Children Living in Poverty				.0134		
Intercept		0.3156	0.2652***	0.2549	0.2548***	0.2652***
	N	21	21	21	21	21
	R^2	14.8%	58.4%	29.7%	59.9%	58.4%
	Adjusted R^2	10.3%	48.0%	17.6%	46.6%	48.0%

Cell entries are estimated regression coefficients. ˜ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

To better understand these results, several prototypical states were developed. The nine different possible combinations of eye report and LMA requirements are documented in Table 11. The largest difference between Child Count and total population data was seen when LMAs were not required and eye reports either were not required or were required for all students. Only requiring an eye report for certain situations seemed to significantly reduce the difference between the population counts, regardless of LMA requirements. There seemed to be little impact in the model whether LMAs were always or only sometimes required for student eligibility.

Table 11 Average Difference Between Total Population and Child Count of Students with VI based on Eligibility Criteria Requirements

Learning Media Assessment	Eye Report		
	No	Sometimes	Yes
No	3.77	1.83	4.2
Sometimes	1.87	1.23	1.97
Yes	1.88	1.23	1.98

Note: The table values refer to how many times larger the average state's total population of students with VI would be compared to the Child Count report of students with a primary disability of VI.

4.3 Qualitative Component

4.3.1 Topic 1: Data Collection Strategies (Research Question 2A)

A written survey and six focus group meetings were conducted to address research question 2A, "What components should a model data collection plan include to facilitate states collecting data on their population of students with VI?" The written survey, collected from participants prior to the focus group discussions, provided information on participant experiences related to data collection on all students with VI in their state, regardless of primary disability. In addition to logistics of data collection efforts, significant time in the focus group meetings were spent discussing the justification of statewide data collection and the data the administrators would want to collect. Consequently, three qualitative super codes, or overarching themes, were identified through the analyses of the focus group written survey and six focus group meetings on statewide data collection: data we want to know; implementation of data collection, and rationale for data

collection. Put another way, these three super codes could be summarized as the what, how, and why of collecting systematic data on all students with VI in the US. Considered together, the findings within these three themes may provided the groundwork for developing a data collection plan for identifying all students with VI, regardless of their primary disability label. Figure 4 provides an outline for the important components and considerations for any model data collection system.

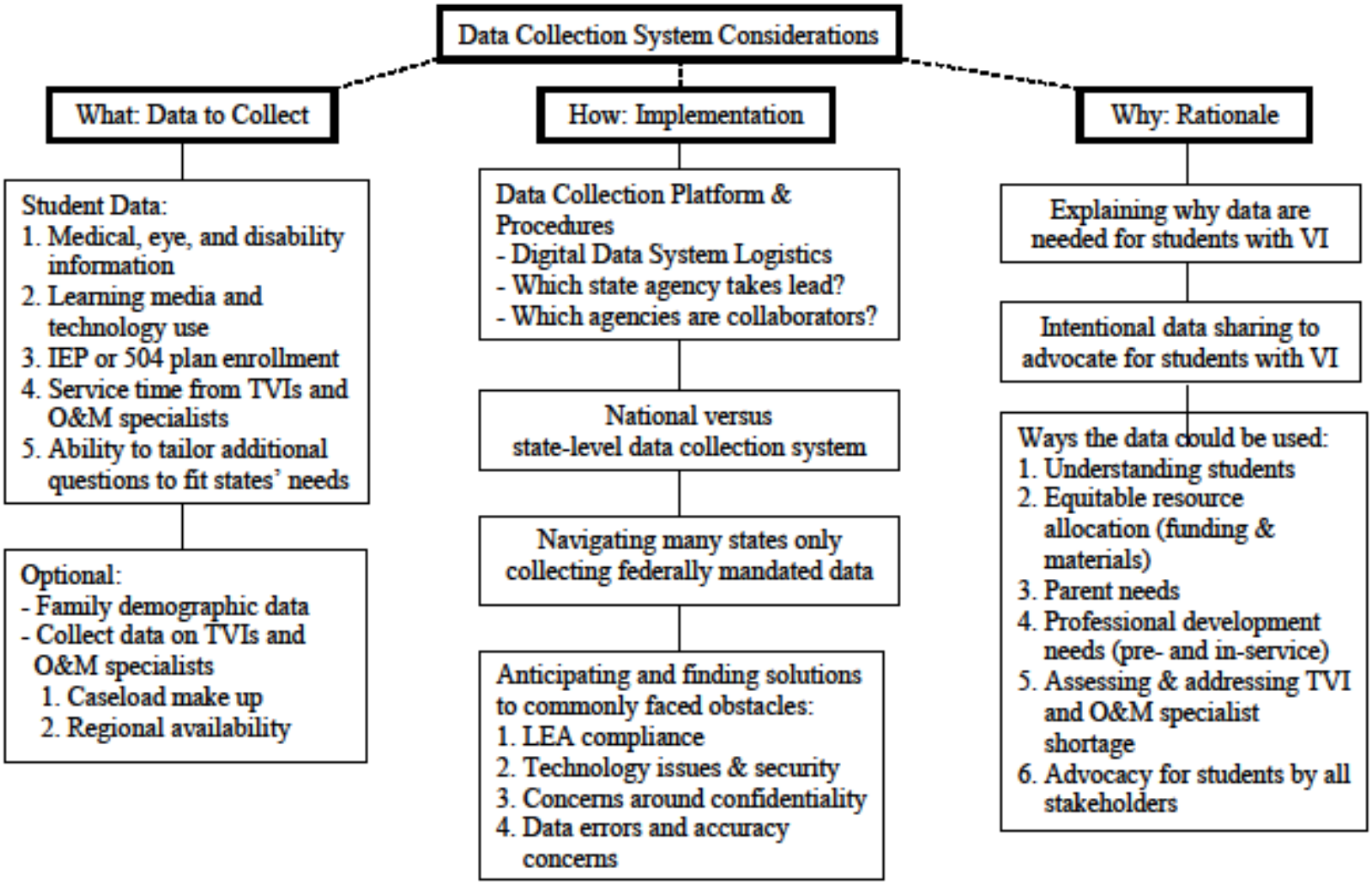


Figure 4 Components and Considerations for a Model Data Collection System

4.3.1.1 What: Data We Want to Know

4.3.1.1.1 Better Understanding Our Students

Based on participants' written survey responses and focus group conversations states' collect, or would like to collect, a wide range of student-specific data. In the written survey, current student data collected were best summed up as either falling into the category of educational/special educational information (e.g. IEP information, service time, learning media, technology use, etc.), or individual/personal data (e.g. psycho-social data, medical information, eye condition or etiology, additional disabilities, etc.). Across survey responses, the most common individual/personal data collected was students' eye condition or etiology (four participants). Additional data collected (reported by one or two states each) included medical information, hearing loss, additional disabilities, students' grade level/school, eye doctor, and date of last eye exam. The most common educational data collected by states were students' primary learning media (4 states). Three states each also collected data on students' IEP status (e.g. dates for IEP), and O&M evaluations and/or services. One or two states collected data on the following: service time from a TVI, technologies used for access, IEP or 504 enrollments, and date of most recent FVA. During focus group discussions, participants noted that it would be helpful to know specifically how students with VI performed compared to their peers on statewide standardized assessments since braille tests are often modified slightly from the print version, as well as the fact it would be interesting to see if families opt their child out of standardized testing due to concerns with inaccessible tests.

4.3.1.1.1.1 Medical, Eye, and Disability Information

Collecting data on students' eye condition or medical diagnosis was of interest to all participants. Participants discussed that knowing the diagnosis and type(s) of visual conditions a student had (i.e., progressive, stable, unknown; ocular or neurological) would allow for better long-term planning. Participant D stated, "I'm always thinking about how best to serve the students, since sometimes decisions get made without looking at where is the student going to be in 10 years in terms of vision." Participant E expanded on this idea, that understanding students' etiologies not only informs the individual students' services but also allowed for better informed teacher preparation programs and informed funding decisions:

> I think that gathering information about etiologies and demographics about students is really important because that informs service providers about what's needed, it gives information about the definition and description of population in terms of teacher prep programs and also the flow of money.

A major obstacle to collecting data on students' etiologies was also discussed by participants. The individuals entering data into a survey or database are not always informed on how to interpret eye reports or understand visual impairment diagnoses. Participant F noted that, "Sometimes, they put down the first thing on the doctor's report as opposed to really teasing out that it's leber's [congenital amaurosis] or its Stargradt's [disease] or whatever." Participant A expanded on this concern:

> Yeah, because in [state redacted], we do collect the etiology for our kids and it is interesting like if you see a primary diagnosis of say, nystagmus, usually that is a comorbidity that's something that's a symptom of something larger. So those are the kind of things that you look for as red flags to dig more into but it is a lot of times, it's somebody

in the district office that might be filling out the VI registry but we try to get the TVIs to do it so that they're pulling the information that is most relevant as that primary. But we also have the option to list multiple conditions and so sometimes then, we can see something that might be flagged as the primary and then dig a little deeper and see "Oh, but they have it listed as the third diagnosis is something greater like ONH [optic nerve hypoplasia] which really probably is the primary. So that helps giving additional, having first, second, third so you can dig a little bit.

Participants were also cautiously interested in gathering information on students receiving vision therapy or having binocular visual conditions. Participant C was interested in learning if vision therapy had lasting educational benefits for students but was concerned investigating the issue could "cause confusion that vision therapy was an education intervention when it's a medical intervention." Participant G noted that districts were "constantly getting inundated with referrals for students [with binocular conditions]," in their state. Therefore, districts knew how many referrals they were getting and such information might not be as hard to collect as one would anticipate.

Another aspect of student medical information that participants were interested in gathering were students' specific additional medical diagnoses or disability labels. Participant B explained that they had some experience collecting additional data on students and found it informative:

> […] I think it would be helpful to just know the additional disabilities. I think in an ideal world […] it would be good to know all the other additional disabilities of kids including CVI [cortical visual impairment], those type of things.
>
> [follow up question by PI] I'd be fine with the special ed labels, I wouldn't have to know diagnosis, per say. We have added a few things to APH so we're able to get a little

bit deeper, but it's not a requirement on APH. So it's been interesting. The thing we have added, like we added deaf-blind to our APH even though we do a separate count, and then we also added CVI, and that number has really surprised us which help us again to develop better PD [professional development] and those type of things.

In summary, across the board participants felt it was important to collect data on students' specific visual conditions, as demonstrated by their state currently collecting the data, or expressing an interest in doing so. Of the states' already collecting the data, however, concerns were voiced regarding ensuring visual diagnoses were reported by a knowledgeable person so that good and accurate data would be collected.

4.3.1.1.1.2 Learning Media and Technology Use

Another student demographic area of interest was students' use of learning media and technology. For students with VI, their learning medium, or media, refers to the primary way(s) the students accessed instructional materials. This included print, large print, braille, tactile graphics, audio materials, and alternative-augmentative communication systems (picture symbols, tangible symbols), with and without the use of optical devices. Many students may have a single primary learning medium, though some students are considered dual-media users, in that they have more than one primary learning media (e.g., print and braille or print and audio materials). Additionally, the United States transitioned to Unified English Braille (UEB) in 2016. However, some states elected to allow individual student's IEP teams to decide if the student would transition to UEB or continue using Nemeth for their math braille code. As a result, a notable portion of the discussion around data collection and students' learning media included understanding students using braille may be using either UEB technical and/or UEB with Nemeth.

In the written survey, four participants noted they collected data on students' primary learning medium, and two of these four participants also collected data on the technology and equipment students used. In the focus group discussions, much of the conversation related to decisions around braille and braille instruction. Participant C noted:

> I would definitely want to know how many dual learners who are out there. I have no way of even collecting data on whether IEP teams have chosen to go with UEB technical, or encapsulated Nemeth. I mean, we are a Nemeth adopted state, but it's an IEP team decision. So I know there are a handful of students out there who have requested UEB technical. So yeah, I would definitely want to know those things.

Participant G elaborated that while their state does collect data on braille instruction, there are limits to their current data collection:

> […] we do collect who is and isn't receiving braille instruction, but it doesn't really dig into it. I mean, that could mean very minimal instruction or that could be full everyday instruction on this is going to be their primary medium. We don't necessarily know that information, which would be great to know.

Participant G also explained that while they also collect data on students' technology use, it was important but difficult data to collect:

> I struggle as how you would really collect that data in any real-time way because a lot of times, especially with younger kids, or kids whose vision is changing pretty rapidly, you could be trialing a whole bunch of different things with the student that ultimately don't work out, or ultimately become all part of this big toolbox that you build for a student. There would always be sort of snapshots to see where you are as things are constantly being introduced and changed. Maybe it's, again, not necessarily something we have to worry

about here, but like how would you capture that in real time? Dynamic. As I'm thinking through, the reason for that collection is, as states either build or have loan libraries or schools are trying to plan budget year to year, can they be planning around this sort of information? I don't know if it'd be useful or not, again, because it's such a rapidly changing landscape.

Participant D noted that while some local school systems had the ability to provide technology for their students, many students and schools were reliant on state resources to provide appropriate technology to students:

> I mean, my reaction to that is maybe what type of technology, not what exact technology, because the idea of having the ability to loan iPads, for instance, I mean obviously that takes some money, and you need to know how many students would that be valuable for. We've got school systems in [state removed] that actually loan those to all students. But that's few and far between, and in terms of the adaptive software, etc. I think it would be good. Not just interesting, I think that would be good to know.

The question about learning media and technology use was introduced into all three groups during Meeting 2, and in-depth discussion was only held by Meeting 2 Group 1 participants. Based on the discussion and current data collection systems reported by participants, specific states may have higher interest in collecting data around students' use of braille (UEB vs Nemeth) and technology based on the states' adoption of UEB and Nemeth and how technology for students are funded.

4.3.1.1.1.3 504 Plan Enrollment

Students with visual conditions and/or visual impairments receiving accommodations through their school on 504 plans were discussed over the course of this study, even though the

focus of this study was students with VI with IEPs. Students with IEPs and 504 plans are similar in that they both have been identified with disabilities or other conditions that require schools to provide specific accommodations for the students to access their education. The difference between IEPs and 504 plans is that students with IEPs require accommodations and specially designed instruction not provided through the general academic curriculum, while students with 504 plans only require accommodations and not specially designed instruction. Because students with visual impairments, are students with visual impairments regardless of the fact they are served through IEPs or 504 plans, participants were asked if they collected data on students with VI who had 504 plans, in addition to students with VI who had IEPs. In the written survey, six out of nine participants noted that their total population data collection included students with 504 plans. In most cases, participants noted that their agency (e.g., school for the blind or instructional materials resource center) was a resource to students with VI regardless of IEP or 504 plan status. As a result, students on 504 plans were included in data collection and reporting so the organization could serve all students. Participant A explained how knowing which students were served on 504 plans also could help their state assess if students were being identified and served appropriately:

> Well, for example with the diagnosis, it's helpful to look at that and then compare it to what we report to APH because for example sometimes we get students that might have a really severe eye condition like anophthalmia [no eyeballs], where you know they should be a braille student, but then they're not listed as such and so then you get to dig a little bit and be like, what's happening here? This student obviously doesn't have vision, so why aren't they being documented as meets the definition of blindness or why are they being served on a 504 because we collect information on 504 students too?

Another participant noted that their state department of education collected data on all students in the state with 504 plans. They were disappointed, however, that the state did not collect information on why each student was on a 504 plan. Across participants, it was generally agreed that having data on students with VI receiving accommodations through 504 plans would be helpful data to collect and maintain.

4.3.1.1.2 Family Demographics

Participants were divided on if and what data on students' families should be collected. One-third of participants (three administrators) reported that their state collected information on students' family demographics, primarily focused on financial status to determine eligibility for federal and/or state and local assistance programs. When the focus group conversation turned to participants' views on collecting family demographic information, the topic did not often come up naturally, but had to be asked by the PI. Participant D said, "Notice we're staying away from family demographics." Three participants noted that family demographics around poverty might be interesting to collect since some data around poverty are regularly reported, but not specific to students with VI. Participant G elaborated:

> It'd be interesting to know, especially from a need and poverty side, what that would look like. I think we have a fairly wide range, but are we concentrating our efforts in the right places? All students have rights through the IEP process to have certain things provided to them. But on the other end, could we better allocate how those funds are distributed amongst your very wealthy areas versus areas with high poverty and high needs in a different way?

Participant E noted that, particularly for early childhood (Part C) services, traditional family demographic data did not interest them. Rather it would be informative to know how the child fit within their family's dynamics:

> I'm looking at family demographics more in terms of routines and where their child spends the majority of their time, what their life, daily activities are like, that's what I'm more concerned about than family dynamics. I don't really care if it's a single mom or a single dad or what type of family structure they have. To me, that doesn't matter where that child is spending the majority of its day, and where, and how, and how long, and what they're doing more in terms of routines space, that's what I would be more concerned. But to me, family demographics, it doesn't matter to me.

While certain participants were interested in specific information about students' families, most participants did not have suggestions or requests for family demographic data they would want collected.

4.3.1.1.3 Service Delivery and Service Provider Information

Some participants expressed interest in gathering data on how much special education service students were receiving and how related service providers were spending their time. At a state level, participants wanted to understand how much service time students received to better assess equity in services across their state. Participant A explained:

> […] in big dreamer's land, it would be nice to have the service delivery that students receive and also what areas of the ECC they're getting instruction within. Just for looking at being able to compare students a little bit and for some equity of services across the board. See what's out there, and what variations we would determine in rural versus urban districts. And there's just a lot you could extrapolate if you had that information but it would

be really challenging to collect that on a statewide level especially because it's ever changing but a snapshot in time, I think that would be pretty cool to have that.

Participant E had a similar inquiry, providing an example of how better understanding through data could inform practice:

> Vision-specific [services], for instance, if a student is totally blind and is going to need braille instruction versus a student who's low vision who's going to need accommodations in the classroom for large print, for instance, those are two very different service needs versus counting two kids with a visual disability. I just think that that level of information about students will inform services.

Participant F noted that while such data could be important given the differences in approaches to determining service time for students, comparing students could present some challenges:

> I think the problem is, it is so all over the place when we meet as a state advisory group and people talk about how do you capture your time on the IEP in terms of how do you quantify it, I am continually stunned how different it is.

Participant E discussed wanting data not just on how much time students received from service providers, but also to better understand how service providers themselves spent their time. They described how organizational differences across states could make data collection straightforward or more complicated:

> I would want to know how many, in what location, for what school district, and what the system is like. In [State A] for instance, they have regional programs, and so they can easily know where each teacher of the visually impaired is located because they're all employed by regional programs. In the state of [State B], not so much. There are teachers

that are employed by the School for the Blind, by individual school districts, by [LEAs], and also independent contractors. So there isn't a clear number of who these folks are and where they're located or what their specialties are. I think that would be good information for a state to know.

As an administrator, Participant E went on to explain why they were interested in collecting such data:

> So that we can locate holes in services. To me the whole goal is to make sure that kids, no matter where they live in the state, are receiving the appropriate resources or appropriate services. So if there was a whole area of the state for instance where no teacher of the visually impaired was identified, I would be concerned because I know that there are students that live there […] I think that's important for teacher prep programs to know in terms of what's the future needs in the state that X amount of teachers are going to be are nearing retirement age for instance or there's TVIs but no O&Ms or all. […] It gives people resources were if a school district were to contact the state and say we've got a student, where can we go to get a teacher of the visually impaired? So it helps programs work and collaborate with each other if we knew [if TVIs or O&Ms were available locally].

Overall, participants found value in learning how much special education service time students were allotted on the IEPs, as well as how and where related service providers spent their time. These components of data collection were generally acknowledged as useful, but also hard to collect and compare within or across states.

4.3.1.1.3.1 Orientation and Mobility Services

O&M services, a related service provided to students by O&M specialists, was discussed in the written survey and focus group discussions. Three participants reported in the written survey

that in their state they collect data on when students received an O&M evaluation and/or the O&M service time they received. In the focus group conversation, Participant G elaborated:

> We do collect who does and doesn't get O&M based on some legislation we had in the state a few years ago. But even that, again, that could be half an hour a month or that could be two hours a week. If we dig into our IEP system, we could get that, but it's not something we can easily pull out.

Participant C, whose state does not collect data on O&M services explained why they would like to know not only if the student was receiving O&M services but also students' service time:

> Just to be able to justify the need for more professionals to meet student need. Because it's sort of like a revolving wheel, where if it's written in the IEP, the service has to be provided. But if there's no one to provide the service, then the LEAs will often not write the need in the IEP because they know they can't find a professional. We need to stop this vicious cycle. We need to get those needs written in the IEP, so we can collect data on the need for professionals to meet the need.

Many participants echoed the concern that students were receiving services based on the availability of local professionals, rather than making decisions based on student need. Participants noted that in states and regions without orientation and mobility training programs they believed it was even more likely professionals were being forced to make service decisions based on their schedules rather than student need. Participant G stated:

> I think we have a lot of cases where students probably being maybe served, but under-served because one school system has, one maybe two TVIs, they're serving way too many students with fairly high needs, and I know this is happening in some places, […]

those IEP service levels are being written for the schedule of the teacher and not for the need of the students. Which then doesn't reflect the actual needs of that local school system in terms of hiring more teachers, hiring more O&M, whatever down the line.

Overall, participants agreed that collecting data on students' service times with professionals would provide insights into what O&M services looked like for students with VI. In turn, these data could be used to assess student and professionals' need, as well as evaluate suspected orientation and mobility specialist shortages and appropriateness of services provided to students.

4.3.1.2 How: Implementation

The second major theme around data collection focused on implementation, or how data could be collected. The components and considerations within implementation included the data collection platform (e.g. type of digital database) and logistical procedures around data collection including who should be in charge and when data should be collected. A significant amount of time was spent discussing balancing the need for data with the limitations of federal mandates, and whether it would be more beneficial to have such data collection efforts run at the national or state level. Lastly, because obstacles to data collection were faced by every participant, including those with current data collection efforts, some time was spent discussing common obstacles to and how such obstacles could be anticipated or navigated.

4.3.1.2.1 Data Collection Platform and Procedures

Across the states that the focus group participants represented, wide variations were observed in the platform used to implement statewide data collection on all students with VI. Table 12 summarizes the platforms participants reported their state used to collect and manage their

student population data. Overall, the most common data entry was for LEAs (data-reporters) to enter data into an online database. There was some debate on whether it was easier to develop a database in-house or outsource the work.

Table 12 Summary Description of Data Collection Platforms Reported by Participants

Platform Description	# States Reporting
Online / Cloud-based Database	
Online database created and maintained by a private contractor	1 state
Online database created and maintained by state school for the blind	2 states
Google Forms	1 state
Databased maintained on internal, secure server	1 state
Babies Count	1 state
Quality Programs for Students with Visual Impairments (QPVI) Paperwork	1 state
Statewide registry for early intervention	1 state
Database maintained at the state level, not otherwise described	1 state
Database primarily used for collecting and reporting APH annual census count	2 states

Note: A few participants reported multiple systems were used to collect data on students with VI, therefore more than nine states are listed in the "states reporting" column.

Participant H noted growing pains over the first few years of their data system developed by an outside company:

> Every year, we build upon it. So I meet with the developer and we change. In the beginning, it was a lot of growing pains which added a barrier, because here, I would ask them to use it, then it would get stuck, and it would have problems, then that was difficult.

Meanwhile, Participant A noted the perks of developing their database entirely in-house:

> What I've learned the most beneficial part about that is that, when we want to add a question, we can just do that which is really great. So for example, last year we had a lot, there were some red flags in the 504 numbers that were reported, and so we were able to

> go back through and look at what people said and then come up with some follow-up questions. […] So that's a benefit of this system that we currently have in place.

While databases maintained in-house seemed to be favored in focus group discussion, emphasis was placed on not only on how data were collected, but specifically on how data were protected. Concerns around security and protecting student confidentiality were discussed in-depth by participants. In some states, parent permission must be obtained prior to student data being reported (e.g. signing a one-time or annual release of information form). Participants were also mindful of the need for digitally secure systems, either by meeting state-mandated privacy requirements, maintaining digital security, not collecting personally identifying information, using data only for internal purposes and not sharing data, or only releasing state-level aggregate data. Overall, participants highlighted the importance of knowing and following their own states' digital data privacy practices.

Several participants noted that if their state had had a statewide IEP system collecting data on students' primary and secondary disabilities, a separate data collection census may not be necessary. None of the participants were in states with statewide-IEP systems. The lack of a singular statewide IEP-system was noted by Participant C. In their state, "LEAs have options of about three different digital statewide IEP systems, or they can choose their own. So yeah, it's all a local area decision." Participant B elaborated not only was it a local decision in their state, but any statewide system and reporting beyond primary disability would need to be federally mandated:

> The only way we would ever get there is if it becomes the law that you have to, and that's what needs to happen. It needs to happen with the OSEP level, you have to report primary and secondary disability, and more than even more than primary and secondary.

[…] Because a lot of our kids have multiple things going on. But at least report those two. I mean, but I don't know if that will ever happen at the OSEP level.

Finding a balance of local, state, and federal authority over special education must be considered in any model data collection system.

4.3.1.2.1.1 When are data collected?

Participants greatly varied across states on when they conducted their statewide data collection. The most common response was in January, with four participants noting that they run their statewide data collection concurrent with the APH Annual Census which occurs in January every year to count the number of students in each state meeting the functional or legal definition of blindness. A fifth participant noted their state mandated a count on January 2nd each year. One participant noted they run their data collection concurrent with the Deaf-Blind Census between December and March each year. Three participants collected information throughout the year. Two described data being collected as LEAs reported the data, and a third noting that Babies Count project required data entry whenever a young child enters or leaves early intervention services. Two participants only provided information on when Child Count data collection happened, which was federally mandated to occur between October 1 and December 1 annually. Lastly, two states noted data collection closer to the start of the school year; with one state having a mandated count on September 30, and another conducted annually in late fall. In the case of when data should be collected, any recommendations on when data should be collected would either need to be federally mandated, or flexible to fit within states' current data collection procedures.

4.3.1.2.2 Interagency Collaborations and/or Supports

Based on focus group participant written survey and discussions, collaboration across educational agencies within a state was essential to successful data collection. Table 13 summarizes the different state agencies' participants reported as being involved in collecting, reporting, or verifying total population data.

Table 13 Lead Agencies and Collaborators for Students with VI Total Population Data Collection

Agency	Lead Agency for Data Collection	Agency Involved in Data Collection
Instructional Materials/Resource Center	3 states	4 states
School for the Blind	2 states	3 states
Department/Commission for the Blind	2 states	3 states
School Districts and LEAs		5 states
School for the Deaf		1 state
State Early Intervention Program		1 state
State Department of Education		1 state
State Steering Committee for Programs for Serving Students with VI		1 state

Note: Total number of states listed in "lead agency" column is 7 and not 9 because one participant was from a state without total population data collection, and one participant is from a state that outsources data collection to an independent contractor.

During the focus group discussion, Participant G described how different agencies are interconnected and play a role in data collection:

> There's a lot of overlap between a lot of these agencies. So the APH data is essentially collected by our instructional resource center [IRC]. But that's also in conjunction with our state department of education, and we have a [vision] consultant at

the State department of education, and that position is actually shared between the State department of education and the School for the Blind. Then the IRC is housed at the school for the blind. Even though it serves the whole state, their physical location is at the School for the Blind. So there's a fairly small number of us doing all these different pieces. Then you have to get local school systems involved in because a lot of these things, we have to kind of to go directly to those school systems and say, can we have this? Can you give us this information? As it's not always required information, not mandated by IDEA, it becomes one thing that no one necessarily says no. But then it gets pushed to the back burner, it's not something that people are spending a lot of time thinking about.

Similarly, Participant E described how having multiple agencies, often reporting slightly different data, was helpful but also had drawbacks:

It does make it more complicated; for instance, the BVI registry that every service coordinator, every IFSP service coordinator, is supposed to complete for a child with a visual impairment on their caseloads. This is where it gets tricky because those service coordinators don't know what a visual impairment is. So sometimes they're putting kids in the registry who are just wearing glasses, or they don't know how to delineate what's a correctable vision issue and what's an actual permanent visual disability, for instance, and so that's going to over-inflate the numbers if that's true. The APH federal quota, only agencies that are registered within our IRC are going to complete the federal quota, and so there's a lot of kids that are getting missed because of that issue. Then, with Babies Count, only teachers of the visually impaired are doing it for their caseload. So there could be a group of kids in some rural population that aren't getting services or who haven't been identified yet, those kids aren't going to be included in the registry. So there's pros and cons

for missing kids or over-identifying kids in some situations in each one of the different strategies or surveys. So with different people doing different stuff, it does make it complicated. But as the state-wide coordinator, that's how we coordinate who does what do a lot of training on how to do it, who does it, when do you do it, that type of thing. So it takes a lot of coordination from one entity to coordinate it all.

Participants B and F shared similar observations that while multiple agencies could be helpful, it was important to indicate which agency or person oversaw the data collection efforts.

Participant B: Well, I think you can have too many cooks in the kitchen in some parts because everybody's got their own agenda that's some of the challenge. […] Because I had some challenges in this state with some of our adult agencies. I still have some challenges. At the same time, I feel they're very valuable and that they're there for a good reason, but it may not be for helping collect the data. It may be for advocacy and support in legislative purposes but I had to re-adjust my thinking over the years. I do think there's a role for everyone. I'm just not sure it's everyone collecting the data, but I could be wrong. I could always be proven wrong.

Participant F: We talk about fields and we talk about procedures but ultimately, [the director of instructional materials/resource center is] responsible for the dissemination, the collection, the storage, the tally, the report. I do think at some point, I think, there's a couple of things, I think, first of all, just from a management perspective, you don't want to have multiple folks involved with that. But I also think from a PII [personally identifiable information] perspective, you have to be really careful about because the whole thing with data collection is you have to be inherently transparent with, what's being collected, how it's stored, who has access to it, etc. I always think, a group think may be good as long as

it's done in the spirit of, 'I appreciate what you're telling me and ultimately you may pose something that we think is lovely but we're not going do it and we were defensible.' I think, it's okay to have really an authority.

Participant E noted that when the source of authority was unclear, or may vary between states (e.g. school for the blind does not have the authority to collect the data), having a written agreement between agencies, such as a memorandum of understanding would allow sharing of authority and possibly increase buy-in to the data collection process. Across participants, it was clear within most states multiple agencies provide resources and supports for students with VI. Therefore, each agency may have a different aspect to contribute to any data collection efforts, but it would be important to not allow for too many "cooks in the kitchen" for the best results.

4.3.1.2.3 Federal Mandates and Paperwork Limitations

Across focus group discussions, a considerable amount of time was spent discussing how state agencies (including state departments of education), were frequently bound to federal mandates and guidance around data collection. OSEP's regulations (through IDEA) only required states to collect data on and report students by their primary disability label. Therefore, when discussing data collection systems, it was important to understand how states that collected such data worked within or around federal guidance. Concerns around the emphasis of only collecting federally required data were voiced by Participants B, C, and F. Each described such limitations. "Just so you know, Rachel, that in my state, we actually have a constitution that prohibits the state department of education from collecting any data that is not federally or state-required," said Participant F. Participant C described the limitations of both working within federal mandates and following paperwork reduction guidelines:

> [State Redacted] Department of Education only collects what OSEP requires. We're going through issues in our state trying to decrease the amount of paperwork that teachers and LEAs have to submit to comply. So that is the reason why we do not collect data beyond a primary eligibility category.

Participant B described the same limitations in their state, with some hope things could change in the future:

> We were a state that really follow very specifically federal data reporting. I have actually mentioned with new leaders that we should add secondary disability on the child count and that may be a possibility. So, now it's always interesting how things shift depending on who the leaders are.

4.3.1.2.4 National or State-level Implementation?

Even with the strict adherence to federal guidance within their states' departments of education, Participants B and F worked in states with annual counts on all students with VI, regardless of primary disability label. In both states, administrators have navigated the system by expanding the federally mandated APH annual census. The APH census requires all states to report the number of children and youth who meet the legal or functional definition of blindness, but in multiple states, administrators have used the APH census to gather information on all students with VI in the state, whether or not they meet the definition of blindness used by APH. Participant B explained:

> We're also a state that pretty much follows federal requirements except that, we're kind of unique in that we contract out a lot of things that may have a little bit more lead way. I couldn't do this as a state employee, but I can have this done through a contracted

agency that does the printing house for the blind, the APH child count. So, we connect it to that.

Participant F noted a similar work-around, by having the state's instructional materials resource center managing the APH census and statewide total population count of students with VI.

While many participants noted concerns about working within federal guidance of only reporting students by primary disability, a few participants described how it was not an issue in their state. For example, Participant A noted that since the statewide data collection efforts were tied to supplemental funds from the state department of education, it was much easier to collect data on all students with VI. Participant E noted that in order to contract early intervention services from the state, service providers were required to report data on young children back to the state. While this worked in theory, Participant E noted issues with service providers complying with the mandate. Across participants, it was clear that any effort to collect data on all students with VI, regardless of their primary disability label, would either need explicit support from the state department of education, or be knowledgably designed and implemented to work within and around the constraints of federal guidelines.

Participants were asked if having data collection run at the national level, rather than state levels, would be more effective, given the amount of discussion around the limitations of states' reliance on only collecting federally mandated data. Overall, participants agreed with the potential benefits of a nationally run, or federally mandated system. Several participants brought up the benefits of data collection built into the Cogswell-Macy Act, which has been in development for the past few years in Congress. While all participants were in favor of a national system, a few

comments were made that some flexibility may be needed for states to tailor the data collection to their specific needs. Participant A observed:

> It almost feels like there has to be this national effort with a purpose, to have the same data from everywhere because every state needs something a little different, I would guess. But I don't think other than [APH census] quota that there's really a national conversation about collecting data like that.

Participant C agreed, and provided some suggestions for how a national, interagency effort could be built:

> I just appreciate you taking the time to collect this information, and I'm hoping that the results can somehow stir up a national effort for us to come together. It'd be great if we could develop a data collection system that we could use nationwide that would be specific for TBVI and mobility instructors. If we could get other national agencies on board, like AER [Association for the Education and Rehabilitation of the Blind and Visually Impaired] and APH, and to back the importance and the need for this. I don't think that TBVI and mobility instructors would grumble filling out a survey like this. It's going to cause the LEAs to wake up and realize what's going on, but I think it will in the long run help to provide better quality services to our students.

Participants D and G were in agreement with Participant C's comments, and Participant D noted that it might be possible to further build support by collaborating with the National Federation of the Blind (NFB). Participant C agreed, though all participants were uncertain if NFB would be open to such collaboration.

In the written survey, five participants noted that they either pair their statewide data collection efforts with the APH census or use their existing statewide data collection to also gather

data for the APH census. Participants from the three remaining states noted that while they do not pair the APH census and their statewide data collection, they do compare their statewide data collection to the APH and Deaf-Blind census results to ensure consistencies, or identify inconsistences across the data. Since APH census is a federally mandated census of students with VI, concern was expressed that only counting students who are legally or functionally blind presented essentially presented the same limitation of OSEP and IDEA's guidelines of only counting students with a primary disability label of VI. In each focus group meeting, a participant asked the group if the APH census could be expanded to count all students with VI. It was professionally believed that at some point in the recent past, APH had attempted to expand their definition of whom should be counted in their census. APH was advised by the federal government, however, that they were bound by regulations to only collect data on students who met the legal or functional definition of blindness. All participants expressed concern that APH was limited to such a narrow definition of students with VI, given that all students with VI benefit from APH's products and services. If APH's charter could be expanded, there was support for APH coordinating a national count of all students with VI. Worth noting was an observation by Participant F on the benefit of navigating outside of a department of education, "I will say, if you work for department of ed you are going to always have red tape. Whether it's what can be collected, whether or not that's a good use of resources."

4.3.1.2.5 Obstacles in Statewide Data Collection

Several common obstacles in statewide data collection were identified by participants. The obstacles described in the written survey results were synthesized into four themes: LEAs not providing data; gathering data and permission from parents; technology issues; and the human

factor. For each overarching obstacle theme, at least three participants described specific examples of how the obstacles impacted their ability to collect data.

Participants described multiple ways in which it was difficult for participants to collect data from LEAs. Several participants made comments that most of the time LEAs would eventually provide the requested data, but not necessarily in a timely manner, or without multiple reminders. For example, Participant D stated, “I don't know that I've ever run into a school district that just flat out wouldn't do it. Some that waited to the very end.” Meanwhile, Participant E noted that even though reporting was required by state contract, “Not everybody participates, not everybody wants to participate.” In states where data collection was directly tied to funding, participants noted that they generally had an easier time collecting data, though they often still needed to prompt LEAs to provide responses. Participant A observed, “…our census is tied to supplemental funds from our department of ed. So that's a huge motivator.” Conversely, while reporting data was not directly tied to funding in Participant B’s state, they explained how sharing out the data, and detailing the extra funding a region received because the state vision agency knew about the students in the region, provided motivation for local-level administrators to report data. Participant B stated, “I think it's that continued conversation and educating them on, ‘this is how much we're saving your local district by using our materials, or using our resources,’ and just that continued, updating them of why it's important.”

In the written survey and discussion, about half of the participants noted that in some states, students’ parents were an obstacle to collecting data. In one state, student data were gathered directly from families and not through schools, so for about 50% of students, the lead vision agency ended up sending someone directly to students’ homes to get in touch with parents and collect data. In most states, however, participants noted that parents’ declining to provide consent for their

child's data to be collected and reported was an obstacle. While some states did not request parent permission, APH recently changed their policy regarding the APH annual census. As a result, any states pairing their statewide data collection with the APH census often decided to require the consent form for all students. Participant F explained:

> Some of them [families] called, said, 'Explain your privacy procedures,' and it did not meet their needs. We have had, I don't think it's many, but I do know at least a handful of families who have said, 'I do not want my kid on it.' What we've explained is your child will not be eligible for materials. So that has absolutely happened, and then we're going to scale that up. That every kid on the big registry has to have that form. I think we will see parents who either just don't do it because they don't get to it, or people who are consciously saying, 'No, I don't want to do that.'

While a few participants noted that if a parent did not consent, the educational agency (typically IRCs) were technically not able to provide materials or adaptive educational materials to the student, the participants all commented they always found a way to ensure students had what they needed. Participant D explained, "But we have to say that [that students cannot get materials]. I mean, did we give materials anyway? When I was there, when a child needed something, I found a way to do it, but that's not legit." Family's rights and parent permission must be respected. Therefore, any model data collection system requiring parent permission would need to consider if there would be any way to account for students whose parents chose to decline consent.

Across focus group participants, technology and technological issues were a major obstacle to navigate as all respondents used digital databases to collect and/or store data. In the written survey, such obstacles included: technical issues when an administrator needed databases (maintained by different agencies) to communicate with one another; digital security concerns by

an outside agency reluctant or refusing to provide data; as well as LEAs not signing up to participate in the statewide database. During discussions, a few participants noted that a major technical issue was that most states do not have statewide IEP or IFSP systems that could easily collect and report out all students with VI. Participant E described how they were currently working within their states' system to build such an option into the statewide IFSP system:

> I'm working right now with the state to create a category for blindness, visual impairment, deaf hard of hearing and also deaf-blind, so that we could pull reports from that data rather than requesting people to do and outside census for instance. […] Then that will take care of the parents' permission, separate parent release for that because it will already be state gathered data as a part of a child's IFSP service program. It eliminates lots of different areas by just streamlining the data collection process.

Participant B noted that they have faced many technology issues around data collection, explaining how much the planning phase of data collection is and that " if you don't have good IT support, then it is just a nightmare."

Universally, errors in data collection were widely discussed in the written survey and focus group discussions on data collection. In the written survey, participants noted that respondents to their own data collection efforts often entered data incorrectly. Participants attributed these errors to either those entering not having the background knowledge to answer questions appropriately or because of "that human factor of error" (Participant F; unintentional mistakes and carelessness) are unavoidable. Participant E noted that, "And most people want to answer the questions correctly and they want to give the accurate information, and so sometimes they overthink how to answer questions." Participant G similarly observed:

> We still have tons of data errors that sometimes go back to human errors or lack of people understanding how to complete something, I think that's just the nature of it, we're people and we make mistakes even though we're trying to put things in place to correct it.

Participants D and E discussed that in their experience that lack of understanding does not only exist for those providing data, but with state-level administrators themselves. In one meeting, Participant E shared:

> Yeah, because Rachel, we were talking about what's the difference between the December 1 Count and total population? I was like, I don't know what the difference between those two numbers are. So I think [Participant D], you're right. It's like sometimes we don't even know what we're doing.

Given the considerable concerns around data accuracy, several participants described efforts they had taken to mitigate data entry errors.

To navigate the obstacle of data entry errors, participants described efforts to either ensure TVIs were entering data and/or to provide training to those entering data into their statewide data collection systems. In some states, participants described systematic training provided to anyone entering data. Participant A described the process in their state:

> They have regional meetings and then they'll go over reporting on the census at those meetings, just walk people through the process. But we also put together a webinar every year that gives like, how to do the census in any updates if we changed some of the questions or anything like that.

Meanwhile, Participant D observed the minimal training in their state was an issue:

> We have relied on, in the past, on TVIs and more recently by region, and we have our regional coordinators collecting the data, however they see fit. Basically, if they want

to go out to the school systems and get the data, great. Otherwise, they do it based on what they know about the students, not a good way, not a good way at all.

Participant B explained how data on students with VI was originally collected from LEAs, but the process needed to be changed to address accuracy concerns:

> We really focused on the local LEA, Directors of Special Education, that was our primary contact for getting information. We still accept information from them. But because that was not real consistent and they have so much they have to report, we decided, you know for child count, of course, for OSEP purposes, we still get information from our directors and LEAs. But for purposes of that deeper dive into data, we go directly to our teachers of the visually impaired. We know who they are in our state. They're good reporters. They understand how we use it and why we need it. So that was a thing we had to tweak a little bit of switching a little bit from the local LEAs, Directors of Special Education to more that boots on the ground, person that knows the kid, and can complete the forms correctly, all of those things or processes correctly.

Participant H provided a similar observation, emphasizing while they cannot control who was entering data into the system from each LEA, whenever questions arose about the data, Participant H would always go back to the local TVI and not the LEA for clarification.

Participant H perhaps best summarized how obstacles in data collection compound onto one another. For context, Participant H oversaw their state's transition to an online data collection system a few years ago and continues to coordinate statewide use of the database.

> So in [State D], it's a little different in how we collect. It depends on the LEA. Some LEAs don't want the TVI to have to do this. So, it could be the sped director doing it, it could be the administrative assistant doing it, it could be the TVI. But in [State D], again,

> we do know who all the TVIs are, and we have a relationship with them, and we have a similar group where we get information, and we can have discussions […]. So, if there are any clarifying questions that I might have, and they didn't fill it out, I could, because like you said, the TVI knows the child versus the sped director, or the assistant. So, if there's anything that I might have a question on, I will ask the TVI. But the database, the security of the online survey, that was definitely an issue in the beginning, but we did make it secure, so it is a secure site now. So ideally, all of the LEAs in [State D] are going to be signed on as a user in this database. It's been difficult to get all of them onboard, and I don't think it's because they're against it, it's more time constraints. I'm still collecting that information manually from them.

Participants reported a variety of obstacles to their statewide data collection efforts. Any future efforts for data collection would need to anticipate the likelihood of facing the obstacles reported by participants, and how such obstacles could be navigated.

4.3.1.2.5.1 Part C verses Part B – no labels and what that means for data collection and reporting

A few participants expressed frustration and concern around the count of young children with VI. In Part B of IDEA (school-aged; 3-22 years old), students are required to at least have a primary disability label in order to receive special education services. Meanwhile in Part C of IDEA (early intervention, birth-2 years old), Participant E explained:

> Another barrier to collecting information about diagnosis or categories for babies is in Part C there is no eligibility categories like there is in Part B. In Part C, you either qualify or you don't qualify, and then the services are provided according to priorities and

needs of families and children. But there's no category. So there's no visual impairment category like there is in Part B, and so collecting that information is difficult.

During Meeting 2, Participants B and F discussed not only the limitations of Part C not requiring labels, but the ‘catch all’ label of developmental delay that many young students enter Part B services with. Participant F noted:

> We know who our babies are because our other count outside of the department, but I will say what's interesting is when kids get into school and they're labeled DD [developmental delay], the definition of DD is that you can’t identify another disability. So I have districts who do DD primary, and then maybe they'll [add] visual impairment secondary. It blows my mind, but I do think it's a little dumping ground.

Participant B expressed similar frustration on the use of the developmental delay (DD) label, and how a solution to the issue could be developed:

> I would love it if we could get something in law, or in policy, that could really for that birth to five identified those kids that had sensory challenges. Because right now in law, they just report those birth to three as DD, and that's all they're federally required to report. So that becomes a challenge for our state. I don't know about others, but for our state, that's a big challenge.

Overall, participants emphasized the need to be able to clearly identify all students, including young children, with VI, regardless of primary disability label, or lack of disability label.

4.3.1.3 Why: Rationale for Data Collection

While the written survey and discussion questions centered on the logistics of how and what data should be collected in a model data collection system, all conversations naturally touched on why the data were needed. Given that total population data for students with VI have

been an area of need and interest within the field for several decades, participants discussed that a clear rationale, or justification would be needed. Such rationale would clearly illustrate why data collection specific to students with VI was needed beyond federal and local requirements. Participants also noted that a clear justification for buy-in from professionals and how the data would be used was equally important. Participant B explained:

> That is not just data you're collecting to just set there. So to me, that's very important to tell the story. If you tell your story with the data, that has big impact. If you can even tell a story that's connected back to a student and the impact there of the data pieces of that become very important as well.

4.3.1.3.1 How Data Could be Shared with Others

How data would be disseminated, in and outside of the agency collecting data was discussed at length in connection to the rationale of data collection. In the written survey only two participants responded that their total population numbers were publicly available. In the focus group conversations, however, all participants noted the benefits of reporting out aggregate, state-level data. With Participants B, C, E, and G in agreement, Participant D explained doing so would allow them to "tell a story that we haven't been able to tell." In a sentiment echoed by several participants, Participant B highlighted the need to be able to explain demographics of our current population of students with VI to those outside of the field, and often making funding decisions. Participant B stated:

> The population has come up for us, shifted a little bit more into those kids with additional disabilities that have vision loss. Because a lot of our senators, and representatives, and state board members don't get that. They think they're all braille readers. So you've got to find the fine line of how you can educate them on this wide range

of population and that that impacts resources because you might need additional funding to support kids that have a lot more intensive needs and everything. So to me, that plays a big part in it.

Bringing it closer to home, Participant A noted how sharing data had led to greater understanding and buy-in of data collection efforts in their state:

> That's a good point about wrapping back around to getting district buy-in. Just like [Participant E] said, one of the things that we do is we go to the regions and we bring the data and then we do a data dive with the vision providers and the administrators in those regions. We can talk about what are the makeup of your kids and it's another motivator for them to submit the data is because they get that out of it as well. It's not just the money, but also what direction are we headed? How are our demographics training? Where are we missing the mark?

In Meeting 3, Participants A, D, and E discussed the benefits of making a simple one-sheet to explain why data collection efforts were important. Discussion included being able to explain how data benefits students and schools, to increase buy-in and responses to data request. Participant A commented:

> I think if you add some bullet points of what the data benefits. I mean, it's hard to be concise with this kind of a topic. But it's not just materials and money, but it's also adequate teaching staff and programs and services and all that stuff. If there's a way to highlight what the data does for us in a short concise way […].

Participant D agreed, noting the importance of using simple language without jargon.

4.3.1.3.2 How Data Would be Used

Participants discussed several ways they would apply the data on students with VI that they either currently collect or would like to collect in the future. Participants noted that better understanding their population of students would allow for better resource allocation (technology, funding, and staffing). Additionally, one state noted that they had run a one-time survey specifically for parents to respond to, to better inform parent information sessions that local or state agencies coordinated. Participant F noted that their state was in the process of changing the eligibility criteria for 'visual impairments including blindness' based on the OSEP guidance over the last few years. Participant F observed that better understanding the student population would allow them to "know what it has done ultimately to change who is determined to be a child with visual impairment including blindness." Participants noted that there were many uses for data, all with the goal of improving the ability to advocate for students' needs.

Much of the discussion on data focused on professional development and how data could benefit all students with VI. Participant F noted, "It's going to change professional development," a sentiment shared by other participants. Participant A commented, "…we can look at a region in [State] and say, wow, this region has a lot of students with this specific condition and then provide training for that." Participant B observed it would not only inform professional development for current teachers, but also help pre-service teachers; "I think that's important to inform our teachers and visual impaired, to inform our university programs so that we can continue to close shortages and gaps there as well, to educate on who our kids are." Participant G explained how the data in their state was already being used to support teacher preparation and recruitment around the shortage of TVIs and O&M specialists:

> What we're using data a lot for now is how do we get more, making sure that we had university programs running within the state of [state] that were producing TVIs, were producing COMS, were getting these folks working in the schools, whether that's completely pre-service teachers going into vision or for tapping our existing population of special ed teachers and getting them interested in this. So that data is really coming from there.

Any plan for a model data collection plan system should include examples of how data are already being applied in states to benefit students and professionals, as well as highlight how data could benefit students and professionals in the local area.

4.3.1.3.3 Conclusions

Across participant comments in the written survey and focus group discussions, it was clear everyone was in support of a national data collection system focused on students with VI. Their comments, based on experience collecting data, as well as where they thought future data collection efforts could lead, were focused around the themes of: what data should be collected, how data collection system(s) could be implemented, and why data collection needed was needed specifically for students with VI, beyond data collection requirements already in existence. To get at the core of why data collection was needed, Participant F simply stated, “I need that data so I can be a good advocate for policy, training, opportunities to support that population of kids. […] I do want the data because I think it helps me be a better steward, a better advocate.”

4.3.2 Topic 2: Perspectives on Regression Variable Results (Research Question 2B)

Three focus group meetings (focus group Meeting #1) were conducted to address research question 2B, "What are practitioners' perceptions on why different variables at the state level appear to influence the prevalence of students with a primary disability of VI compared to the total population of students with VI?" Variables discussed included: requiring an O&M specialist to participate eligibility meetings, states' per capita income, and including the phrase "adverse educational impact" in eligibility criteria. One additional question asked participants to suggest other variables that they thought may correlate with the prevalence of students with VI, and therefore should be considered in future research in this area.

4.3.2.1 Requiring an O&M Specialist to Participate in Eligibility Meetings

The regression model for the 2016-17 school year identified a correlation between states' requiring O&M specialists to participate in eligibility meetings and higher rates of students with a primary disability of visual impairment including blindness. A synthesis of participants' perspectives identified two overarching themes on why this relationship may exist. The first theme was the unique perspective O&M specialists bring to the eligibility process. Participants noted that TVIs and O&M specialists bring different sets of skills to the eligibility process, therefore the required presence of an O&M specialist could shed a different light on students' needs. Participant F noted that O&M is a related service only available to students already identified for special education services. Therefore, they noted, O&M specialists should be present in the IEP process but not hold influence over the eligibility process. This perspective was considered, but not agreed upon by some other participants. The second overall theme identified from focus group discussions was the representation of vision professionals in the eligibility process. This theme fell into two

categories: strong representation and limited representation. Discussion of how requiring O&M specialists led to strong vison representation included, theoretically, having two vision professionals (TVIs and O&M specialists) in an eligibility discussion would ensure a larger discussion and more emphasis placed on students' suspected visual impairments. For participants discussing limited representation of vision professionals, conversation centered around their experiences of many eligibility meetings for students with VI conducted without a TVI present. They contended that requiring O&M specialists to participate in the eligibility process was ensuring someone with vision knowledge participated in the eligibility meeting. Figure 5 illustrative participant quotes on each theme.

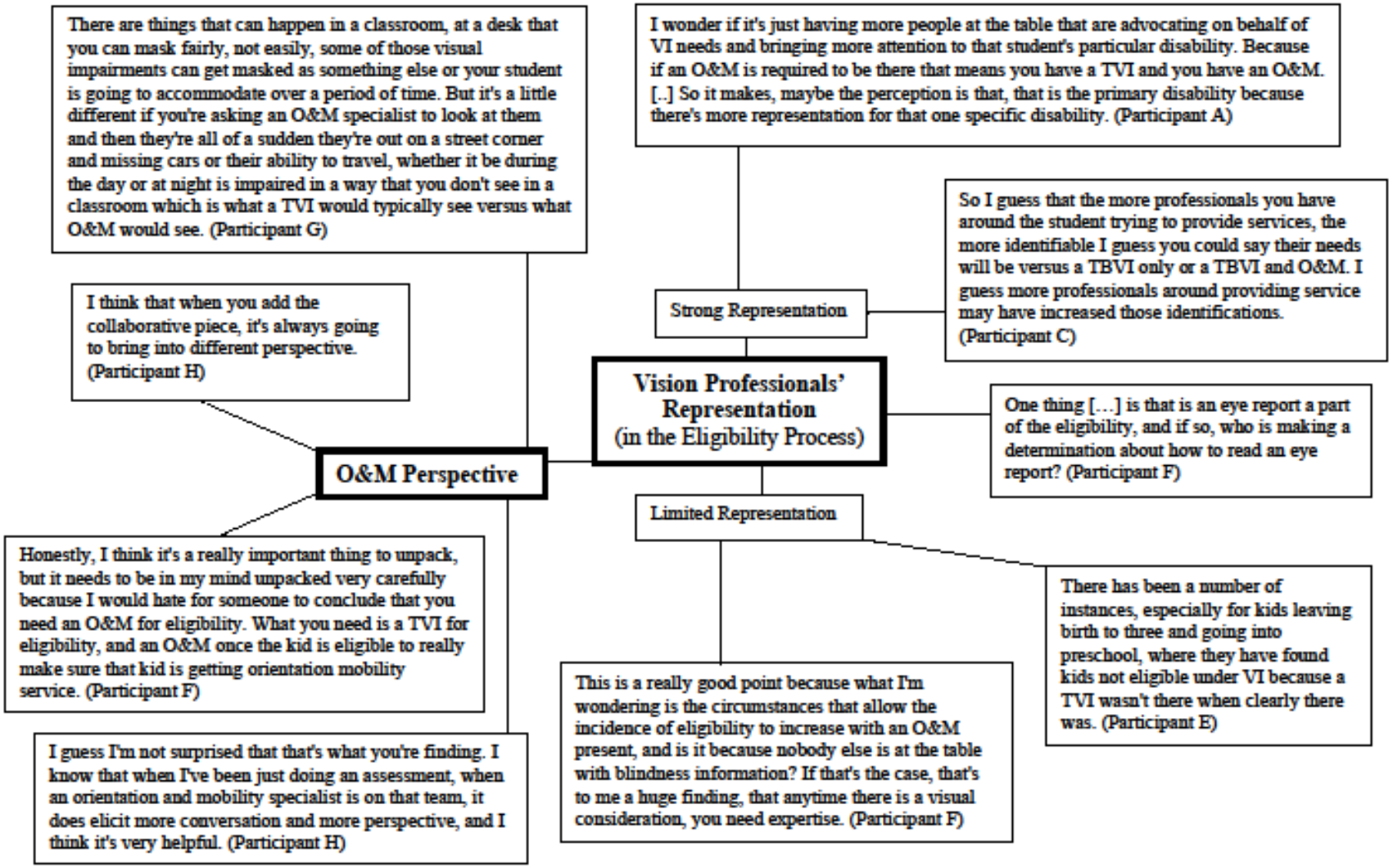


Figure 5 Relationship between O&M Specialist and Prevalance of Students with a Primary Disability of VI

4.3.2.2 Influence of Per Capita Income

The regression model for the 2016-17 school year identified a positive correlation between states' average per capita income and the prevalence of students with visual impairment including blindness (regardless of primary disability label). A synthesis of participants' perspectives identified two overarching themes on why this relationship may exist. The first theme focused on families' ability to advocate for their child with a disability. Participants discussed how it can take families a significant amount of resources and time to navigate the special education system and advocate for what they believe their child needs. For students from families with higher per capita incomes, it was logical to focus group participants that the resources afforded families through higher per capita incomes translated to more students from wealthier families being identified. Participant F stated, "I do think there's just time and resources and energy to be proactive and it's not an indictment on low SES. It's actually the reality of the burden of being overwhelmed." Participant B shared a similar perspective, and explained:

> Families don't have access to understanding what the requirements are for eligibility criteria. This can be a challenge for families living in poverty in our state. For families working multiple jobs, it is hard to connect with the school and be at the meetings. I could see where a family that's in a higher level is going to be at the meetings.

The second theme identified from participants' discussions focused on families' access to services and availability of services. Much of the conversation in this theme focused on the resources, that were often present in areas of higher per capita income, compared to lower per capita income. Participant E explained:

> If you live in a school district that has a much higher tax base, more money is going to be going to that school which means more resources, which means more TVIs, which

means the availability to serve more kids and have more of a looser definition of who gets those services versus a more poor school district that doesn't have much money, that is going to be a little bit more tighter on their eligibility criteria about who's going to get services and what those services could look like.

Such inequities to services were discussed from a few different perspectives. Participant F observed:

> There are families who are affluent and can afford eye exam reports and there are families who are poor, who based on what health services come to them, may actually get in the door for an eye report, and then there's the middle class who is taxed with doing everything.

Participants reported that most families are not aware of special education services, nor what constitutes a visual impairment for special education (Parts B and C) services. Given the influence per capita income can have on all aspects of life, participants voiced they were not surprised higher per capita income resulted and more students reported with VI. Simply put, Participant B reported, “There seems to be a correlation and access to resources, including Wi-Fi and access of those resources connected to per capita income and SES.” Figure 6 reports quotes made by the participants’ which connect to the two themes identified for per capita income.

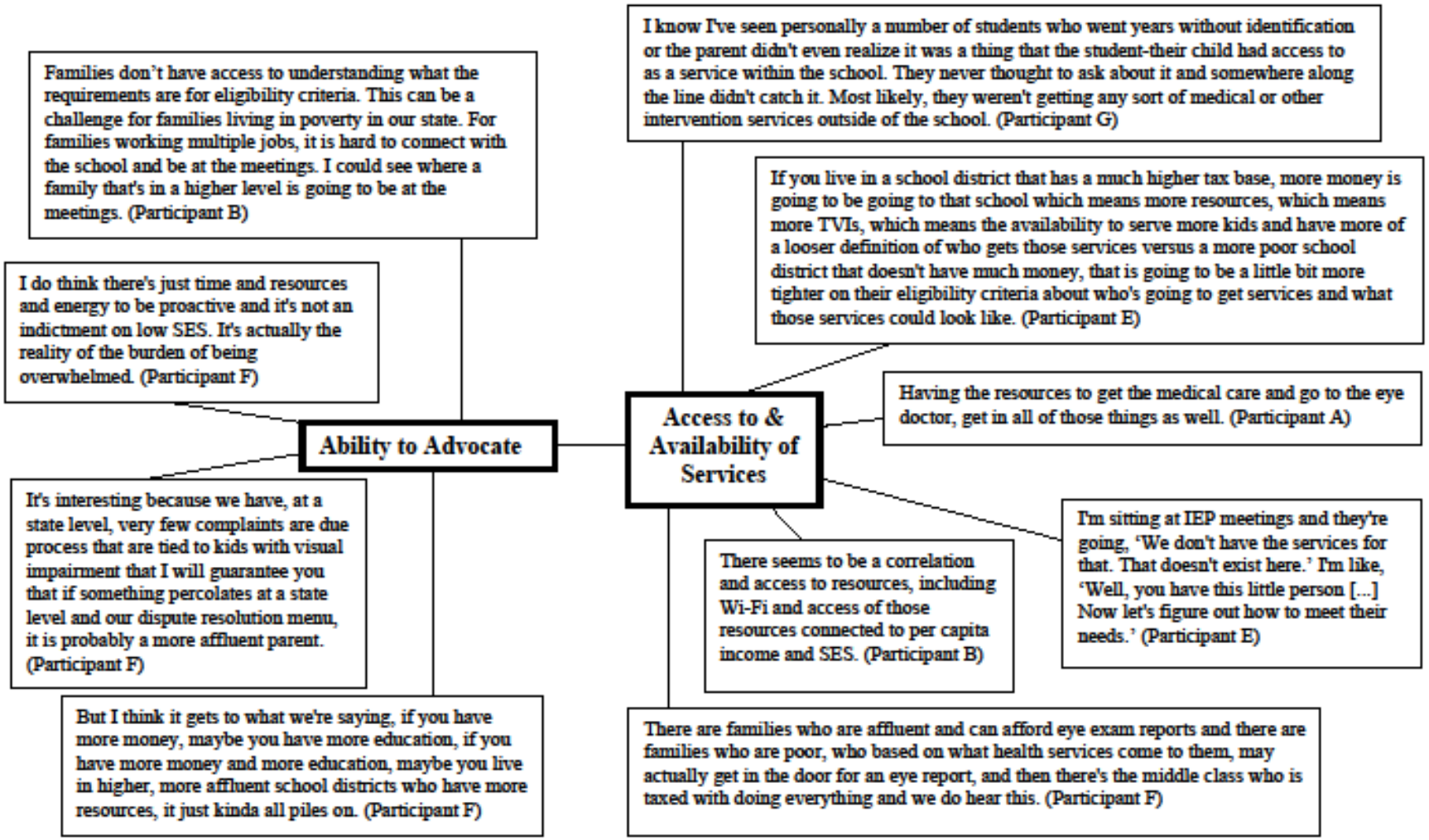


Figure 6 Relationship between Per Capita Income & Prevalence of All Students with VI (regardless of primary disability status)

Note: Participants E and F spoke on this topic much longer than the other groups, therefore there are more quotes from them.

4.3.2.3 Influence of "Adverse Educational Impact"

The regression model for the 2016-17 school year identified a correlation between states' use of the phrase "documented adverse educational impact" in states' eligibility criteria and the prevalence of students identified with visual impairment including blindness (regardless of primary disability label). A synthesis of participants' perspectives yielded two overarching themes with subthemes on why this relationship may exist. The first theme focused on the bureaucracy and administration of special education. Within this theme, three subthemes were identified: eligibility decision making, limiting students in special education, and kids on the cusp. Conversations around this variable started off with participants discussing exactly what "documented adverse educational impact" meant. Through these conversations, the first subtheme of eligibility decision making developed as participants discussed the eligibility process and how eligibility teams were determining and documenting adverse educational impact. While most participants felt they knew what this should entail, many participants also observed how inconsistently the term was interpreted by eligibility teams. Participant B suggested:

> I'm not sure that [OSEP] truly understands even how to determine adverse effect. Especially in the area of low incidence, vision being one. Because we've been in a medical model for years until recent guidance came out in 2017 to give us a clearer understanding of eligibility requirements for VI.

Figure 7 reports quotes made by the participants connected to the subthemes identified related to special education bureaucracy and administration. Participants discussed how special education was designed primarily for students with special learning disabilities, and not students with sensory disabilities in mind. Special education was designed to limit students from being

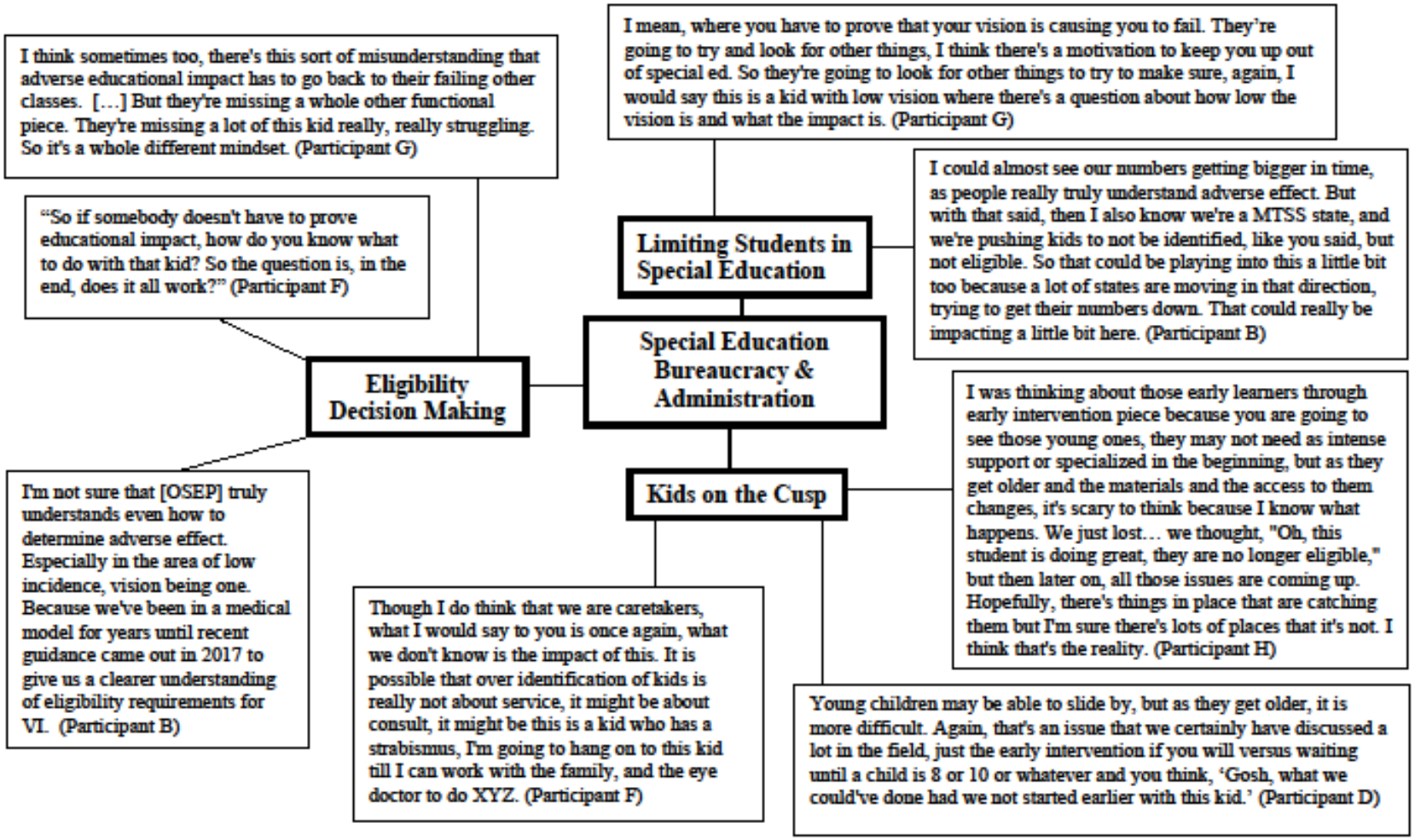


Figure 7 Relationship between "Documented Adverse Educational Impact" & Prevalence of All Students with VI (regardless of primary disability status): *THEME: Special Education Bureaucracy & Administration*

identified for special education services when the students' educational needs could be addressed through other interventions. As such, some participants saw extra levels of bureaucracy that needed to be navigated before students with VI were identified. Participant B explained:

> I could almost see our numbers getting bigger in time, as people really truly understand adverse effect. But with that said, then I also know we're a MTSS state, and we're pushing kids to not be identified, like you said, but not eligible. So that could be playing into this a little bit too because a lot of states are moving in that direction, trying to get their numbers down. That could really be impacting a little bit here.

There was a connection between participants' discussions around limiting students in special education, and students on the cusp of eligibility. Participant H stated:

> I was thinking about those early learners through early intervention piece because you are going to see those young ones, they may not need as intense support or specialized in the beginning, but as they get older and the materials and the access to them changes, it's scary to think because I know what happens. We just lost… we thought, "Oh, this student is doing great, they are no longer eligible," but then later on, all those issues are coming up. Hopefully, there's things in place that are catching them but I'm sure there's lots of places that it's not. I think that's the reality.

Participant H's description of students being found ineligible and released from services, only to be determined eligible again later in their school careers would likely not be the case if there was not a general view the students should not be in special education, and a better understanding of how to determine adverse educational impact.

The second theme identified from the conversations around adverse educational impact focus on the role and influence of the TVI. Within this theme, three subthemes were identified:

TVI bias, TVI insight into student need, and clear documentation. Figure 8 reports quotes made by the participants connected to the subthemes identified in the theme of the role and influence of the TVI. Since TVIs are often the only professional on an eligibility team with knowledge of vision, participants observed TVIs often have undue influence on which students do (or do not) get identified as a student with VI for special education services. The influence of the TVI was discussed in terms of the bias TVIs may bring to their job as well as the importance of TVIs knowing how to collect. TVIs' unique insights into students' needs inform how adverse educational impact could be objectively determined. Participant E made a statement which highlighted both subthemes:

> It's a training issue but it's also another implicit bias within TVIs. […] you're only going to build a caseload based on what your knowledge and information of where your expertise and where your interests are. So there are some TVIs who preferred only work with children with multiple disabilities, I'm one of them. Don't give me a braille reader, I wouldn't know the first thing what to do with the braille reader. Give me a child with more multiple disabilities, I will know exactly what to do and perform a very good comprehensive evaluation. The reverse is true of a lot of us.

Participant E went on to discuss how clear documentation from TVIs was an important component of understanding adverse educational impact as well:

> Well, again, if you have to actually prove through assessment that there is an adverse educational impact, it's going to require you due diligence to demonstrate that or to show that. If you don't, then anybody with nystagmus, strabismus, all of those other eye conditions that we were talking about that might not have adverse educational impact, you're just going to continue… […] So to me this has everything to do with due diligence.

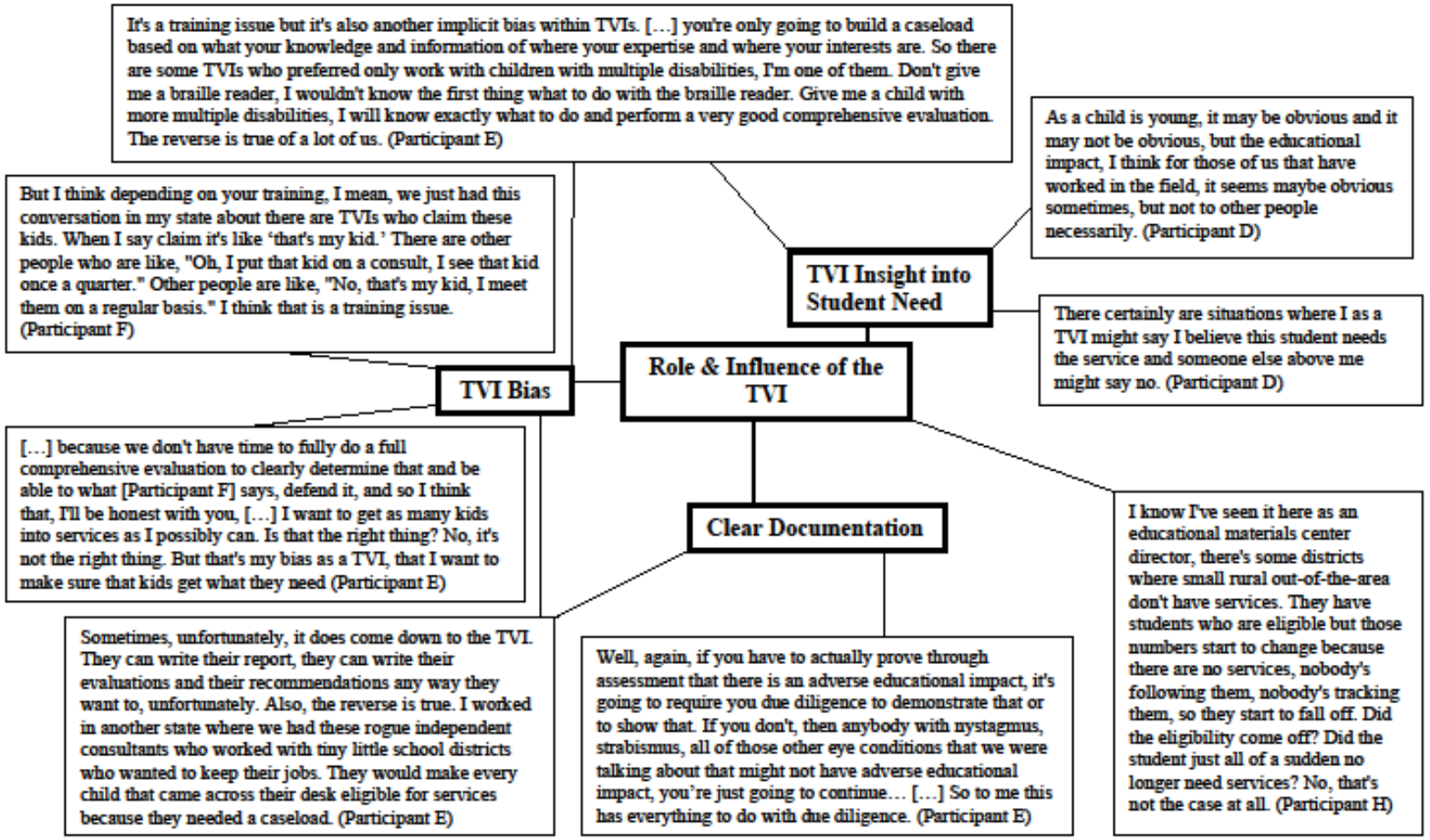


Figure 8 Relationship between "Documented Adverse Educational Impact" & Prevalence of All Students with VI (regardless of primary disability status): *THEME: The Role & Influence of the TVI*

Participant E's statements can be directly connected to Participant B's earlier statement around the lack of clarity on what constitutes adverse educational effect for students with VI, and inconsistencies on which students experience an adverse educational impact from their VI and, therefore, should quality for special education services. Through these perspectives from participants, some light was shed on why the use of "documented adverse educational impact" can influence the number of students with VI identified in a state.

4.3.2.4 Variables to Consider in Future Research

Participants had several suggestions for variables that should be considered in future research. The suggestions were broadly coded into five themes summarizing types of state-level variables. These were vision specific resources in a state, equity of resource distribution and access, geographic component, utilization of IEPs versus 504 plans, and bookend (early intervention and adult) state resources. Variables within themes, and connections between themes are depicted in Figure 9. Conversations between participants emphasized many factors within a state were interconnected. For example, there was significant overlap between the themes of "equity of resource distribution and access" and "geographic component." Participants noted there were often direct relationships between easily accessing resources that were geographically close by and having a harder time accessing resources that were farther away. Participant E explained how the geography of their state influenced inequalities:

> Here in [state], [pediatric ophthalmologists are] all located on the west side, and there's a couple of them on the east side, but there's nobody in the middle. So all of the families, it's very limited regional access. So that's an issue.

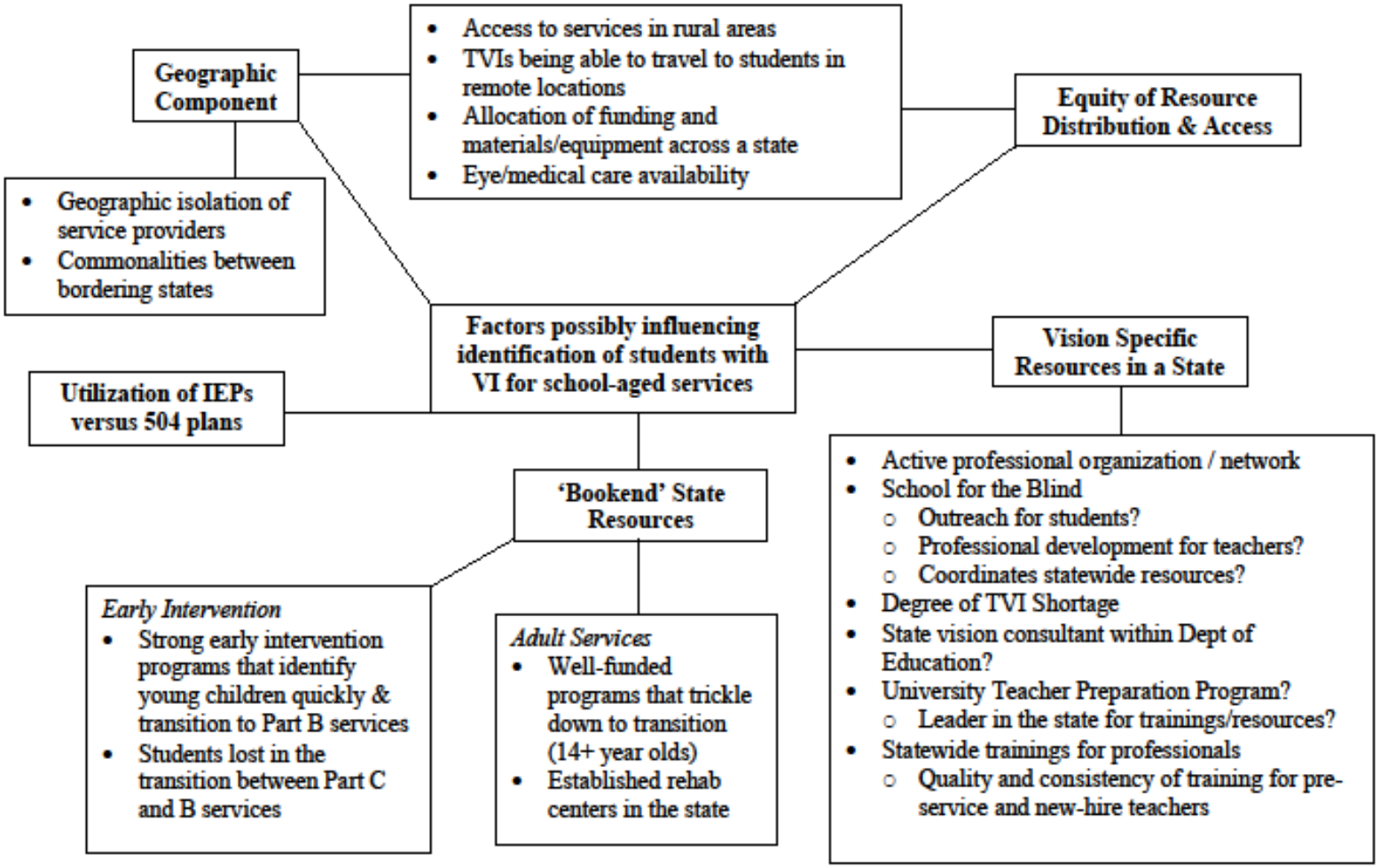


Figure 9 Focus Group Discussion on what variables should be included in analyses considering prevalence between state-level factors and the number of students with VI identified for special education services.

Meanwhile, Participant D described how geography could influence how often TVIs might be able or willing to see a student in a remote area:

> As you alluded, if I can't see a student who is far away from me, I'll see that student less. Am I going to go out there once a month? Are there other students to be seen along the way or not? Or am I devoting a whole day to that student going out there? Do I have to spend the night when I go see the students?

In addition to assessing the availability of eye/medical care described by Participant E, and TVIs' access to students in remote locations described by Participant D, other potential variables within these themes included how funding, materials, and equipment were allocated within a state, and the likelihood that bordering states may share regional commonalities not present in other parts of the county.

Participants were emphatic that vision-specific resources within states would be explored in future research. The benefits of having a vision consultant or specialist within the state department of education was emphasized. Participants' experienced states without a vision consultant to not have adequate representation or understanding of students with VI at the state level. Similarly, assessing if states had vision services coordinated through the state department of education or outsourced to the state school for the blind or other agency, was important to participants. Schools for the blind were the only variable discussed across all 3 focus group meetings on this topic; conversation included whether or not there was a school for the blind, and what type of service delivery model the school followed. Participant G asked, "Does [the school for the blind] have any impact on provision of services, good or bad, negative or positive?" Additional vision-specific variables discussed included if the state had a TVI preparation program and measuring the shortage of TVIs. Lastly, availability and quality of professional development

for TVIs (pre- and in-service) were discussed by participants as factors they suspected could influence the prevalence of students with VI identified for services.

An additional factor discussed by participants was the utilization of IEPs compared to 504 plans in their state or region. Participants noted that while 504 plans and IEPs serve specific purposes, at the local level the differences were not understood. As a result, students with VI were not consistently served under the program which was most appropriate for them. Participant B explained:

> But the one I thought of was because we're seeing a little bit of this, it's not for the kids that are blind, but it's more those low vision kids. A lot of teams are making decisions to it. They don't have a real, a strong educational need. They're moving them off of IEPs into 504 plans. […] a lot of the attorneys will push that for sensory issues like vision and hearing. I'm always curious if we're see an increase in that area. We don't really have a good way of tracking that data in our state, but we're hearing different things. I think that could be an interesting question of how many of your school-aged kids "6-21" are being served on 504 plans with vision loss, that really might be better served on an IEP.

These views and experiences were agreed upon by the other participants in the meeting.

Lastly, the fact that school-aged (Part B) services are sandwiched between early intervention (Part C) and adult services was of interest to several participants. Participant C explained, "…states where there are adult service programs where those services trickle down to our 14-and-up kids." Participants E and F discussed how the quality of early intervention services (Part C) had the potential to influence which students were identified. Participant F stated, "But it seems to me that the vast majority of our children have congenital visual or early onset visual impairment. […] So many of our kids really are kids that are coming to us from the Part C system."

Participant E elaborated on this idea, noting that more robust early intervention services within a state led to identifying children with VI from a young age, and in turn, likely influences who will receive school-aged services.

From their perspectives as administrators supporting students with VI at the state level, participants had a range of recommendations for variables to consider in future research. Many participants did note that though they strongly suspected the factors they were describing were influencing students with VI being identified for special education services, they knew it would be hard to gather data or measure several of the factors.

5.0 Discussion

The purpose of the current study was threefold. The first goal was to gather population data on students with VI. The second goal was to understand state factors correlated to the prevalence of students with VI. The third goal was to assemble perspectives on how population data could be collected for all students with VI. Significant disparities were found between states' Child Count and total population data. Many states did not know the total number of students with VI in their state in the 2017-18 school year. Regression analyses identified specific components of states' eligibility criteria correlated to the prevalence of students with VI during the 2017-18 school year, primarily influenced by the types of assessments states required for eligibility. Understanding the relationships between these variables is essential for practitioners and policymakers to make informed decisions to support students with VI. Discussions with state level administrators identified the processes and types of data an ideal total population data system should collect. Ultimately, the conversations highlighted that a federal mandate would likely be the only way all states would ever begin collecting total population data on students with VI.

5.1 Population Data on Students with VI

The lack of accurate total population data for students with VI has been an established national issue in the field for several years (Erin, 2007; Kapperman & Love, 1999; McMahon, 1997; Mason & Davidson, 2000; Muller, 2006). Limited efforts have been made to address these gaps (e.g., Kapperman & Love, 1999; Mason & Davidson, 2000). The intent of the current study

was to obtain total population data on students with VI in each state. During the 2017-18 school year, states were supporting an average of 3.6 more students with VI than the number reported in their Child Count data. The difference between the two counts could mean planning for 100 students but having 360 students with VI to support.

Misunderstandings of Child Count data is a historical issue in special education, dating back to the start of Child Count itself (Gerber, 1984; McMahon, 1997; Ward & Zambone, 1992). Given Child Count's long history, it was concerning that misconceptions around Child Count data repeatedly surfaced during data collection for this study. In the national state survey ten respondents entered Child Count data as total population data, while an additional seven entered total population as Child Count data. Three respondents simply added their states' VI and deaf-blind Child Count data as their total population of students with VI. In the focus group discussions Participant E even noted confusion of the two counts, "…we were talking about what's the difference between the December 1 [Child] Count and total population? I was like, I don't know what the difference between those two numbers are." The misuse and overreliance on Child Count data as a total population count of students with VI is likely impacting states' ability to serve and support students with VI.

Accurate data are essential to make informed decisions about policy and program planning. Administrators are simply unable to make informed decisions without knowing how many students with VI are in their state each year. This includes funding allocations, distribution of materials, and even planning for costs associated with statewide assessments and other specialized resources. Yet, in several states funding allocation for students with disabilities was determined by special education primary disability label (Child Count) data (Education Commission on the States, 2015). In the focus group discussions on the importance of total population data Participant A noted, "But

it's not just materials and money, but it's also adequate teaching staff and programs and services and all that stuff." Consider the example of an average state having 100 students with VI in Child Count while actually supporting 360 students across the state. In this state, administrators focused on Child Count data might consider having 20 TVIs adequate staffing for their state, as TVIs might be averaging a caseload of just 5 students. In reality, however, those 20 TVIs would likely be overextended, each with caseloads closer to 20 students not 5 students each. Child Count and total population data report two very different statistics on students with VI. Each population count has its own purpose and they should be notably different within each state. It is inexcusable for decisions impacting all students with VI to be made on the basis of population data for only some students with VI.

5.1.1 Impact of Interstate Variations

While the average difference between Child Count and total population data were 3.6 times the number of students, there was a large range, spanning from 1.3 to 6.5 times difference. Wide interstate variation in prevalence is a historically documented concern in all disability areas. Hallahan and colleagues (1986) analyzed interstate variability rates across each special education disability area. They found the category of visual impairments to have one of the most variable prevalence rates across states, ranked the fourth most variable of ten disability categories. The range of prevalence found in the current study reflects the variations first documented more than 30 years ago. Additionally, these findings were in line with the results of a pilot study (Schles, in press) which found states supported an average of 4.1 times their Child Count data in the 2016 school year.

The benefits of knowing interstate variations can help practitioners and researchers explore factors relating to prevalence of students with VI. Hallahan and colleagues (1986) noted that even though initial assumptions might be that every state should have the same prevalence rates, perhaps there should be differences between states. States vary in resources, general population, and other factors which all may influence childhood disability rates and/or identification, and therefore prevalence. Beyond the current study and pilot research little is known about recent populations of students with VI. Only 29 out of 51 states had total population data available for school-aged students with VI for the 2016 and/or 2017 school years across the current and pilot studies (Schles, in press). More than a quarter of these states (n = 8) only reported data for one school year. It is challenging to gauge their reliability without data from other school years as comparison. Having multiple years data will be critical to understanding if data collected through the national state survey were reliable. For comparison, the US Census Bureau advised data consumers to use 5-year averages of data for small sample sizes (<65,000 people) since data for individual years can vary greatly and be unreliable (US Census Bureau, 2018). Each states' total population of students with VI would certainly be less than 65,000 students. Therefore, continuing the national state survey on data for the 2018-19 school year and beyond will be essential to developing reliability of the available total population data.

5.1.2 Recognizing the Gaps in and Barriers to Student Data

There are several barriers which impeded access to the limited data that exists on students with VI. First, at the state and national levels, the issue remains that there are almost no publicly available total population data for students with VI. Texas School for the Blind and Visually Impaired was the only organization which facilitates an annual total population state census and

makes the aggregate, deidentified results available publicly (https://www.tsbvi.edu/student-data-program). Yet in the focus group conversations, participants were nearly unanimous that having aggregate, deidentified data publicly available would benefit students and stakeholders. Public data would allow all stakeholders (policy makers, researchers, teacher preparation programs, etc.) a deeper understanding of who students with VI are and what resources are needed to best support them within and across states.

In the process of issuing the national state survey for this study, requests for data were submitted to more than 20 data departments within states' departments of education. Some requests were brief and straightforward, simply requiring the requestors' contact and demographic information along with a brief statement about the data being requested. Several states maintained a much more in-depth application processes, with applications ranging from just a few pages to over twenty pages long. The amount of time to complete some data application requests was prohibitive. Several states noted on their websites that fees may be charged for data requests. This initially deterred the PI from submitting data applications to a few states, although the PI was ultimately not charged for data collection requests. Respondents (within and outside data departments) from a few states expressed concern to the PI that reporting aggregated deidentified data would violate student confidentially. Once data requests were submitted, follow up over several months was needed to obtain responses from several states. Four states' data departments refused to complete the data request. New Jersey refused because they did not maintain total population data collection. Tennessee initially refused and then revised their denial once the PI outlined how the data request did not conflict with their student confidentiality policy, though they ultimately did not send data once the denial was revised. Washington, D.C. refused the data request because they only fulfill requests which closely align with their "mission and strategic plan" due

to limited resources. Hawaii refused the data request because any request for students with disabilities (included aggregated, state-level data) must be submitted for full IRB review and cannot be considered through a data request.

5.1.2.1 Why Data Access Matters for Students with VI

In every state, educating and supporting students with VI was widely supported by agencies not housed within state departments of education. As a result, these agencies did not have easy access to population data guarded by administrative bureaucracy. Such agencies are critical for their support of students and operate without knowing the entire population they could be serving because any available total population data was guarded within the department of education. This includes states where vision services are outsourced to schools for the blind, non-government agencies, or housed in departments outside of the state departments of education. Beyond direct school services students with VI and their families benefited from a variety of services from non-school agencies. This included advocacy and support, social opportunities, and community engagement. Organizations such as APH, National Federation for the Blind (NFB), American Foundation for the Blind (AFB), American Council of the Blind (ACB), and Association for the Education and Rehabilitation for the Blind and Visually Impaired (AER) all have crucial support and advocacy roles at local, state, and national levels for students with VI.

University preparation programs would benefit in several ways from having access to population data. They prepare future professionals, generate critical professional development resources for their region, and conduct research to improve educational outcomes for students with VI. Simply put, many stakeholders need access to data that are not accessible. It remains unlikely these organizations can fully anticipate the program planning of students with VI to make fully informed decisions in allocating their resources.

5.2 Interpreting Factors Correlated with Students Identified for Special Education Services

The regression results shed some light on factors which may correlate to the prevalence of students with VI in the United States. Statistically significant relationships were found between state factors and Child Count data, as well as the ratio of Child Count and total population data. Across models, specific assessment components (LMAs and FVAs) seemed to have the largest connection with prevalence of students with VI, particularly in tandem with TVI preparation programs in a state. Additionally, the presence of vision-specific factors (requiring an FVA and having a TVI preparation program in a state) seemed to negate poverty's influence over the prevalence of students with VI reported in Child Count. Overall, the final statistical models and identified variables account for approximately 55%-60% of the variation in prevalence data across states.

5.2.1 Connections Between Student Prevalence and Assessments

FVAs and LMAs were both strongly associated with student prevalence across regression models. The regression model results indicated states had a higher prevalence of students with a primary disability of VI when FVAs were required. These findings were in line with prior research in other disability areas. Patrick & Reschley (1982) and Barton et al. (2016) found positive correlations between certain assessments and prevalence for students with intellectual disabilities or students with autism respectively. However, there were no standards or consistencies in the US in how FVAs were conducted (Shaw et al., 2009). In a recent survey of over 300 TVIs (Kaiser & Herzberg, 2017) the majority of TVIs felt there were some gaps, many gaps, or received no training in how to conduct FVAs in their university programs. Without standards of practice, the quality of

students' FVAs is questionable. Many students' files have FVAs that are less than a page long that do little than repeat eye-medical report data and do not explore the functional implications of their vision at all. Meanwhile other students have in-depth FVAs 10 to 20+ pages long, examining very aspect of their functional vision. This range of practice and lack of standards result in inconsistently implemented FVAs. As a result, the similar statistical impact of requiring FVAs sometimes and always had nearly the same impact on student prevalence were plausible.

It was intriguing that not requiring an LMA resulted in a larger discrepancy between Child Count and total population reports than when an LMA was required. Perhaps it was logical that there was almost a four times difference between Child Count and total population data when neither an LMA nor eye report were required. When no assessments inform eligibility, anyone may be found eligible. Conversely, requiring eye reports and LMAs for students may inadvertently rule out students with VI who were hard to assess. Many students with VI have severe or complex additional disabilities. These students are often not fully evaluated by eye medical professionals and many TVIs do not know how to conduct an appropriate LMA for such students. As Participant E explained in the focus group, many TVIs have their preference or comfort-zone for the type of students they like to work with and only find those students eligible. In a survey of TVIs who worked with students with deaf-blindness, only 23% of respondents reported using LMAs to make decisions for their students (McKenzie, 2007). There have been articles and position papers (e.g., Holbrook, 2009; Lusk et al., n.d.) urging the use of LMAs for students with VI. In practice, however, without validation of assessment tools and fieldwide standards to ensure LMAs are implemented with fidelity, there will continue to be little to no consistency in what an LMA looks like for each student.

5.2.2 TVI Preparation Programs and Prevalence

Having a TVI preparation program in a state correlated with more students being identified with a primary disability of VI in the 2017-18 school year. This finding was in line with Noel and Fuller (1985) who found the number of BA, MA, and PhD degrees awarded in learning disability special education positively correlated with the prevalence of all students in special education and the number of students with LD in a state. A thorough search of the literature was conducted to identify any existing research between the connection of how the historic national shortage of all special education teachers (US Department of Education, 2016) could have downstream influences on the identification rates of students with disabilities for special education services. While research exists on the teacher shortage (Mason & Davidson, 2000; US Department of Education, 2016), no research could be found on how the shortage of teachers could be resulting in fewer students being identified. In the focus group discussions for this study, multiple participants reported that the presence of TVI and/or O&M preparation programs should be explored related to identifying students with VI. They shared that states without preparation programs often faced much more severe staffing challenges when it came time to hire TVIs and O&M specialists. TVIs are the only educational professionals trained to assess students with VI for special education eligibility. It could be possible that having more TVIs in a state (evidenced by the presence of a TVI preparation program) could result in more students being identified. More nuanced research into connections between TVI preparation programs and student identification rates is certainly warranted as university TVI preparation programs are moving to online learning platforms, and therefore less bound by states' geography.

5.2.3 Negating the Influence of Poverty on the Prevalence of Students with VI

The correlation between the prevalence of students with disabilities and poverty was established in the literature (e.g. Barton et al., 2016; Wiley & Siperstein, 2011). In the current study, states' percentage of children living at or below the poverty line was statistically significantly positively correlated to the prevalence of students with VI as a primary disability throughout several models. Once FVAs (as a required component of eligibility) and the presence of a TVI preparation program were added to the model, states' percentage of children living at or below the poverty line were no longer statistically significant. Unequivocally there are systemic inequities created by poverty for students in the US. It is possible that requiring students' functional vision to be assessed helped to negate the historic influence of poverty on students' disability status. The coupling of FVAs and TVI preparation programs together in the model rendered poverty insignificant was interesting, as it suggested a connection. Perhaps having a TVI preparation program in the state encourages a higher rigor or standards in implementing FVAs not seen in states without both components. For students with VI and stakeholders in the field, this insight could be a critical point to explore to ensure all students with VI are appropriately identified regardless of their socio-economic status.

5.3 Systematically Gathering Reliable Total Population Data in All States

A federal mandate requiring all states to collect data on their total population of students with VI will be the only to know how many students with VI receive special education services. Between focus group discussions, efforts supporting the Cogswell-Macy Act, and prior research

in the field (Mason & Davidson, 2000), there has been a decades-long history of calls for the federal government to move past primary disability labels and support total population data collection on all students with VI. Many state departments of education limit themselves by only collecting federally required data based on the national state survey and focus group conversations. Consequently, adequate data collection efforts will not happen in several states without revisions to IDEA's focus on primary disability labels. Simultaneously, many administrators still do not know Child Count data only represent students by primary disability label and not all students with a given disability in a state. Ultimately, a federally mandated system for reporting all students with VI (regardless of primary disability) will be needed to establish a foundational knowledge of students with VI in the US. Federally mandated total population data collection, however, is unlikely to be implemented in the next few years. Therefore, it is imperative that stakeholders in the field (i.e., state and local administrators, teachers, policy makers, parents, university partners, and advocates) come together to address the gaps in data which impact our ability to adequately plan and prepare for all students with VI.

This way, state-level agencies can take it upon themselves to collect essential data to understand their student populations.

5.3.1 Implementing Total Population Data Collection at the State Level

Of the states with total population data collection systems, a few were collected centrally within the state department of education. Central data collection primarily occurred when the state maintained one electronic IEP system for the entire state and identified students beyond their primary disability label. The remaining systems were independently developed and coordinated through vision-specific programs within states. More than a few focus group and survey

respondents described significant lengths they took to implement an annual total population count of students in their state. They often navigated the bureaucracy and red tape of their departments of education without bringing attention to data collection efforts. Importantly, all participants described the extra work to collect data was worth it. The benefits of data collection included improved program planning for students and professional development for teachers, informed resource allocation within their state, and increased efforts to curtail the teacher shortage. It may be complicated but it should not be prohibitive for states to collect data given the significant benefits of having total population data on students with VI.

5.3.1.1 Data Collection Considerations

Several components should be considered when implementing or improving total population data collection within a state. First, stakeholders within each state need to identify the data to be collected. Participants agreed that certain student data were critical to collect. This included students' medical, eye, and disability information, learning media / technology use, and IEP or 504 plan enrollment status. If feasible, collecting data on special education service time that students received from TVIs and O&M specialist as well as the content covered (e.g., expanded core curriculum IEP goals) could be invaluable to the field. Such data could highlight variations in services, inform personnel preparation and in-service teacher professional development needs. It seems essential for states to have the ability to collect additional data to address state-specific needs.

Stakeholders in each state should be identified for the role(s) and resources they can contribute to data collection efforts. One agency should oversee the process and technology to facilitate the process and maintain security over data. Other agencies (i.e., early intervention, transition/adult services, professional organizations, and non-profits) may support data collection

and students by building awareness, advocating, and disseminating deidentified information to grow community support and an understanding of all students with VI. In the process of developing a data collection system, stakeholders should reflect on several questions which could inform how their system evolved. This includes what the platform for data collection should look like and when data collection should occur. Based on feedback in the national state surveys and focus groups, in 2016 (Schles, in press) and 2017, total population data collection occurred throughout the school year and greatly varied across states. Some states effectively paired data collection with other mandated student censuses (i.e., APH Annual Census, Deaf-Blind Census, or Child Count). Others maintained separate counts but compared the data across counts for consistency and reliability measures. It will be critical for states to identify the most effective and efficient data collection platform and procedures to support their data collection efforts. Perhaps equally important will be establishing a method to disseminate aggregate, deidentified student data back out to stakeholders in the local and statewide community. All participants noted the benefits sharing such data, whether it was obtaining more financial and material support for students in an underserved region, obtaining grant money to train future TVIs and O&M specialists, or improving their professional development offerings for teachers.

5.3.1.2 Alternative to Designated Statewide VI Count

Several states keep a total population count of students with VI without maintaining a separate data collection system. In these states, a singular electronic IEP system was used for the entire state. Critically important, was that in these statewide IEP systems, students can have more than one disability label, and all disabilities are documented regardless of their primary disability status. In the focus group meetings one participant discussed how a similar approach was being adopted into their statewide IFSP system to document all young children with sensory disabilities.

Several participants in the focus groups noted, however, that local control over education was paramount. The only way they could see their state having a singular IEP system would be by federal mandate. It seems regardless of approach, a federal mandate will be essential for collecting population data on all students with VI.

5.3.1.3 Considering an Estimate Total Population for Students

Lack of total population data was not an exclusive concern to students with VI. Data on the total number of students with a specific disability does not exist within any disability area. Researchers in other disability areas have attempted to navigate away from special education data to estimate the total population and/or prevalence of students within each disability area. Primarily, researchers have used extant, federally developed data sets to calculate prevalence estimates of students with disabilities (e.g., students with learning disabilities or ADHD, Pastor & Reuben, 2008; students with development delays or general disabilities, Barton et al., 2012; Peterson et al., 2013). For other researchers, they have been able to take advantage of the Autism and Developmental Disabilities Monitoring Network (ADDMN) which has sites in several states screening medical and school records to estimate prevalence rates of students with autism or developmental disabilities (e.g., Kirby et al., 2011; Soke et al., 2017). Lastly, a few research teams have attempted to directly survey schools or screen students to gauge prevalence (e.g., Holler & Zirkel, 2008; Merikangas et al., 2010). Students with visual impairments represent a low incidence group with an extremely small sample size in any data set. It remains unlikely any nationally representative sampling will provide sufficient data to extrapolate to all students with VI. Given the reality of working with such a low incidence group, the most practical way to estimate the total population of students with VI may be to support states to collect the data.

5.4 Limitations

5.4.1 National State Survey

There were a few limitations which impacted the national state survey. First, there was a probability of human error in the survey responses, both in the reported population totals and open-ended questions. During the current survey the PI identified five errors in the pilot study's national state survey responses and two errors in the current survey responses. Consequently, it is likely that repeating the survey for future school years could locate additional errors not yet identified. Second, a major obstacle in soliciting survey responses was the ongoing confusion that Child Count data only represents students by their primary disability. Additional revisions in the survey tool may be warranted to further clarify the differences between the two population counts. Third, several respondents noted that early intervention services were handled privately or by a different state agency not in the state department of education. As a result, any future efforts should include a concerted effort to identify the correct agency(ies) in each state to report on the total number of young children with VI.

5.4.2 Focus Group

A few considerations should be kept in mind when interpreting the results of the focus group discussions. First, qualitative research should not be generalized. The perspectives and comments made by the focus group members only represented their experiences and points of view. Second, only one participant from a state without a data collection system consented in this study. Therefore, the perspectives documented represent predominantly administrators in states

with data collection systems. Future research should capture the perspectives of administrators without total population data collection systems for a more balanced view of the needs in the field. Last, the primary purpose of the qualitative data collection was to shed light on the quantitative results. The focus group topic 2 discussions did review the results of the quantitative results of the pilot study, but a few months after the focus group occurred the models were corrected, and half of the variables discussed were no longer significant. Now that the regression models for the prevalence of students with VI as a primary disability are very similar for the 2016 and 2017 school years, it may be worth repeating the focus group to gain stronger insights into the statistical findings.

5.4.3 Regression Analyses

The regression analyses were constrained by a few limitations which should be considered when reviewing the findings. First, only 22 states had total population data so the exploration into the differences between Child Count and total population data was likely underpowered. The results would be different if all or even a majority of US states had sufficient data for the model. Second, as mentioned above, it was assumed that there remained some human error in the 2017 school year data. Those errors may have influenced the regression models. Any model presented in this study may change if such errors were identified and corrected. Third, the models presented in this study only represent data from the 2017-18 school year. They should be interpreted with caution until similar models can be run for different school years to see if the relationships remain consistent or change across school years. Last, readers are reminded that correlation does not equal causation, therefore none of the potential relationships identified explicitly influence one another.

5.5 Next Steps

5.5.1 Population Data Collection Research

The findings from the national state survey and focus group discussions yielded several next steps for research into understanding the total population of students with VI. Expanded research and data collection efforts are needed to gather more complete total population data. The national state survey should continue for the 2018 school year and beyond, until a more established or efficient system is developed. It is unlikely a federal mandate or the passage of the Cogswell-Macy Act will occur within the next few years. As a result, a field-wide collaborative effort is needed to establish a sustainable data collection system focused around students with VI and the needs of the field. The data collected through such efforts could be used to inform pre- and in-service teachers working with students with VI, educate stakeholders on accurate student demographics, and ultimately improve services and outcomes for students with VI, regardless of their primary disability status.

Further investigation into states' current data collection systems is also warranted. The perspectives of focus group participants presented a bias view on state-level data collection as eight out of nine participants worked in states with total population data collection systems. As such, it may be beneficial to conduct a series of focus groups with state level administrators in states without total population data collection systems so that insights could be gained into what it would take to implement data collection systems in those states. Additionally, it would be worth collaborating with a state system to pilot a data collection system based on the recommendations of the focus group, to learn firsthand what it takes to establish a new total population data collection system at the state level. The data collected could be used to inform state practices for students

with VI, and lessons learned from the process of implementing the system could be applied to other states, especially if a national data collection system is ever mandated.

5.5.2 Understanding Factors Correlating to Students with VI Identified for Special Education Services

The study results highlighted several next steps for research into state-level factors correlated to the identification of students with VI. Encouragingly, there were consistent findings for state level factors and Child Count data for the 2016 and 2017 school years. Research should continue to see if patterns hold for future (or past) school years as well. Should these models hold, further investigation should be conducted to understand why the presence of a TVI preparation program and requiring an FVA correlated so strongly with higher numbers of students reported in Child Count. Additionally, all future explorations into prevalence should attempt to assess the accuracy of the eligibility system. It is important research focuses on the accuracy of the eligibility process to identify students and not simply look for as many students to be identified as possible. There were not statistically significant findings between state level factors and the total population of students with VI during the 2017 school year. However, this line of inquiry should continue as total population data on students with VI is collected for future school years, particularly once most of the states have total population data. Similarly, research into the degree of difference between Child Count and total population data for students with VI could be used to facilitate a fieldwide discussion on why each population count serves an important, but very different, function.

In the continuation of this line of research, several additional state factors should be considered for inclusion in future regression models. Geographic factors might be particularly

interesting and easy to incorporate into future regression models. This may include the percentage of rural areas in a state. Zablotsky and colleagues (2020) suggested students in rural areas were more likely to be diagnosed with a developmental disability (including blindness) and not receive special education services. Conversely, students in urban areas were less likely to be diagnosed but more likely to receive special education services than students in rural areas. Geography can also play a factor into the equity of resource distribution and access, so how states allocate special education funding and materials and the availability of eye/medical care may be worth exploring. The number of optometrists per capita in each was included in the current study and found to be not significant. The number of pediatric or general ophthalmologists is worth consideration as ophthalmologists, and not optometrists, diagnosis eye-medical conditions. State vision-specific resources such as the systems in place to support Part C and adult services in a state should also be considered. These were some of the factors noted by focus group participants as likely correlated with student identification rates. Research into factors correlating with the prevalence should continue. Future data can serve as evidence to inform possible future studies seeking to assess the accuracy of special education to identify students with VI. In turn, intervention studies based on statistically significant variables could be developed so that all students with VI can be identified and supported within the special education system, regardless of which state they live. Last, the current study took a strongly quantitative approach to understanding student prevalence. Exploring these issues through a qualitative lens could provide additional insights into factors connected to the prevalence of students with VI not identified through the current line of research

5.6 Understanding the Prevalence of Students with VI in the Absence of Population Data

The primary goal of this line of research was to understand if differences in states' eligibility criteria influenced the number of students with VI identified for special education services. Consistencies were found in the Child Count regression models for the 2016 and 2017 school years. However, inconsistencies and insufficient total population data prevented any conclusions to be drawn from regression models dependent on total population data. Given the lack of total population data in most states, any models including total population data were underpowered and not representative of the United States. Out of necessity and in response to the historical lack of population data on students with VI in the US (Mason & Davidson, 2000), the research line has expanded to investigate how accurate total population data could be acquired. All focus group participants were unanimous on the need for and benefits of knowing the total population of students' in the US (regardless of primary disability status). There are current efforts in the field to bring attention to the need for data. This includes the Cogswell-Macy Act and the National Plan for Training Personnel 2 (NPTP2) coalition by several vision program university faculty and other stakeholders throughout the US. In the absence of total population data for the majority of the states, it will be critical that future research efforts focus on gathering total population data. Such data could be used to better understand prevalence and variations in prevalence of students with VI across states as was the initial intent of this research. More importantly, total population data could be used by policy makers, teacher preparation programs, researchers, and other stakeholders to accurately plan for and support all students with VI.

Appendix A Literature Review Coding Results

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
Barton et al. (2016)	Autism (*note: only children 3-5 years old)	Use of DSM; **use of eval by person outside school distric**t; requirements for outside evals; family input; required observations; required domains assessed; state definition of ASD	n/a	**PPE; number of children living in poverty (free/ reduced priced lunch)**	correlation; backward multiple linear regression	n/a

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
Coutinho & Oswald (1998)	EBD, ID, SLD, and all students with disabilities	n/a	**4th grade reading proficiency, 8th grade math proficiency, community adult dropout rate, % of state population that was White, % of school staff that are aides**; +3 additional variables, not significant	**PPE; median household income; percent of households earning < $25k/year; per capita income; elem./sec. ed. expenditures per capita**; +11 additional variables, not significant	stepwise linear regression	prediction of LRE placement and graduation rates of students within each disability group
Lester & Kelman (1997)	SLD; students with SLD based on their LRE placement; and "hard disabilities"	n/a	**% of population that is African American, proportion of adults with bachelor's degree; serious crime rate; % of pop that lives in a city, % that voted for Bush (conservatism), abortion rate (liberalism); % of babies w/low birth weight, southern state, New England state**	**poverty, per capita spending by state govt, ratio of teacher salary to average state salary, average annual pay**	multiple linear regression	Additional regression models exploring change in prevalence between 1976 and 1989 due to LRE and listed state variables

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
McLaughlin & Owings (1992)	SLD, EBD, MD, and all students with disabilities	n/a	**rural school-age population and minority school enrollments**	**per capita income, PPE, state & federal revenue for education; % children living in poverty**	bivariate correlations, assigned states to quartiles, ANOVAs	conducted separate ANOVAs for each year; 1976, 1980, & 1983
MacFarlane & Kanaya (2009)	Autism	State Criteria alignment w/IDEA; type of autism definition; evaluation team member requirements	**n/a**	**n/a**	Cohen's d, t-test, f-test, partial $\eta 2$	Prevalence over time, detail report of eligibility criteria variability across states
Mandell & Palmer (2005)	Autism	n/a	**number of pediatricians in the state, pupil/teacher ratio; student ethnicity, school-based health clinics**	**PPE, children living in poverty (free/reduced lunch),**	$\chi 2$, linear regression (natural log of prevalence to interpret as change in prevalence over each variable)	n/a

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
Noel & Fuller (1985)	SLD, EBD, and all students with disabilities (no statistically sig. relationships found for EBD)	n/a	**% minority K-12 enrollments; % of population living in rural areas; Teacher training: number of special ed. degrees awarded; number of SLD special ed. degrees awarded; amount of Program Assistance Grant federal grants per student enrolled**	**state & local school aid per capita, percentage of all federal education aid, PPE, federal special ed. aid per total school enrollment, % children living in poverty**	Correlation analysis, factor analysis, multivariate regression (state & district levels)	Comparison of SLD students in 1976, 1982 and change over time; comparison of all students with disabilities in 1976, 1982, and change over time
Oswald (1995)	ID	IQ cut off, adaptive behavior cut offs, achievement cut off	**geographic region, ethnic representation of students across the state; students without ID receiving special ed.**	**per capita income; per pupil revenue; total expenditures per capita on all human services; per capita expenditure on all education; elem./sec. ed. expenditure per capita; ratio of per pupil revenue to per capita income**	correlation analysis; student-newman-keuls (SNK) means-comparison, f-test, stepwise regression	Explored impact of ID variations when controlling for regional economic & social differences across states

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
Oswald & Coutinho (1995)	EBD	n/a	**% of state population that was White, geographic region,**	**per capita income, per pupil revenue, ratio of per pupil revenue to per capita income, total expenditures per capita on all human services; ed. expenditure per capita; elem./sec. ed. expenditure per capita**	Pearson product-moment correlation analyses; stepwise regression	Divided variables of interest into quartiles to determine if variations in prevalence existed across types of states
Patrick & Reschley (1982)	ID	Terminology used in reference to ID; levels of ID recognized; role of adaptive behavior; assessment procedures (list of approved assessments)	**median adult education level, illiteracy rates, ethnic representation of students across the state (% Hispanic students; % African American students); urbanicity of the pop.; portion of students with SLD, EBD, and total pop. of students with disabilities**	**per capita income, PPE**	correlations, factor analysis, regression	n/a

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
Phillips & Odegard (2017)	SLD (dyslexia)	Dyslexia law implementation status	**n/a**	**n/a**	t-test	Explored 2 states as case studies (prevalence by grade level); pre-post test of prevalence rates in 2011 vs 2015 for states that had implemented laws
Skiba et al. (1994)	EBD	EBD definition; use of social maladjustment (s.m.) clause; definition of s.m.; application of exclusionary clause; assessment procedures for s.m.	**n/a**	**n/a**	$\chi 2$, kruskal-wallis one-way analysis of variance	Conducted analysis for how respondents reported criteria was applied, regardless of legal definition
Velazquez-Ramos et al. (2018)	SLD	n/a	**ratio of Hispanics to the state general population; ratio of people without health insurance coverage to the state general population**	**ratio of people living in poverty to the state general population**	Mahalanobis distance, bivariate Pearson's correlation, hierarchical multiple regression	n/a

Authors	Disability Area	Eligibility Criteria Components	State Demographic Variables	State Economic Variables	Statistical Tests	Additional Analyses
Wiley & Siperstein (2011)	EBD, ID	n/a	**% of conservative voters (McCain, 2008 presidential election); % of students who are white**	**PPE; per capita income; % of children living in poverty**	bivariate correlations, hierarchical regression	n/a

Note. Variables in bold indicate author(s) found statistically significant relationships in their final model(s) with the variables and their outcome measure. *Abbreviations*. ASD: autism spectrum disorder; EBD: emotional/behavioral disorder; ID: intellectual disability: LRE: Least restrictive environment; MD: multiple disabilities; PPE: per pupil expenditure; SLD: specific learning disability.

Appendix B Initial Solicitation for State Survey Response

Dear [*recipients' names*],

My name is Rachel Schles and I am doctoral candidate at the University of Pittsburgh completing my dissertation about students with visual impairments, including blindness.

[familiar respondent]

Last year I reached out to collect information about our students for the 2016-17 school year, and now I am continuing with study focusing on the 2017-18 school year. This work is in part to update a survey originally conducted for the National Agenda more than 20 years ago, so that as a field we can have the most up-to-date information available to support students with visual impairments.

[new respondent]

I am replicating and updating a survey originally conducted as part of the National Agenda more than 20 years ago, so that as a field we can have the most up-to-date information available to support students with visual impairments

Attached is the survey for your review, to ensure [*state's*] data is included in the project. Please complete the survey at your earliest convenience, and return it to me (ras277@pitt.edu) by ***[day, date; 4 weeks in the future].***

If you are not able to complete this survey [*or changed jobs since filling out last year's survey]* please forward this message to colleague(s) you think would best be able to answer the survey questions (CC'ing me so I can follow up with them directly), or feel free to send me their contact information and I can contact them.

Please do not hesitate to contact me while completing the survey if you have any questions.

Thank you in advance for your time,
Rachel Schles

Rachel Anne Schles, M.Ed., TVI
Doctoral Candidate - Vision Studies Program, University of Pittsburgh
Scholar - National Leadership Consortium in Sensory Disabilities

Appendix C Sample National State Survey

State Survey Regarding Students with Visual Impairments Including Blindness

Thank you for taking the time to answer a few questions about the students with visual impairments including blindness who are eligible for special education services and supports from licensed teachers of students with visual impairments in your state. The information you provide will be used to gain a better understanding of the number of students with visual impairments including blindness in your state and across the country. Once this study is completed, the information collected will be made available so that as a field we can work to improve services and planning for all students with visual impairments including blindness across the country.

Send your completed survey to Rachel Schles at ras277@pitt.edu . Do not hesitate to contact Rachel if you have questions while completing the survey or to set up a phone call. Your name and contact information will be kept confidential.

Name:
Email:
Phone:
Job Title:
Department:
State:

NOTE: In this survey, all questions relate to the 2017-2018 school year. For the purposes of this survey, "2017-18 Child Count" refers to the federally mandated child count which occurs in each state between October 1-December 1 in 2017. Many states also refer to this as the "December 1 count."

1. Please verify the following **2017-18 School Year Child Count** regarding the number of students with visual impairments including blindness as a primary disability in your state (Child Count occurring in October-December 2017). If any of the values are incorrect, please provide the correct number of students with visual impairments.

Part B Services (school age/3-22 years old): 317 students
This number is Correct ☐
This number is Incorrect ☐ The correct number is:

Part B Services Children 6-22 years old (K-12): 271 students
This number is Correct ☐
This number is Incorrect ☐ The correct number is:

Part B Services Children 3-5 years old (preschool): 46 students
This number is Correct ☐
This number is Incorrect ☐ The correct number is:

Since Child Count only reports students by their primary disability, we are also interested in learning about the total number of students with visual impairments including blindness that your state serves.

Note: Often this type of information is not available formally, but you may have informal information regarding the total number of students with visual impairments including blindness. Questions 2A and 2B refer to all students with visual impairments including blindness, even if their visual impairment is not the students' primary disability.

2A. During the **2017-18 school year** what is the total number of students in your state who were eligible with a visual impairment including blindness as a **primary or secondary disability**? Please check the correct box to indicate if the number you have provided is an exact count of all students with visual impairments including blindness, is an estimate, or partial count for your state.

Age/Demographic	Number of students	The number provided is an **exact count**	The number provided is an **estimate**	The number provided is a **partial count***
3-22 years old		☐	☐	☐
6-22 years old (K-12)		☐	☐	☐
3-5 years old (Preschool)		☐	☐	☐

* If you provided a **partial count**, please describe which students are represented in your partial count:

(Please type your response here)

☐ Check this box if do not have any information (formal or informal) regarding the total number of students with visual impairments including blindness in your state

2B. Did your state track the number of infants/toddlers identified with visual impairments including blindness served during the 2017-18 school year?

Yes ☐

No ☐

If yes, please provide the number of infants/toddlers receiving vision services during the 2017-18 school year:

In my state, early intervention services support infants/toddlers who are:

Birth- 2 years old ☐

Birth- 3 years old ☐

3A. How does your state collect and verify the data you provided regarding the total number of students with visual impairments including blindness (information provided in Questions 2A and 2B)?

(Please type your response here)

3B. If your state uses a form or template to collect data, would you be able to share a sample of the form you use?

Yes ☐ (Attach form with your survey response)

No ☐ (No template and/or no statewide data collection procedures)

No ☐ (Unable to share template. Please consider a phone call with Rachel if you are

unable to share your state's survey format directly)

4. Optional; additional information you would like to share:

(Please type your response here)

Appendix D Examples of Eligibility Criteria

Federal Definition

Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

Source: https://sites.ed.gov/idea/regs/b/a/300.8/c/13

California

Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

Source:https://govt.westlaw.com/calregs/Document/I373AB03442904938AF3AC9CC81652730?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

Delaware

6.17.1 Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

6.17.2 This eligibility determination requires a thorough and rigorous evaluation with a data-based media assessment which is based on a range of learning modalities and includes a functional visual assessment.

6.17.3 The age of eligibility for children identified under this section shall be from birth until the receipt of a regular high school diploma or the end of the school year in which the student attains the age of twenty-one (21), whichever occurs first.

Source: http://regulations.delaware.gov/AdminCode/title14/900/925.shtml

Virginia

Eligibility as a child with a visual impairment.

1. The group may determine that a child has a visual impairment if:

a. The definition of "visual impairment" is met in accordance with 8VAC20-81-10;

b. There is an adverse effect on the child's educational performance due to one or more documented characteristics of visual impairment; and

c. The child: (1) Demonstrates the characteristics of blindness or visual impairment, as outlined in subdivisions 2 and 3 of this subsection; or (2) Has any of the conditions including, but not limited to, oculomotor apraxia, cortical visual impairment, and/or a progressive loss of vision, which may in the future, have an adverse effect on educational performance, or a functional vision loss where field and acuity deficits alone may not meet the aforementioned criteria.

2. A child with blindness demonstrates the following:

a. Visual acuity in the better eye with best possible correction of 20/200 or less at distance or near; or

b. Visual field restriction in the better eye of remaining visual field of 20 degrees or less.

3. A child with a visual impairment demonstrates the following:

a. Visual acuity better than 20/200 but worse than 20/70 at distance and/or near; or

b. Visual field restriction in the better eye of remaining visual field of 70 degrees or less but better than 20 degrees.

Source: http://www.doe.virginia.gov/special_ed/regulations/state/regs_speced_disability_va.pdf

Alabama

(a) Definition. Visual Impairment means a visual impairment that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

(b) Criteria.

1. Evidence that hearing screening results are satisfactory prior to proceeding with evaluations.

2. Optometric/ophthalmic data indicating that the individual has a visual impairment.

3. Evidence of visual functioning that adversely affects educational performance as evaluated by a certified vision specialist.

(c) Minimum Evaluative Components.

1. Hearing screening.

2. Optometric and/or ophthalmic evaluation indicating that the individual has a visual impairment.

3. Documentation of educational problems that even after appropriate accommodations, the disability continues to affect educational performance. Educational problems may be assessed by a certified vision specialist through one or more of the following:

(i) A learning media assessment,

(ii) Functional vision assessment, and/or

(iii) An orientation and mobility evaluation.

Source: http://alabamaadministrativecode.state.al.us/docs/ed/290-8-9.pdf

Appendix E Regression Variables

Appendix E Table 1 Regression Variable Codebook Table

Conceptual Grouping	Variable Name	Description	Coding	Notes
Legal Component	FEDDEF	Alignment with the federal definition	0: no alignment for definition & includes criteria 1: not verbatim but no substantive differences & includes criteria 2: Verbatim but includes criteria 3: No alignment, no additional criteria 4: Not verbatim but no substantive differences & no criteria 5: Verbatim & no criteria	Federal definition is: Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness. https://sites.ed.gov/idea/regs/b/a/300.8 If the state has added content to the federal definition, it is not considered aligning or not verbatim but no substantive differences, code as "no alignment"

Conceptual Grouping	Variable Name	Description	Coding	Notes
Legal Component	REGS	Are eligibility criteria defined in the state regulations or by the department of education	Department of Education (0), State Regulations (1)	DOE includes handouts or technical assistance materials
Qualifying Conditions	BETEYE	Eligibility is based on use of the better eye	no (0) yes (1)	Eligibility criteria requires potential eligibility status for VI services as defined by the acuity or limited use of the better eye, not the ability to use both eyes.
Qualifying Conditions	LOWVI	low vision (including partially sighted, etc.)	no (0) yes (1)	Does the eligibility criteria discuss & define students with low vision/visual impairment/partial sight separately from students who are blind in a quantitative way? The phrase "Partial sight refers to the ability to use vision as one channel of learning if educational materials are adapted." does not count because needs to be quantitative
Qualifying Conditions	LOWACU	the best visual acuity which may qualify a student	20/40 coded as 40, 20/70 coded as 70, etc., (-1) if no acuity stated (-9) if low vision is defined but no threshold acuity is provided	

Conceptual Grouping	Variable Name	Description	Coding	Notes
Qualifying Conditions	LEGBL	legal blindness (20/200 visual acuity)	no (0), yes (1)	Does the eligibility criteria discuss legal blindness and/or provide separate criteria for students who are legally blind in a quantitative way? The phrase "Blindness refers to the prohibition of vision as a channel of learning, regardless of the adaptation of materials." does not count because needs to be quantitative
Qualifying Conditions	FIELD	Visual field loss/restriction	no (0), yes (1)	Does the eligibility criteria include visual field loss or visual field restrictions?
Qualifying Conditions	FDEG	Visual Field Degree	20° coded as 20, 60° coded as 60, etc. (-1) if visual field loss is not included (-9) if visual field loss is included but no threshold field loss is provided	If there are 2 threshold degrees which would qualify a student, list the more inclusive value (e.g. state allows 20° and 70°, code as 70)
Qualifying Conditions	CVI	cortical, cerebral or neurological visual impairment	no (0), yes (1)	Is CVI or related terms discussed?
Qualifying Conditions	PROG	a visual condition which is progressive though the student may not meet other criteria at this time	no (0), yes (1)	Student does not currently meet criteria, but it is known their vision will get worse in the future

Conceptual Grouping	Variable Name	Description	Coding	Notes
Qualifying Conditions	BIVI	a student may qualify with a binocular vision issue (e.g. accommodative insufficiency, strabismus, etc.)	no (0), yes (1)	Additional terms may include muscle imbalances or issues,
Assessment Components	EYERPT	Does the state require an eye report from a medical professional	No (0), conditionally (1), yes (2)	Eye report may be from an optometrist, ophthalmologist, or neurologist
Assessment Components	ACU	Does the state provide a threshold acuity or medical diagnosis but does not require an eye report?	No (0), conditionally (1), yes (2)	e.g. requires 20/70 or worse acuity but does not specify that an eye report is needed to be eligible
Assessment Components	FVA	Does the state require a functional vision assessment	No (0), conditionally (1), yes (2)	Term “functional vision” or assessment of functional vision must be used
Assessment Components	LMA	Does the state require a learning media assessment	No (0), conditionally (1), yes (2)	Terms may include learning media assessment, evaluation of learning media, or need for braille instruction.
Assessment Components	ECC	Does the state require an expanded core curriculum assessment	No (0), conditionally (1), yes (2)	Term “expanded core curriculum assessment” must be used
Assessment Components	OM	Does the state require an orientation and mobility screening or assessment?	No (0), conditionally (1), yes (2)	
Assessment Components	EDIMP	Does the state require an educational impact of the visual impairment?	No (0), conditionally (1), yes (2)	Terms may include “adverse,” “educational,” “functional” impact, or requiring the student needs special materials

Conceptual Grouping	Variable Name	Description	Coding	Notes
Eligibility Team Member	TVI	Is a teacher of students with visual impairments/teacher of the visually impaired required to conduct assessment(s) or being on the eligibility team?	No (0), conditionally (1), yes (2)	The term “vision specialist” may be counted as a TVI
Eligibility Team Member	COMS	Is an orientation & mobility specialist required to conduct assessment(s) or being on the eligibility team?	No (0), conditionally (1), yes (2)	(previously coded as OMS)
Eligibility Team Member	VITEAM	Does the state require that a ‘vision professional’ of any type be on the eligibility team?	No (0), conditionally (1), yes (2)	This includes TVIs, O&MS, and optometrists or ophthalmologists if listed as team members (do not include optometrists or ophthalmologists if only a reported is needed from them).
State Demographics	PPE	average per pupil expenditure for school age children in the state	dollar amount as reported	American Community Survey, 5-year data
State Demographics	POV5	percentage of children 5-17 years old living under the poverty line in the state	Percentage to two decimal places	American Community Survey, 5-year data
State Demographics	GEO	geographic region of the state, as defined by the US Census Bureau	1 through 4	https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf
State Demographics	PERCAP	Per capita income	Dollar amount as report	American Community Survey, 5-year data

Conceptual Grouping	Variable Name	Description	Coding	Notes
State Demographics	SBLIND	Does the state maintain a school for the blind?	no (0), yes (1)	
State Demographics	SDB	Type of School for the blind	no school (0) combined school for the deaf and school for the blind (1) school for the blind (2)	
State Demographics	UNITVI	Is there a college/university preparation program for TVIs in the state?	no (0), yes (1)	
State Demographics	UNIOM	Is there a college/university preparation program for COMS in the state?	no (0), yes (1)	
State Demographics	OPTO	Number of optometrists in each state as of May 2018	Continuous	https://data.bls.gov/oes/#/home
State Demographics	POP	Total number of people in the state, July 1, 2017	Continuous	https://www.census.gov/newsroom/press-kits/2018/pop-estimates-national-state.html Used table 1: NST-EST2018-01: Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2018
State Demographics	PEROPTO	Percentage of optometrists to the entire state population	Percentage	Calculated by: OPTO / POP x 100

Appendix E Table 2 Variables for Calculation Purposes & Outcome Variables

Title	Variable Name	Description	Coding
CCP	Child Count Preschool (3-5)	Continuous, -1 indicates value suppressed.	Number of children 3-5 years old with visual impairments a primary disability, reported, 2017-18 school year
CCS	Child Count School age (6-21)	Continuous, -1 indicates value suppressed.	Number of children 6-21 years old with visual impairments a primary disability, reported, 2017-18 school year
CCT	Child Count Total (3-21)	Continuous, -1 indicates value suppressed.	Number of children 3-21 years old with visual impairments a primary disability, reported, 2017-18 school year
TCP	Total Count Preschool (3-5)	Continuous, -1 indicates value reported unknown -9 indicates no response or blank	Total number of children 3-5 years old with VI, regardless of primary disability status, 2017-18 school year
TCS	Total Count School Age (6-21)	Continuous, -1 indicates value reported unknown -9 indicates no response or blank	Total number of children 6-21 years old with VI, regardless of primary disability status, 2017-18 school year
TCT	Total Count Total (3-21)	Continuous, -1 indicates value reported unknown -9 indicates no response or blank	Total number of children 3-21 years old with VI, regardless of primary disability status, 2017-18 school year
PTTLP	Preschool (3-5) total special education population	Continuous, -1 indicates value suppressed.	Total number of children in the state 3-5 years old receiving special education services, 2017-18 school year
STTLP	School age (6-21) special education total population	Continuous, -1 indicates value suppressed.	Total number of children in the state 6-21 years old receiving special education services, 2017-18 school year

Title	Variable Name	Description	Coding
TTLSP	Total special education student population	Continuous, -1 indicates value suppressed.	Sum of 3-5 and 6-21 federally reported data of total students in the state receiving special education services, 2017-18 school year
PRELVCC	Prevalence with VI Child Count	Continuous to 8 decimal places -1 indicates value does not exist	Calculated by dividing the total special education population (3-21 years old) by the number of children w/VI as a primary disability (CCT / TTLSP)
PREVLT	Prevalence with Total VI Population	Continuous to 8 decimal places -1 indicates value does not exist	Calculated by dividing the total special education population (3-21 years old) by the total number of children w/VI in the state (TCT / TTLSP)
PREVCC	Percent of children with VI based on Child Count	Continuous to 8 decimal places -1 indicates value does not exist	Calculated by dividing the total special education population (3-21 years old) by the number of children w/VI as a primary disability and multiplying by 100 (CCT / TTLSP x 100)
PREVT	Percent of children with visual impairments receiving special education	Continuous to 8 decimal places -1 indicates value does not exist	Calculated by dividing the total special education population (3-21 years old) by the total number of children w/VI in the state and multiplying by 100 (TCT / TTLSP x 100)
PREVRA	Ratio of child count VI numbers to total prevalence of students with VI	Continuous to 8 decimal places -1 indicates value does not exist	Ratio: PREVCC / PREVT (value in %)

Appendix F Sample Focus Group Participant Recruitment Email

Hello [*recipient's name*],

I am in the process of conducting my dissertation at the University of Pittsburgh, and I wanted to invite you to participate in the focus group portion of my research. I am reaching out to you and a few other state-level vision administrators to learn more about your professional experiences and opinions about statewide data collection programs and factors which associated with the portion of students identified with VI for special education services.

Following up on the pilot study I ran last year (thank you again for completing the survey for [*their state*]!), one of the key survey findings was only about 50% of states know the total number of students with visual impairments including blindness (VI) in their state receiving services. There are significant implications for our students and colleagues, as many states are making decisions without knowing how many students they are supporting. [For those in a state without a data collection program in place: *Based on our conversations and your survey response last year, I know [state] does not currently have a system in place to count your total number of students with VI. I highly respect you as a professional and hope you will consider sharing your experiences so that we can identify strategies for all states to implement statewide data collection programs.]*

Participation in this study will include: A brief survey about your experiences with statewide data collection programs. Approximately 2-4 focus group meetings, conducted via recorded Zoom meetings, where you will get to chat with other state-level administrators. (I will send general conversation topics for each meeting in advance and facilitate the conversation.)

Please do not hesitate to follow up with any questions you may have. I can be reached at ras277@pitt.edu or by phone at 845-XXX-XXXX. If you could let me know by [*date ~2 weeks in the future*] if you are interested in participating, I would greatly appreciate it.

Thank you in advance for considering this opportunity,
Rachel Schles

Rachel Anne Schles, M.Ed., TVI
Doctoral Candidate - Vision Studies Program, University of Pittsburgh
Scholar - National Leadership Consortium in Sensory Disabilities

Appendix G Consent Form – Understanding the Prevalence of Students with Visual Impairments

The purpose of this research study is to determine strategies for implementing statewide data collection programs regarding students with visual impairments including blindness (VI) and gaining insights into why certain factors correlate with the number of students with VI identified for special education services in the US. For that reason, I will be conducting focus group meetings with state-level administrators with experience working with students with VI. Focus group meetings will occur where a few administrators (approximately 3-4) from different states can discuss these topics and share their experiences. It is anticipated a total of 2-4 focus group meetings will be conducted, lasting approximately 60-90 minutes each. If you feel you have more to share on the topics than can be covered in the survey and during focus group meetings, there is there option for an additional individual interview. After the focus groups are completed, you will be invited to complete a member check, verifying whether analysis aligns with what was shared during focus group sessions.

There are no anticipated risks to your participation in this study other than those encountered in daily life. You will have no direct benefits from participating in this study. You will not receive any compensation for participating in this study. All focus group meetings will be recorded (video recorded via video conference call or audio or video recorded in person) so that the conversation can be transcribed for analysis.

This study does not meet the federal definition of Human Subject Research per University of Pittsburgh's Human Research Protection Office. Therefore, this study is not overseen by a human research protection office / institutional review board (IRB).

Your participation is voluntary, and you many withdraw from the study at any time. This study is being conducted by Rachel Schles, who can be reached at ras277@pitt.edu if you have any questions.

Rachel, a few people assisting in the research, and other focus group participants will know your identity. However, your name will not be included in any written or presented work about the focus group. Please select the options below you are most comfortable with (check one box for each question).

When disseminating the findings of the focus group, I prefer:

- ☐ My job title and name of my state(s) can be used
- ☐ The name of my state(s) and only generic/non-specific job title can be used
- ☐ Indirect references only (e.g., instead of Maine, a state in the Northeastern US, and generic job description/title) can be used

May your name be used in any general acknowledgements and thanks in Rachel's finished dissertation? You will not be identified as a focus group participant, but readers may infer a connection.

☐ I give permission for my name to be included

☐ I prefer to be acknowledged anonymously

Name & Title:

Contact information (email & phone):

Signature:

Date:

Appendix H Focus Group Written Survey

Name:

Please answer the following questions. The term “students with visual impairments” (VI) refers to all students with visual impairments including blindness who were found eligible for special education services in the category of “visual impairments including blindness.” These students may or may not have additional disabilities and/or be deafblind.

1. What experience do you have collecting statewide data on students with visual impairments (VI)?
2. Does your state have a system in place to collect total population data on all students with VI in the state?
3. If yes, do you pair your system with the APH annual census or federal Child Count “December 1 Count?” Why/Why not?
4. If yes, do you publish your total population count publicly?
5. What does your data collection system look like? (platform & procedures)
6. Do you collaborate with certain agencies to collect data? (If yes, what agencies?)
7. Do you collect data on all students with VI or a subset of students? (Please describe.)
8. Do you collect any data other than number of students and their grade level?
9. If so, what kinds of questions do you ask / data do you collect?
10. How do you manage potential threats to student confidentiality?
11. Who completes your survey and at what time of year?
12. Is there a template you can share? (If yes, please attach to your response.)
13. Have you faced any obstacles collecting population data, or attempting to collect population data? (If yes, please describe.)
14. How did you navigate these obstacles?
15. Do you count students with 504 plans for visual impairments in your total population counts? Why/why not?
16. Are there any topics or issues relating to statewide data collection and Child Count versus total population of students with VI you are looking forward to hearing about from other administrators during the focus group session(s)?
17. Is there any additional information you’d like to share?

Appendix I Focus Group Discussion Points Topic 1 (Meetings 2 and 3)

Introduction

Thank you for taking the time to participate in this discussion. Currently, less than half of the 50 states have systems in place to count their population of students with visual impairments (VI; birth-22 years old). This means in many states, decisions about hiring, program planning, and overall services for students with VI are being made without knowing how many students need services or access to TVIs and O&M Specialists.

As we get started, I ask you to commit to a few ground rules. Please keep today's conversation confidential, which I hope will also help ensure you feel safe sharing any relevant professional experiences, positive and negative. Everyone comes here today with diverse experiences across different states. Please respect that each state takes a slightly different approach to special education; as we well know, resources are unfortunately not equally distributed and we're all working to do the best we can to support our students. I have some guiding questions for our conversation, but please do not hesitate to pose a question to the group based on your own experience collecting statewide data on our student population. Thank you again for participating today-let's get started!

Discussion Questions

Below are some conversation starter questions and a summary of the responses to the focus group written survey. Today we are only discussing how to collect data on all students with visual impairments in a state, (*not discussing federally mandated Child Count which only considers students with a primary disability of VI).*

1. In an ideal situation, what kinds of data would you collect to best understand students with VI in each state?

<u>Follow up questions based on the written survey comments:</u>

- Summary data collection categories included (big variations across states; few states collect all of the information listed below):
    - Family Demographics (i.e. demographic info; financial info)
    - Individual Information (i.e. eye/medical info including eye condition & etiology; additional disabilities, date of last eye exam, reading/math levels)
    - Special Education Information (i.e. TVI and O&M service time, primary media, technologies used for access, IEP/504 plan status)

- What would be the purpose of the data you want to collect?
- How would you want to use the data you collect on the state's students with visual impairments?
- Would you want the data to be publicly available, and easy to access? Why/Why not?

2. A variety of types of data collection systems were discussed in the survey responses, would anyone like to start the conversation by saying a little more about why you/your state uses a specific the approach?

   Follow up questions based on the written survey comments:
   - Every state reported a different way of collecting or reporting data (for example; database developed/maintained by a private company, database maintain by the school for the blind, database maintained by lead vision agency in the state), and some had LEAs/districts enter data, others collected the data from schools/districts and then entered the data themselves. What are the pros and cons of these approaches based on your experiences?
   - 4 states pair their total population data collection with the APH annual census; 2 states use their total population data collection to gather the data needed for APH's annual census. What benefits or drawbacks are there for combining the APH annual census with a census of all students with VI in a state?
   - Most data collection systems reported here are run by Schools for the Blind and/or state Instructional Materials/Resource Centers. The most common collaborators in data collection are school districts and LEAs (local education agencies) (4 states), and the Department/Commission for the Blind (2 states). Other collaborations mentioned included School for the Deaf, State Early Intervention Agency, School for the Blind, and Instructional Materials/Resource Center. Based on your experiences, what are the pros and cons of collaborating with agencies to gather information? Are more agencies better or make data collection more complicated?

3. Several obstacles to data collection were discussed in the written surveys; What recommendations do you have to colleagues on navigating potential obstacles?

   Follow up questions based on the written survey comments:
   - The obstacles in the written survey can be summarized into 4 themes:
     1. Local/regional education agencies (LEAs) not providing data (i.e. difficulty getting schools to provide data, time constraints, low response rates)

2. Technology issues (i.e. difficulty with different databases "talking" to each other; districts concerned with security of online survey; districts refusing to use digital database and only completing paper forms).
3. Parents' concerns about confidentiality and/or data sharing (not providing consent for their child's data to be reported, even without their name; parents not completing requested surveys)
4. Individual Error / The Human Factor (i.e. answering survey questions incorrectly due to lack of professional knowledge; inconsistencies in data entry because accuracy depends on the person entering the data, professionals unwilling to learn the survey/system)

- How have you addressed these issues in your own state?
- Are there solutions you have tried that were not successful?
- Are there other obstacles not listed that you have tried to address? (please discuss)

4. Are there certain resources or advice professionals should have before attempting to implement a statewide population count?

Follow up questions based on the written survey comments:

- What strategies have you found helpful when trying to collect data?
- What other topics relating to data collection do you want to discuss?

Appendix J Focus Group Handout for Topic 2 (Regression Model Variables)

Introduction

State population counts of students with visual impairment as their primary disability (Child Count data) are typically much lower than states' total population of students with visual impairments (that is, regardless of primary disability). The relationship between these two counts seems to correlate with different factors. In today's conversation, I would like to know why you think these relationships might exist.

The following handout describes state-level factors corresponding to the number of students with visual impairments including blindness identified for special education services in the US. Each of these variables were statistically significantly correlated to the number of students with VI during the 2016-17 school year.

Statistical models can only calculate the <u>average</u> experience. As a result, for each variable described in this handout, you will see examples for an imaginary "average state" that has the average number of students in special education.

The purpose of this focus group meeting is for you to share your insights and experiences in real states. This allows us to have a deeper, more meaningful understanding of these relationships beyond the "average." Please share how these "average" relationships may or may not reflect the experiences of students in your states.

Population Count: CHILD COUNT

Child Count only reports students with a primary disability label of “visual impairments including blindness.”

Three variables correspond with the number of students with VI that states reported in the 2016 annual Child Count (December 1).

A. Legal location of eligibility criteria (whether the criteria are issued by state legislatures versus state departments of education);
B. Requiring an O&M Specialist to participate in eligibility meetings (whether an O&M Specialist is required never, sometimes, or always); and
C. The percentage of children in the state living at or below the poverty line.

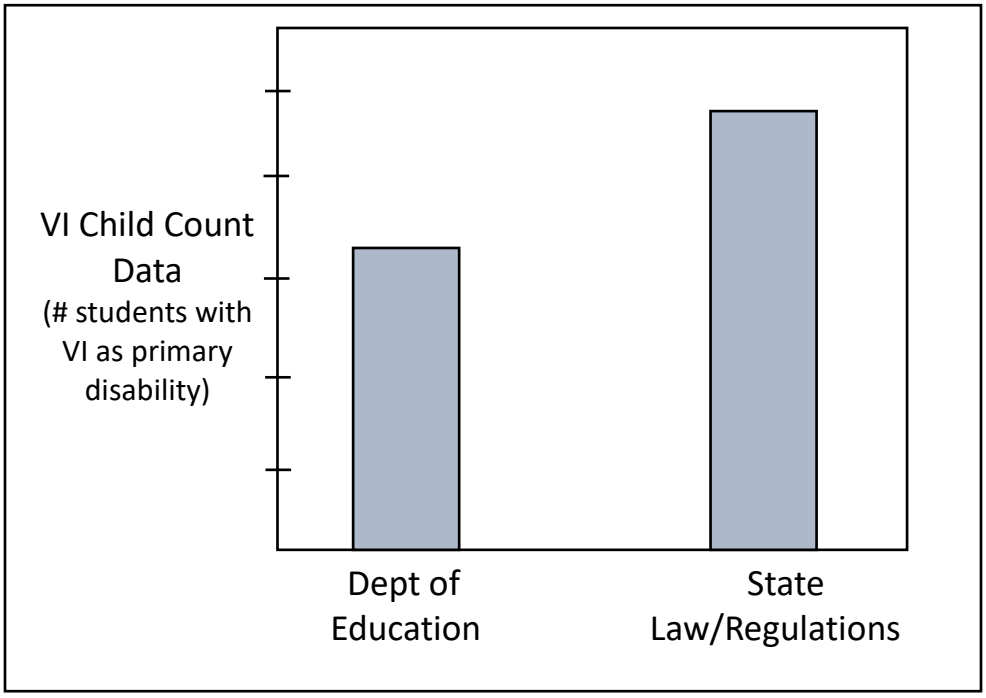
A. On average, states with eligibility criteria in their state regulations had a higher number of students with VI in their Child Count data than states whose eligibility criteria issued was by states' departments of education.

"Average State" – national average childhood poverty rate of 19%, O&M specialist not required to participate in eligibility criteria decisions, and the national average of number of students receiving special education services (~137,000 students).

In this average state, the number of students with VI reported in 2016 Child Count data varied depending if the legal location of eligibility criteria is…

- In policy documents by the state department of education: 446 students
- In state regulations (law): 524 students

Legal Location of Eligibility Criteria



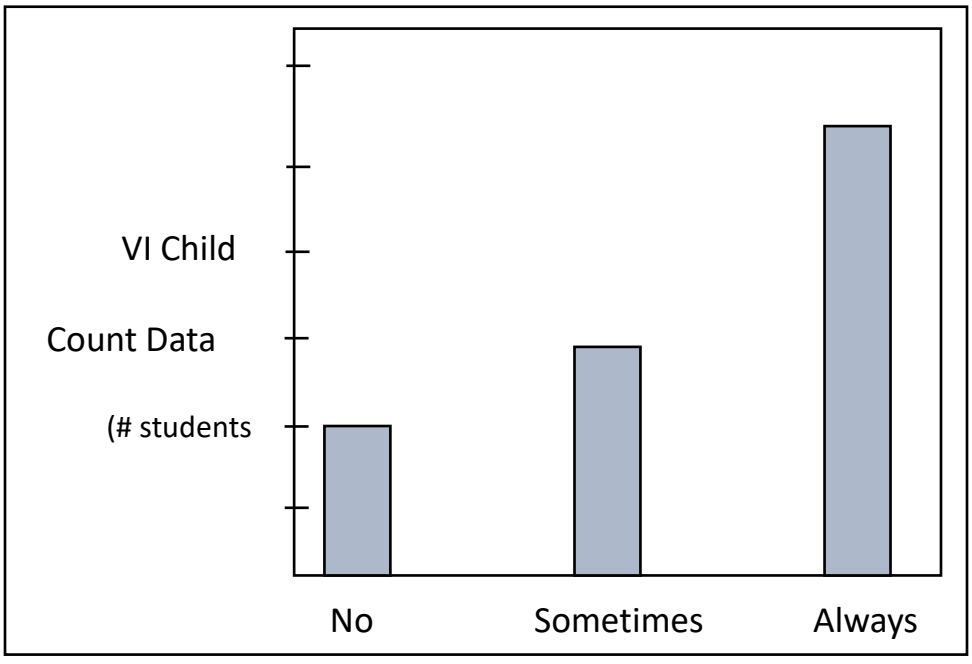
B. On average, states that required O&M specialists to participate in eligibility team meetings for students with suspected VI report higher numbers of students with VI than states that did not require an O&M specialist on an eligibility team.

"Average State" – national average childhood poverty rate of 19%, eligibility criteria written into state regulations, and the national average of number of students receiving special education services (~137,000 students)

In this average state, the number of students with VI reported in 2016 Child Count data varied depending if an O&M Specialist was…

- Not required when considering VI eligibility: 527 students
- Sometimes required when considering VI eligibility: 670 students
- Required for all eligibility meetings considering VI eligibility: 1,353 students

O&M Specialist Required to Participate in Eligibility Meetings



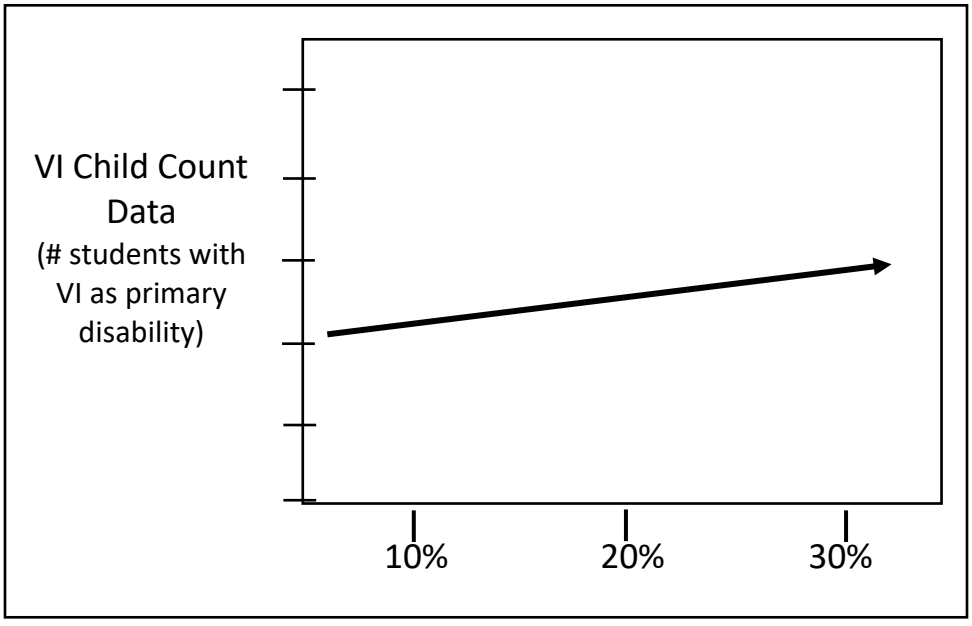
C. On average, states with a higher percentage of children living in poverty had a higher number of students with VI in their Child Count data than states with a lower percentage of children living in poverty.

"Average State" – eligibility criteria written into state regulations, O&M specialist not required to participate in eligibility criteria decisions, and the national average of number of students receiving special education services (~137,000 students).

In this average state, the number of students with VI reported in 2016 Child Count data varied depending if the childhood poverty rate was…

- At the 25th percentile nationally (15%): 469 students
- At the 50th percentile nationally (19%): 524 students
- At the 75th percentile nationally (23%): 576 students

Percentage of Children Living Under the Poverty Line



Population Count: TOTAL POPULATION

Total Population includes all students with “visual impairments including blindness,” regardless of whether their visual impairments are a primary or secondary label.

Three variables correspond with the total number of students with VI in a state, regardless of primary disability during the 2016-17 school year:

1. States’ eligibility criteria does / does not specify cortical, cerebral or neurological visual impairments (“CVI”) as a qualifying condition;
2. States’ eligibility criteria does / does not require a documented adverse educational impact of visual condition for students to qualify; and
3. The average per capita income in the state.

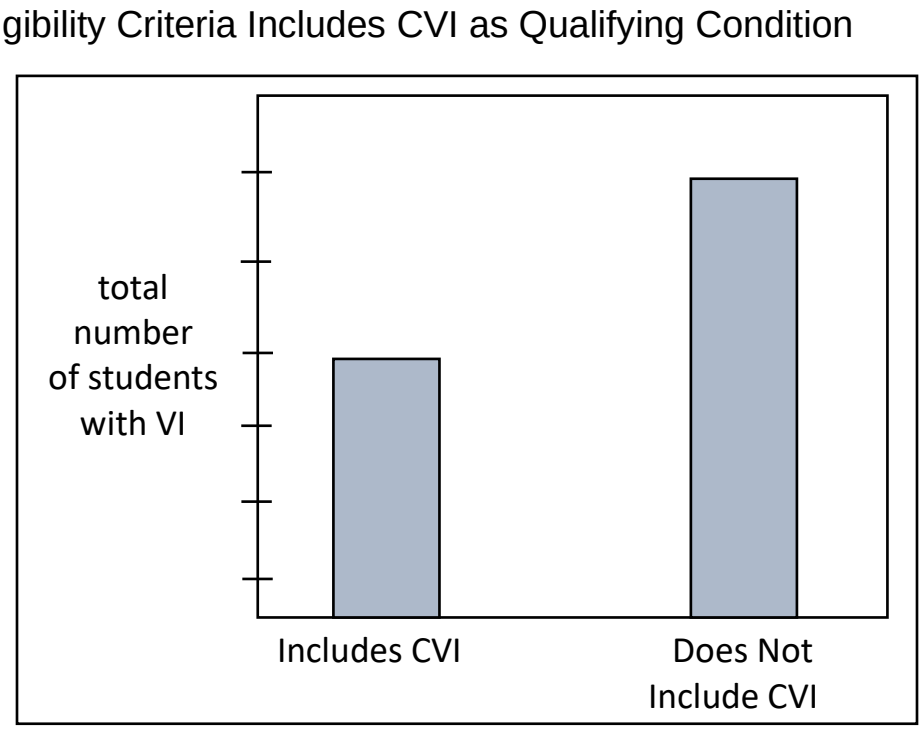
Note: The following statistical model only included 27 states with total population counts for all school-aged children. Therefore, generalizations to all US states cannot be made.

1. On average, states that specify cortical, cerebral and/or neurological visual impairments ("CVI") as a qualifying condition for students with visual impairments including blindness had a smaller total population of students with VI than states that did not specify CVI as a qualifying condition.

"Average State" – eligibility criteria required documentation of an adverse education impact of VI; average per capita income ($29,225), and the national average of number of students receiving special education services (~137,000 students).

In this average state, the total number of students with VI (regardless of primary disability status) reported during the 2016-17 school year varied depending if state eligibility criteria did…

- Include CVI as a qualifying condition: 930 students
- Not include CVI as a qualifying condition: 1,601 students

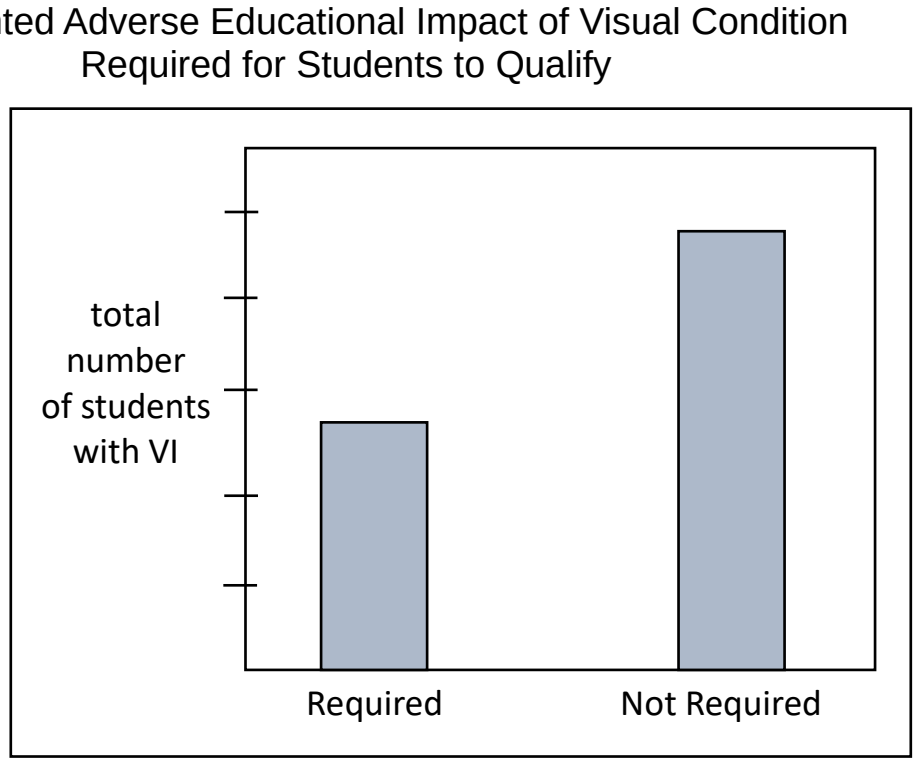


2. On average, states that required documented adverse educational impact of a student's visual condition as criteria for qualifying as a student with visual impairments including blindness had a smaller total population of students with VI than states that did not require such documentation.

"Average State" – eligibility criteria did not list CVI as a qualifying condition, had the average per capita income ($29,225), and the national average of number of students receiving special education services (~137,000 students).

In this average state, the total number of students with VI (regardless of primary disability status) reported during the 2016-17 school year varied depending if state eligibility criteria…

- Required documented adverse educational impact: 1,601 students
- Did not require documented adverse educational impact: 2,415 students

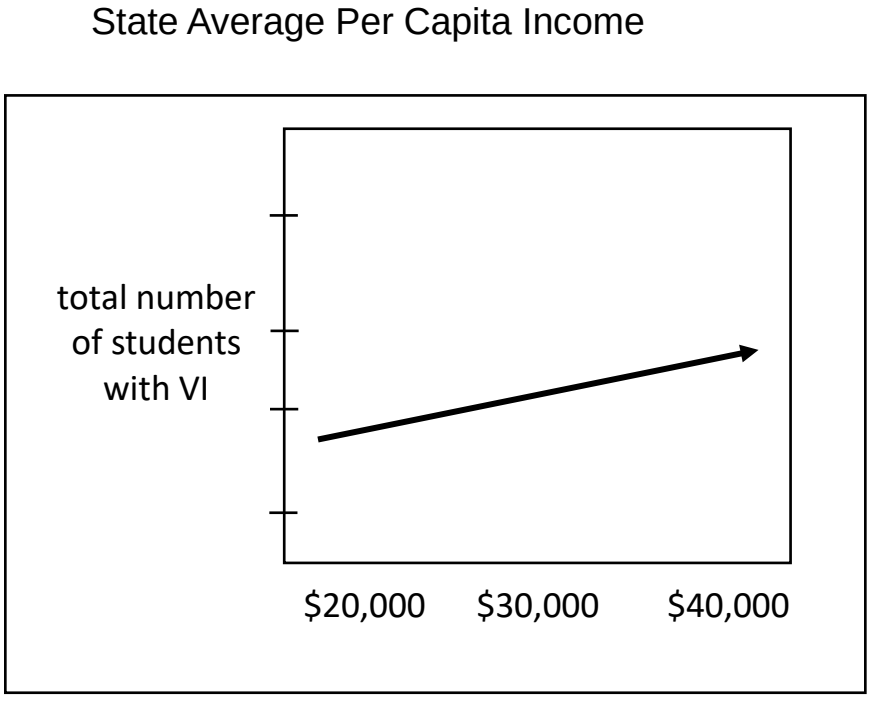


3. On average, the states with higher average per capita incomes had larger total populations of students with VI than states with lower average per capita incomes.

"Average State" – eligibility criteria did not list CVI as a qualifying condition, eligibility criteria required documentation of an adverse education impact of VI, and the national average of number of students receiving special education services (~137,000 students).

In this average state, the total number of students with VI (regardless of primary disability status) reported during the 2016-17 school year varied depending if the state's average per capita income was…

- At the 25th percentile ($26,019): 1,338 students
- At the 50th percentile ($29,225): 1,601 students
- At the 75th percentile ($31,904): 1,820 students



*Note: Percentile values based on the 27 states in this model, not national average. National average percentile values across all 50 states are very similar, only a few hundred dollars different than the values listed here.

Additional Question:

- In the current study, state level factors are being considered in the statistical analyses. This includes factors like components of eligibility criteria, per capita income, and geographic region. Are there other state demographic or vision-specific variables you think would be important or interesting to include? Please discuss.

Appendix K Qualitative Thematic Codes from Focus Group Meetings on Data Collection Strategies

Major Thematic Category (*subthemes*)	Definition (*select subthemes*)
Advice or Recommendations[2,3]	Comments include explicit advice and/or recommendations for others attempting to collect data
Collaboration & interagency agreements	Examples and non-examples of collaboration between agencies or stakeholders. Additional themes within this subtheme included, "vision coalitions"
National data collection effort	Discussion of pros/cons of national effort for data collection (compared to state-run system). Additional themes within this subtheme included, "APH leading data collection"
Purpose of data collection	Why total population data collection is needed, and what purposes having such data could serve. Additional themes within this subtheme included, "addressing TVI and O&M shortage," "parent needs," "professional development needs," "technology and resource allocation," and "understanding eligibility."
Understanding the purpose of data collection	Making sure the purpose of data collection was clear to all stakeholders and those involved. Additional themes within this subtheme included, "explaining buy in."
Sharing data with others	How collected data would be shared with others, including education and non-education agencies. Additional themes within this subtheme included, "reporting aggregate data," "secure data system," and "using the data well."
We've got a lot we can learn from each other	Benefits of learning from what is going on in other states, even if it's different from what can happen in one's own state.

Major Thematic Category (*subthemes*)	Definition (*select subthemes*)
Data Collection Systems[1,2]	Descriptions and logistics of total population data collection systems participants provided based on experience collecting statewide population data
Connection between state department of education and vision program	Discussion on the experiences of administrators based on the degree to which the state department of education was aware of the needs of the state vision program and students with visual impairments
Data we want to collect	Descriptions and justifications for the types of data that could be collected. Additional themes within this subtheme included, "family demographics," "justification for TVI preparation and hiring," "learning media decisions," "service providers," "student information."
Logistics for data collection & reporting	Descriptions and ideas around the logistics of data collection and reporting out data. Additional themes within this subtheme included, "multiple data collection tools," "statewide IEP system," "system security."
Non-mandated data	How programs and/or administrators were collecting data that was not federally mandated. Additional theme within this subtheme included, "LEAs tracking data."
Pairing with APH census	Discussion around the pros and cons of pairing total population data collection with the APH annual census as well as expanding the APH census.
Limits of primary disability labels	Discussions of the limitations of Child Count data only looking at students by their primary disability. Additional theme within this subtheme included, "child count versus total population data."
Obstacles in Data Collection[2,3]	Descriptions and observations on the obstacles faced during data collection efforts
Individual error-human factor	Examples and experiences around errors in data collection. Additional themes within this subtheme included, "accuracy concerns," and "lack of understanding."
LEAs not providing data	Experiences of local education agencies (LEAs) not providing requested data. Additional themes within this subtheme included, "is census from department of education or outside entity," and "money and resources tied to data reporting."

Major Thematic Category (*subthemes*)	Definition (*select subthemes*)
Navigating obstacles	Descriptions of navigating obstacles faced during data collection and reporting. Additional themes within this subtheme included, “ensuring TVIs entering data,” “failed attempts at data collection,” and “providing training for data reporting.”
Paperwork & federal limits	Experiences with state governments imposing paperwork reduction mandates, and/or only collecting data mandated by the federal government.
Parents’ concerns about confidentiality	Discussions and examples of parents’ concerns about how their children’s information would remain confidential in a data collection system
Part C vs Part B	Limitations of navigating between IDEA Part C (early intervention) services to IDEA Part B (school age) services, and how the two systems are very different.
Technology and technological issues	Obstacles faced in the technology used to collect data and examples of technology issues that participants had to navigate during data collection.

Note: Footnotes indicate primarily where the data was applied withing the “what, how, and why” of data collection synthesis. [1]what data, [2]how to implement; [3]why collect data.

Appendix L External Audit Findings

Letter 1 Focus Group Written Survey

February 16, 2020

Hello Rachel,

I have completed my first audit. The goal was two-fold:

1) ensure data was accurately transposed and synthesized from nine written responses of focus group surveys; and
2) assess the use and representation of survey responses to develop focus group questions/talking points for Topic 1 focus group discussions.

Audit 1, Goal 1

All survey responses were accurately transposed into the "General coding of written responses to develop FG questions.docx" you used to code and synthesize the responses. Synthesis was also handled logically, with some basic summaries compiled for some survey responses and more in-depth analysis for the later questions in the survey.

Audit 1, Goal 2

Discussion and follow-up questions were developed with clear connection to survey responses (as represented in "FG Meeting 2 Questions revised.docx" document). Summary responses were accurately represented, and synthesis of the survey responses were presented accurately and appropriately for the audience. The only item of concern is listed below, as I didn't see this perspective described in either of the other two documents:

- pg 2 – Q3, number 3 – "*Parents' concerns about confidentiality and/or data sharing (not providing consent for their child's data to be reported, even without their name…*". .

Please reach out with any questions or concerns – I'm happy to meet and discuss my audit and feedback.

Cheers,

- Justin

Justin N. Coy, M.Ed., BCBA
Ph.D. Candidate – University of Pittsburgh

Letter 2: Focus Group Topic 2: Regression Variables Discussion

May 10, 2020

Hello Rachel,

I have completed my second audit. The goal of this audit was two-fold:

1) verify connection between coded transcript segments and summary coding documents for each independent variable discussed in focus groups; and
2) review the relationship webs generated based on summary coding.

Audit 2, Goal 1

For Goal 1, I first reviewed the focus group transcripts related to each variable individually. I then reviewed the "Coding Summary.docx" you developed for the variable. Overall, the four summary documents present synthesized themes that accurately reflect the focus group conversations. The themes incorporate responses across all participants, and it is obvious a lot of time was dedicated to synthesis and analysis. An important note – the synthesis documents include a lot of your own words. You provide appropriate context and discuss the implications of themes/responses, which is an important component of this work. When writing up the results, be sure to present enough quotes to support the accuracy and importance of each theme without relying too much on your own words.

Audit 2, Goal 2

I really liked the inclusion of relationship webs for the emergent themes and subthemes. I believe the most successful web was "Other Variables" – this web clearly shows relationships between response themes and includes bulleted "main points" from the discussions. I would recommend you mirror this format across all webs for clearer dissemination of participants' perspectives. Overall, while the quotes provide a more direct connection between participant words and themes, I feel the excessive words clutter the web itself. Also carefully consider and standardize your use of line weights, shapes, font sizes and styles, etc., including a key if necessary. As I stated previously, I think including direct participant quotes is a good, transparent process. Perhaps consider including the identified quotes in a follow up table. You can clean up the quotes for clarity, as long as the participants give their approval during member checking.

It is obvious you spent a lot of time and effort on this analysis, good work! Please reach out with any questions or feedback.

Cheers,

- Justin

Justin N. Coy, M.Ed., BCBA
Ph.D. Candidate – University of Pittsburgh

Letter 3: Focus Group Topic 1: Data Collection Strategies

May 21, 2020

Hello Rachel,

I have completed my final audit. The goal of this audit was to verify connections between coded transcript segments, model data collection summary figure, and applicable results write-up on topic 1, discussions around data collection for students with VI.

For this audit, I first read through each coded focus group transcript. I then compared responses/themes with the figure and written results. Overall, I think your summary figure does a good job of conveying the general themes and topics discussed across the six focus group transcripts. The figure effectively displays your synthesis within and across themes. I would encourage you to work towards streamlining and standardizing this display. For example, the first box within the "What" column has a header ("Student Data") and list of specific data, but the boxes related to family and professional data do not. I will provide you with my marked-up version for you to review more specific feedback. The results section was incredibly thorough and well-supported with participant's direct quotes. As with your summary figure, the results text present individual and "super codes" logically. I would encourage you to review your use and format of headers throughout and will also send along a version with some comments.

It is obvious you spent a lot of time and effort on this substantive analysis, great work! Please reach out with any questions or feedback.

Cheers,

- Justin

Justin N. Coy, M.Ed., BCBA
Ph.D. Candidate – University of Pittsburgh

Appendix M Member Checking Handout Template

Rachel Schles

Doctoral Dissertation: Member Checking Meeting

In qualitative research, "member checking" involves the researcher sharing the results of their analysis with participants, and participants verify if the researcher's interpretation of the participant's perspectives is accurate to the participant's experiences.

The results and statements provided in this document are a draft; please keep this discussion confidential and do not share this document with anyone

Question 1:
Correlation between O&M Specialists & Prevalence of Students with a Primary Disability of VI

I have synthesized that based on focus group conversations, participants (your) perspectives indicate the following reasons may account for why requiring an O&M specialist to participate in eligibility meetings correlates to a higher number of students with a primary disability of VI being identified.

Theme 1
O&M Perspective

1. TVIs and O&M specialists have different professional knowledge banks / assess students differently and are not interchangeable in the eligibility process.
2. O&M specialists bring a specific and important view of students to the eligibility discussion.
    a. O&M is a related service, not a special education eligibility area, therefore it may be questionable that an O&M specialist could influence eligibility (view of at least one participant).

Based on **Theme 1**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the themes outlined in Theme 1 make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Theme 1 accurately capture your views? 1 2 3 4 5

Theme 2
Vision Professionals' Representation (in the eligibility process)

a. Having two vision professionals (TVI & O&M specialist) in an eligibility discussion may allow for a stronger representation of a student's possible visual impairment; having more discussion on the topic of VI may in turn result in the team as a whole deciding a student's VI is a primary disability.
    i. Simply having more vision professionals around students may increase the number of students being identified.
b. An eye report should be part of eligibility regardless of state law, however, especially when eye reports are required by state law, who on an eligibility team knows how to read an interpret an eye report?
c. TVIs are often not present during eligibility meetings (e.g., school team doesn't know to invite one, or there is not one employed in the area). When TVIs aren't in the eligibility meeting, students (especially with less obvious visual impairments), are missed by the system and are not found eligible. Is having an O&M specialist required in eligibility meetings significant because now at least one vision person is present with professional knowledge to inform students' eligibility?

Based on **Theme 2**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the themes outlined in Theme 2 make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Theme 2 accurately capture your views? 1 2 3 4 5

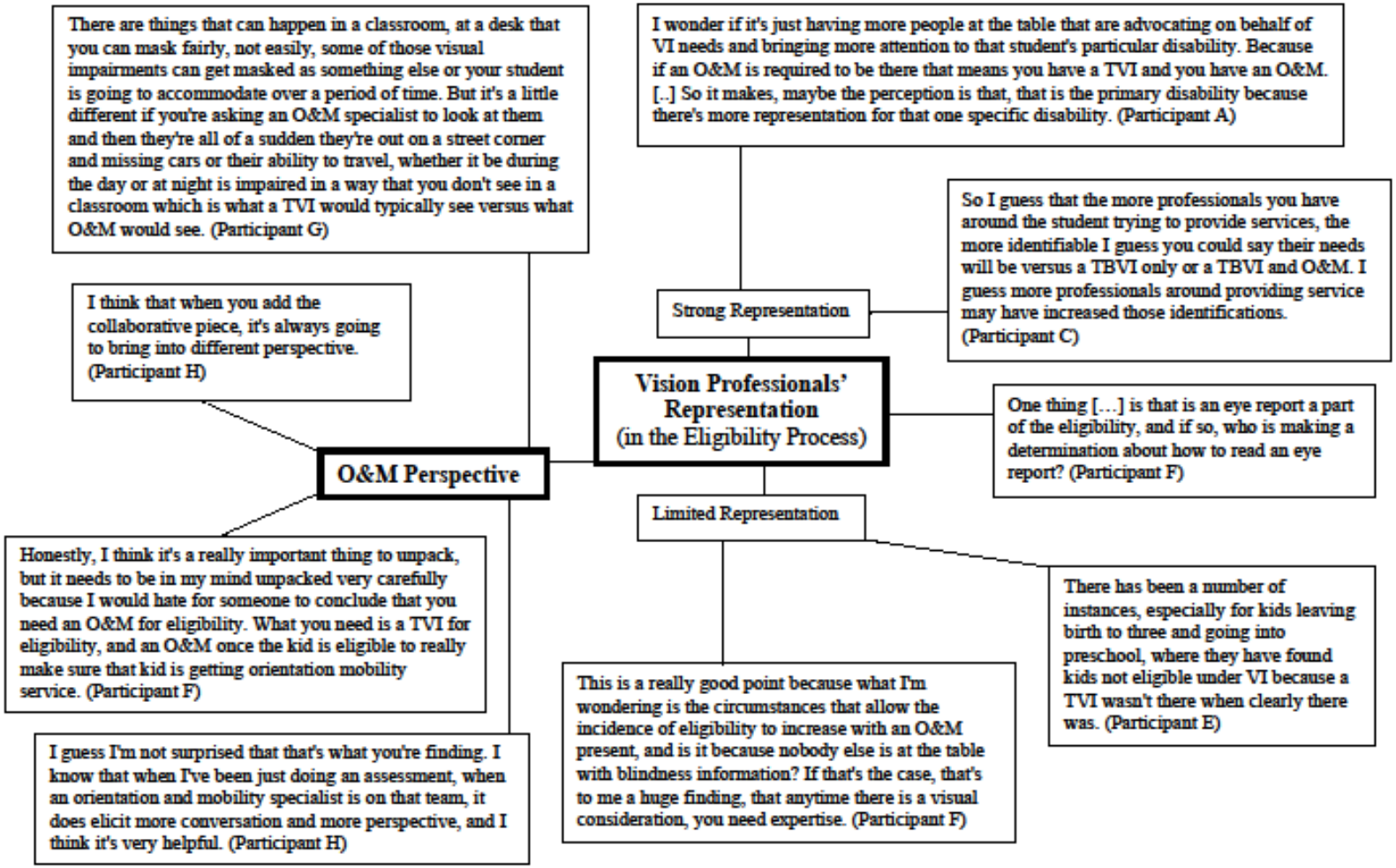
Overall Synthesis. Figure A
On the following page Figure A maps out how participant quotes connect to these themes.

Please review your comments (you are Participant X) and note if you agree that these quotes may be used as I write up the results. Some minor edits may have been made to remove extra "so" "um" etc., or for clarity.

Based on **Figure A**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the comments outlined in Figure A make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Figure A accurately capture your views? 1 2 3 4 5



Appendix M Figure A Relationship between O&M Specialist & Prevalence of Students with a Primary Disability of VI

Question 2:
Correlation between Per Capita Income & Prevalence of Students with VI (regardless of primary disability label)

I have synthesized that based on focus group conversations, participants (your) perspectives indicate the following reasons may account for why there is a positive correlation between states' per capita income and the total population of students with VI identified in the state.

Theme 1
Access & Availability of Services

1. States and regions with higher per capita income have more services and resources than areas without.
    a. With higher per capita incomes, schools and communities have more services (e.g. stronger schools, better special education programs, more TVIs, broader definition of what it means to be VI because the services are available so the eligibility criteria can be interpreted more broadly), compared to a school/community with fewer services (professionals, doctors, special education services), that needs to be stretched farther, therefore limiting students might otherwise be identified for services.
    b. Students from families who can independently pay for eye/medical exams/diagnosis and students from families who knowingly qualify for social services/supports to pay for eye/medical exams (in areas where the system is strong enough to support them), may be able to get diagnosed & found eligible, while students from middle class families may be "stuck in the middle" unable to afford eye/medical exams, nor know enough about the system to advocate for their needs.
2. Many families do not know the details of special education services, let alone who might qualify for VI services, therefore (even if a student had the ability to go to a doctor and get medically diagnosed), families/students are not aware they could also access services through school.

Based on **Theme 1**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the themes outlined in Theme 1 make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Theme 1 accurately capture your views? 1 2 3 4 5

Theme 2
Ability to Advocate

1. To navigate the special education system and be an informed, vocal advocate for one's child often takes significant access to resources and time; time & resources families in high per capita areas are more likely to have than families in low per capita areas.
    a. Families with access to disposable income or flexible jobs more often have the time to do this (e.g. have the time and money to file due process or take their child to multiple doctors' appointments)
    b. Families reliant on lower-paying jobs and/or multiple jobs are dealing with "the reality of the burden of being overwhelmed" and cannot afford/do not have the free time or money to go outside of the system (or even take the time to learn how to navigate the system) to advocate for their children.

Based on **Theme 2**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the themes outlined in Theme 2 make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Theme 2 accurately capture your views? 1 2 3 4 5

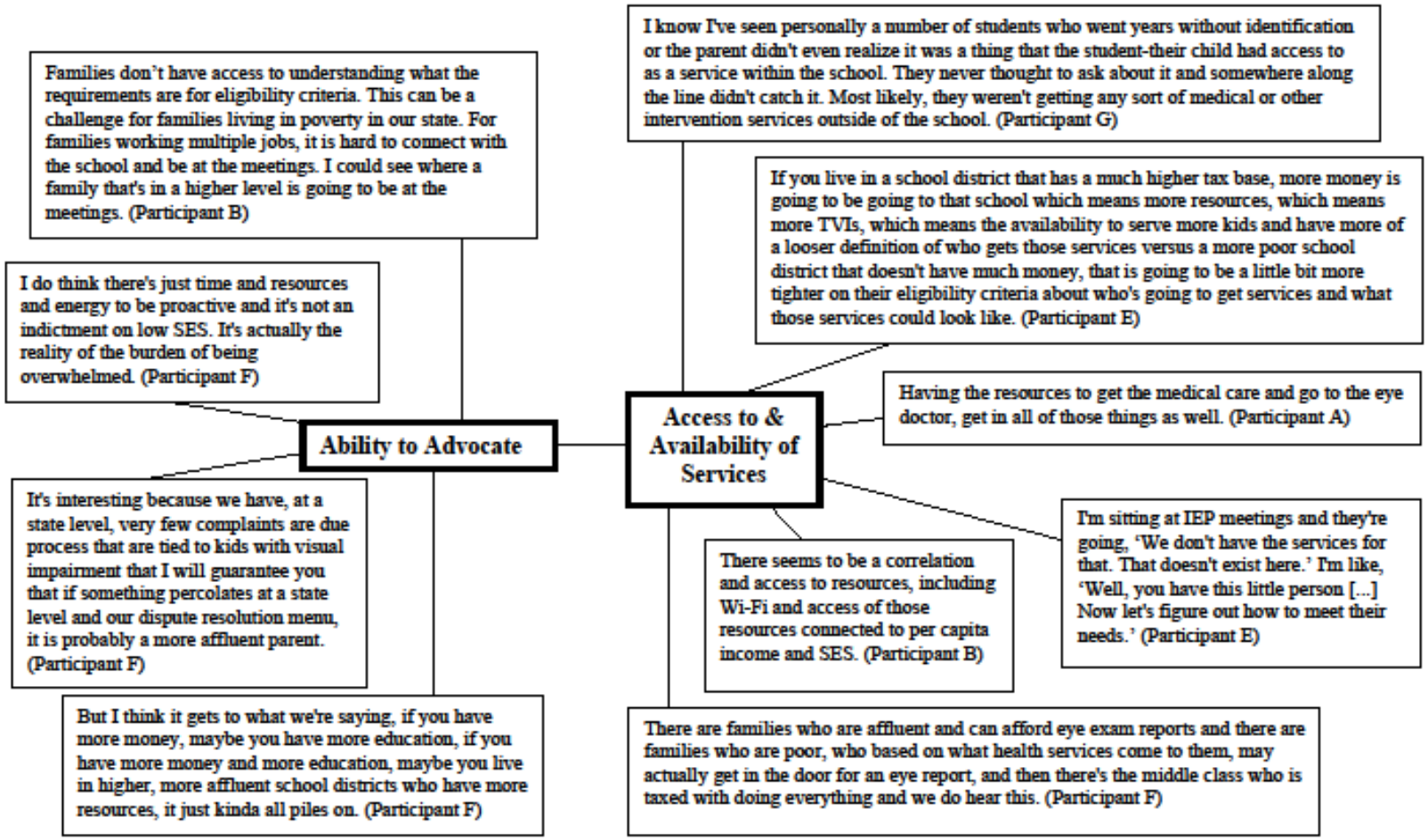
Overall Synthesis. Figure B
On the following page Figure B maps out how participant quotes connect to these themes.

Please review your comments (you are Participant X) and note if you agree that these quotes may be used as I write up the results. Some minor edits may have been made to remove extra "so" "um" etc., or for clarity.

Based on **Figure B**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the comments outlined in Figure B make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Figure B accurately capture your views? 1 2 3 4 5



Appendix M Figure B Relationship between Per Capita Income & Prevalence of All Students with VI (regardless of primary disability status)

Note: Participants E and F spoke on this topic much longer than the other groups, therefore there are more quotes from them.

Question 3:
Correlation between "Documented Adverse Education Impact" & Prevalence of Students with VI (regardless of primary disability label)

I have synthesized that based on focus group conversations, participants (your) perspectives indicate the following reasons may account for why there is a negative correlation between states' requiring 'documented adverse education impact' and the total population of students with VI identified in the state.

Theme 1
Special Education Bureaucracy & Administration

1. The special education system (laws, regulations, policies, and procedures) are not designed specifically with students with sensory disabilities/visual impairments in mind. As a result, there are bureaucracy or barriers that need to be navigated (e.g. documented adverse educational impact), with a lot of interpretation and some confusion on what these policies mean for students with VI.
    a. Because the special education system (e.g., MTSS, RTI) is designed to attempt to intervene on students to *prevent them from entering the system*, students with VI often face unnecessary barriers before they can qualify. With many states trying to keep their total number of students in special education low, students, especially students with low vision, may not be identified because the 'adverse educational impact' is not apparent to everyone.
2. *Eligibility Decision Making*: most of special education does not know what should inform eligibility decisions for students with suspected VI. Perhaps because of an overemphasis on the medical model (meeting acuity thresholds or specific diagnosis), and general belief that special education is an intervention for students failing academic coursework, many students with VI, missed because the functional implications of their VI are not fully assessed or considered during the eligibility process.
3. Similarly, many "*kids on the cusp*" fall in and out of special education qualification, especially in the first several years of their education as their development, environment, and access to visual materials changes over time. Some students may live in places where their needs are identified and addressed, but often once the student is out of special education, that's it for them in terms of services. Conversely, many students are deemed not needing services, until it is too late, and then a lot of work needs to be done to 'catch them up,' instead of ensuring they had access the entire time.

Based on **Theme 1**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the themes outlined in Theme 1 make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Theme 1 accurately capture your views? 1 2 3 4 5

Theme 2
Role & Influence of the TVI

1. Because TVIs are often the only education professional with knowledge of vision, there is a lot of responsibility on TVIs' shoulders to collect quality data and inform the eligibility team's decisions on students' qualifying as VI.
2. As a result, individual TVIs can wield a significant amount of influence in their district or region. This may be positive, in terms of advocating for students with VI whom need services (based on a quality assessment). But this can also be negative, including "rogue independent consultants" looking to build their caseloads as large as possible because they need the work. Often, TVIs prefer to work with either students with multiple disabilities (having complex educational needs), or students who are strong academic students who may primarily just need access accommodations. When a TVI can choose which students they work with, the students they do not choose are left out at higher rates. This can be at the identification level, as well as service level, with TVIs choosing a consult model over direct service just because they prefer, or feel more comfortable, addressing one student's need over another.
    a. Additionally, there are many new/younger TVIs who are not fully trained or do not have much experience and may not know how to conduct an appropriate assessment on a student to determine 'adverse educational impact.' Leaving possible unintentional gaps in eligibility and identification in their region.
    b. Because TVIs hold the vision knowledge, they may see a student who they believe has 'obvious' needs, while others on the eligibility team may turn a student's eligibility decision into an administrative decision, dictating who will/will not get services.

Based on **Theme 2**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the themes outlined in Theme 2 make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Theme 2 accurately capture your views? 1 2 3 4 5

Overall Synthesis. Figure C
On the following page Figure C maps out how participant quotes connect to these themes.

Please review your comments (you are Participant X) and note if you agree that these quotes may be used as I write up the results. Some minor edits may have been made to remove extra "so" "um" etc., or for clarity.

Based on **Figure C**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the comments outlined in Figure C make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Figure C accurately capture your views? 1 2 3 4 5

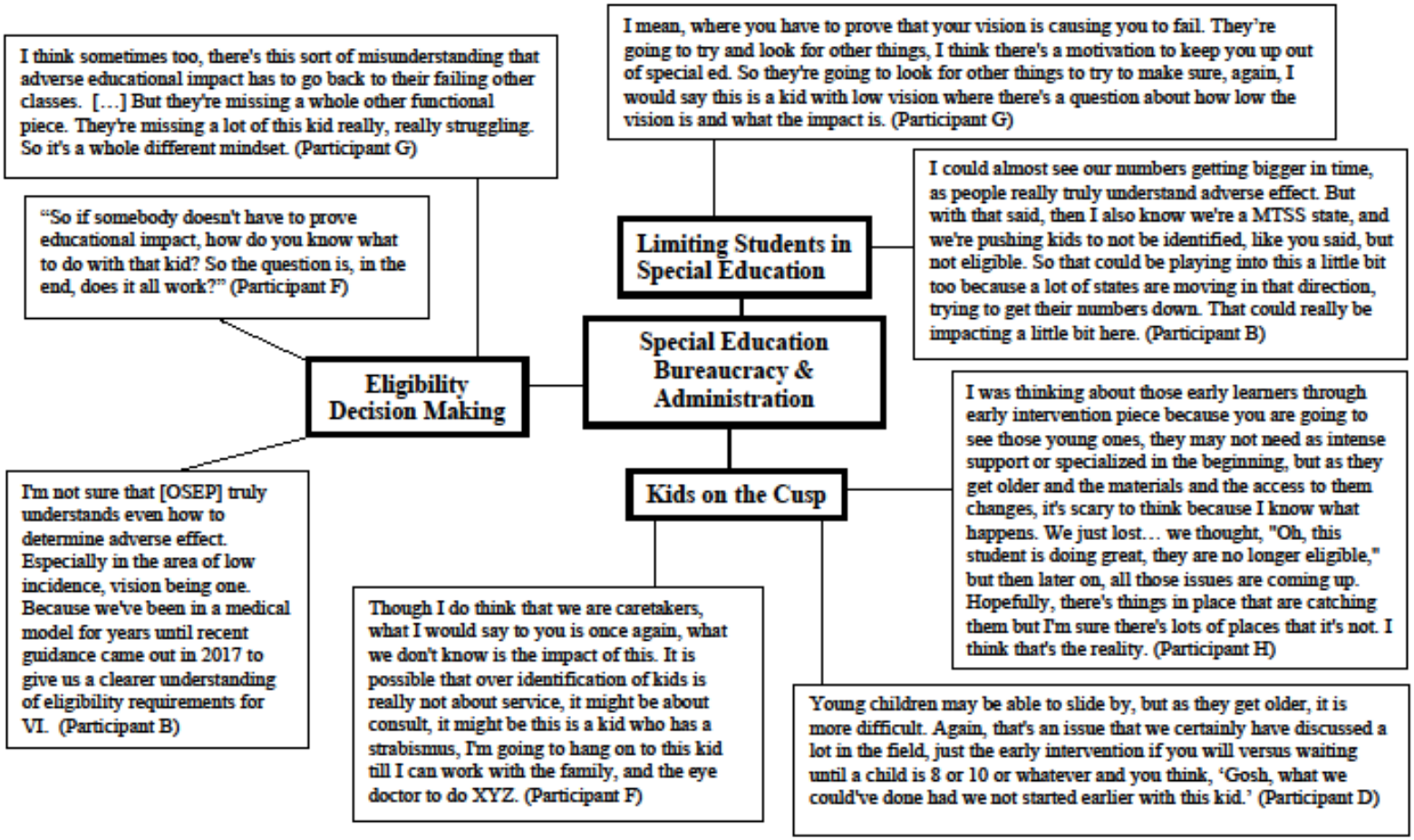
Overall Synthesis. Figure D
On the following page Figure D maps out how participant quotes connect to these themes.

Please review your comments (you are Participant X) and note if you agree that these quotes may be used as I write up the results. Some minor edits may have been made to remove extra "so" "um" etc., or for clarity.

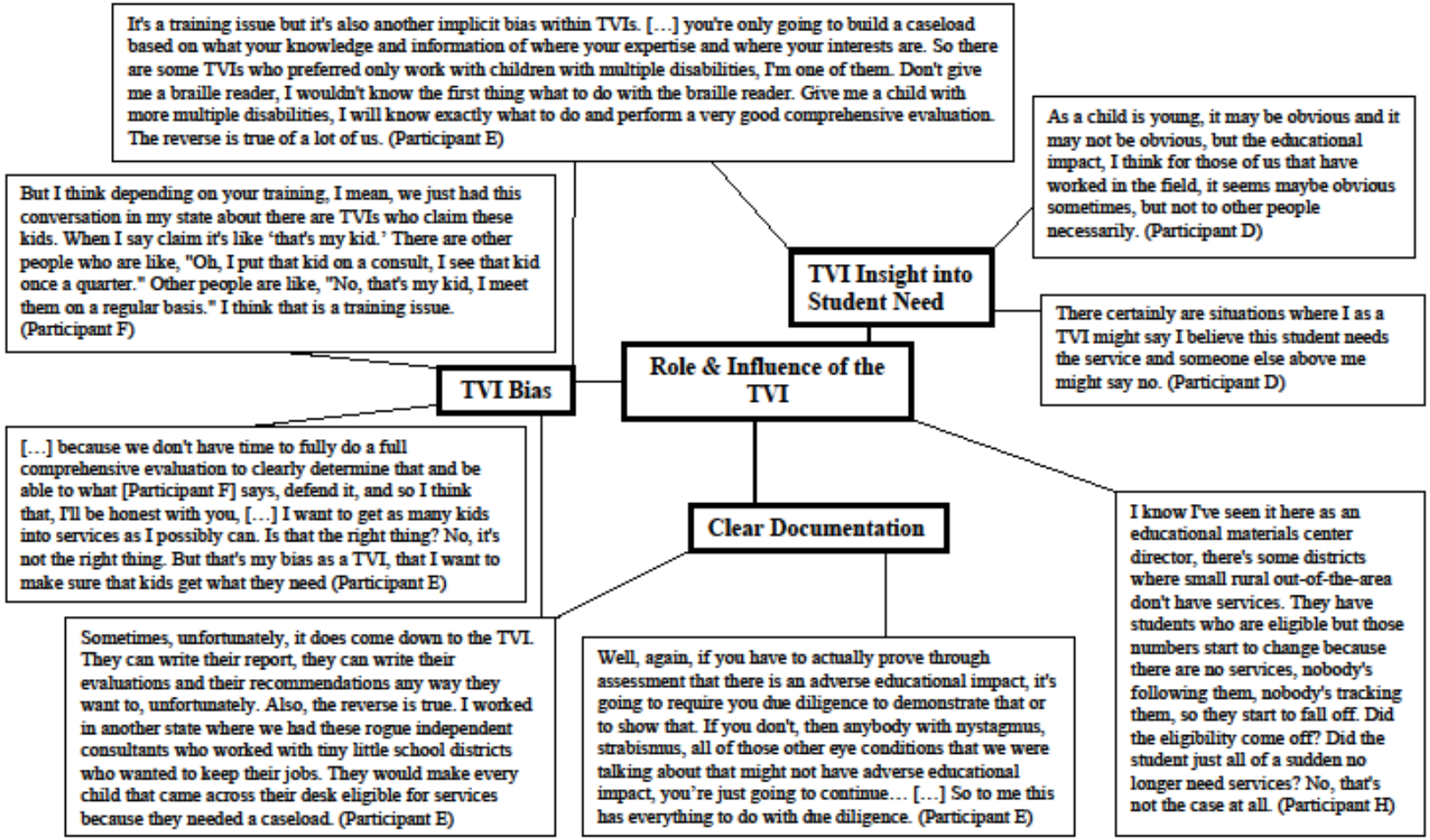
Based on **Figure D**, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the comments outlined in Figure D make sense to you? 1 2 3 4 5

2. Do you believe the comments outlined in Figure D accurately capture your views? 1 2 3 4 5



Appendix M Figure C Relationship between "Documented Adverse Educational Impact" & Prevalence of All Students with VI (regardless of primary disability status): THEME: Special Education Bureaucracy & Administration



Appendix M Figure D Relationship between "Documented Adverse Educational Impact" & Prevalence of All Students with VI (regardless of primary disability status): THEME: The Role & Influence of the TVI

Question 4:
Participants' Recommendations on Variables that Should be Considered in Future Research

I have synthesized that based on focus group conversations, participants (your) perspectives on what variables should be included in future research exploring factors that may correlate with students with VI being identified for special education services.

Figure E on the following page presents a summary of the factors participants recommended be considered in future research.

Based on Figure E, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

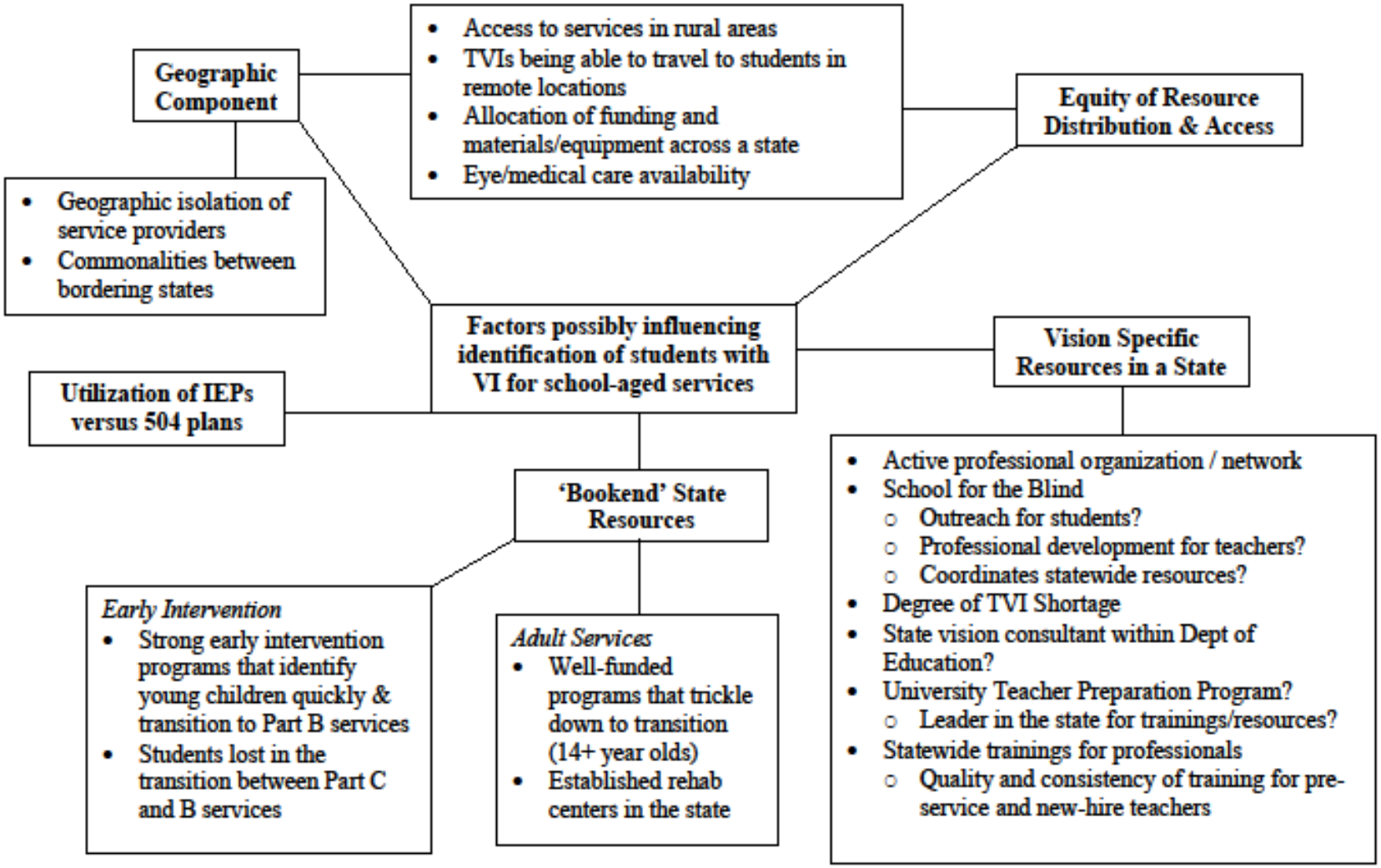
1. Do the themes outlined in Figure E make sense to you? 1 2 3 4 5

2. Do you believe the themes outlined in Figure E accurately capture your views shared during Focus Group Meeting 1? 1 2 3 4 5

To draw meaning from discussion on future variables discussion in Focus Group Meeting 1, I have listed below any statements you made during the meetings that I may include in my write up. In all write-ups, your name and state will not appear, and your quotes will only be attributed to "Participant X" to protect your identity.

Please review your comments and note if you agree that these quotes may be used as I write up the results. Some minor edits may have been made to remove extra "so" "um" etc., or for clarity. If there are any minor revisions you would like made to any quote, please use either the "comment" feature or tracked changes in the Word document.

[*block quotes from Participant X included here for participant review*]



Appendix M Figure E Focus Group Discussion on what variables should be included in analyses considering prevalence between state-level factors and the number of students with VI identified for special education services.

Question 5:

Discussion on a Model Data Collection System for Students with Visual Impairments Including Blindness.

Figure F on the following page presents a summary of the components and considerations that should be made when developing a data collection system focused on students with VI.

Based on Figure F, please answer the following two questions on a scale of 1 to 5 (1: completely disagree, 5: completely agree)

1. Do the components and considerations outlined in Figure F make sense to you? 1 2 3 4 5

2. Do you believe the components and considerations outlined in Figure F accurately capture your views shared during Focus Group Meetings 2 and 3? 1 2 3 4 5

- - - - - -

To draw meaning from the Focus Group Meetings 2 and/or 3 conversations on data collection, I grouped most statements into one of three themes: "What: Data to Collect," "How: Implementation," and "Why: Rationale." Below I have listed the statements you made during the meetings that I may include in my write up. In all write-ups, your name and state will not appear, and your quotes will only be attributed to "Participant X" to protect your identity.

Please review your comments and note if you agree that these quotes may be used as I write up the results. Some minor edits may have been made to remove extra "so" "um" etc., or for clarity. If there are any minor revisions you would like made to any quote, please use either the "comment" feature or tracked changes in the Word document.

Question 6: What: Data to Collect

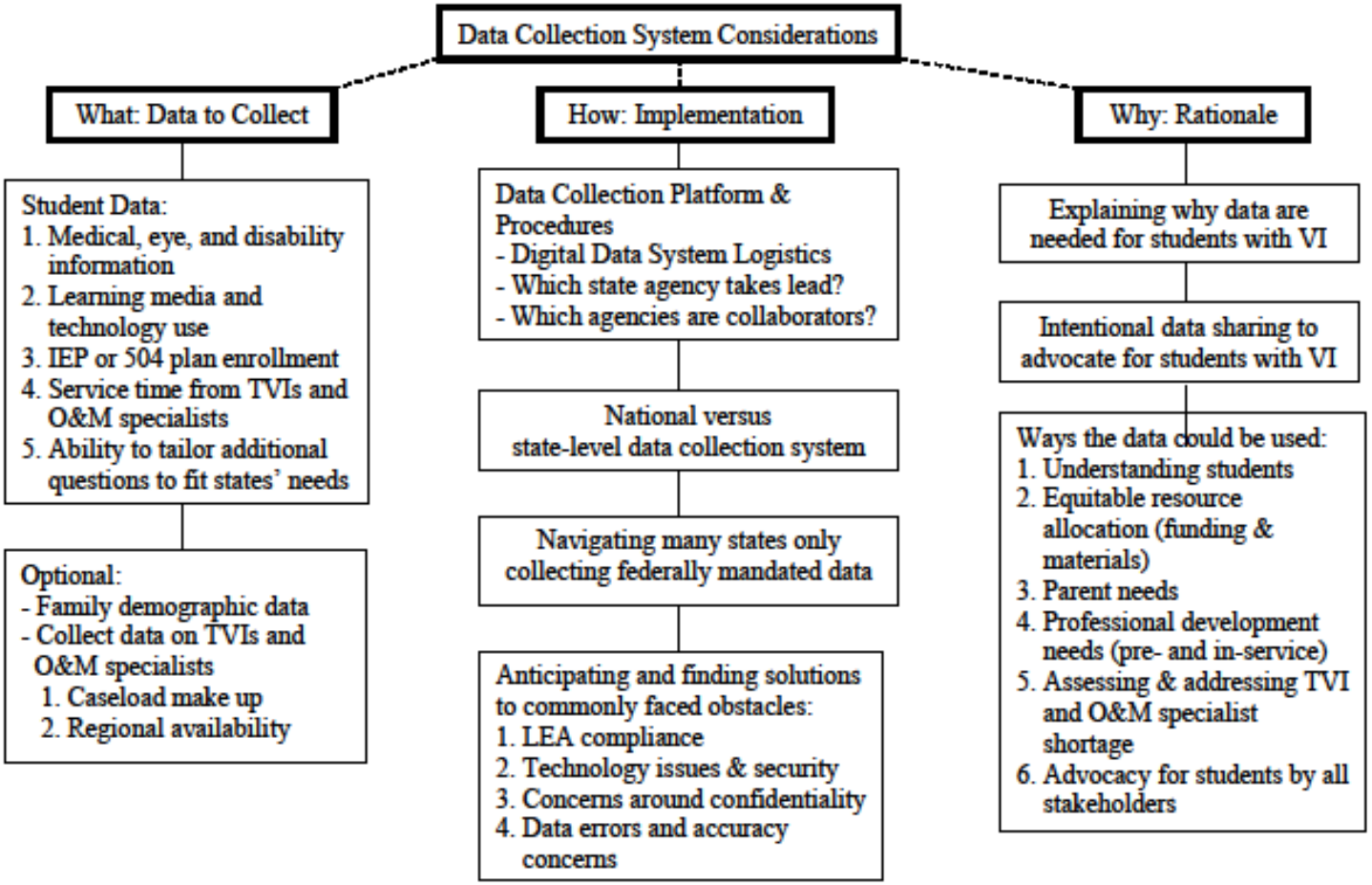
[*block quotes from Participant X included here for participant review*]

Question 7: How: Implementation

[*block quotes from Participant X included here for participant review*]

Question 8: Why: Rationale

[*block quotes from Participant X included here for participant review*]



Appendix M Figure F Components and Considerations for a Model Data Collection System

References

* Indicates article was included in the systematic literature review.

Alwell, M. & Cobb, B. (2009). Functional life skills curricular interventions for youth with disabilities. *Career Development for Exceptional Individuals*, *32*, 82-93. https://doi.org/10.1177/0885728809336656

APH (n.d.). Directory of Ex Officio trustees. https://www.aph.org/federal-quota/trustees

*Barton, E. E., Harris, B., Leech, N., Stiff, L., Choi, G., Joel, T. (2016). An analysis of state autism education assessment practices and requirements. *Journal of Autism and Developmental Disorders, 46,* 737-748. https://doi.org/10.1007/s10803-015-2589-0

Barton, L. R., Spiker, D., & Williamson, C. (2012). Characterizing disability in head start programs: Not so clear cut. *Early Childhood Research Quarterly, 27;* 596-612. https://doi.org/10.1016/j.ecresq.2012.04.002

Birt, L., Scott, S. Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research 26*(12), 1802-1811. https://doi.org/10.1177/1049732316654870

Cobb, R. B., & Alwell, M. (2009). Transition planning/coordinating interventions for youth with disabilities: A systematic review. *Career Development for Exceptional Individuals, 32*, 70-81. https://doi.org/10.1177/0885728809336655

*Coutinho, M. J., & Oswald, D. P. (1998). Understanding identification, placement and school completion rates for children with disabilities: The influence of economic, demographic and educational variables. *Advances in Learning and Behavioral Disabilities, 12,* 43-78.

Creswell, J. W. & Creswell, J. D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches* (5th ed). Sage.

Education Commission of the States (2015). State funding for students with disabilities: All states all data. http://ecs.force.com/mbdata/mbquest3D?rep=SD10

Emerson, R.M., Fetz, R.I., & Shaw, L.L. (2011). *Writing ethnographic fieldnotes* (2nd ed.). University of Chicago Press.

Erin, J. N. (2007). Identifying the primary disability: Are we speaking the same language? *Journal of Visual Impairments & Blindness, 101*, 582-585. https://doi.org/10.1177/0145482X0710101003

Fletcher, J. M., Espy, K. A., Francis, D. J., Davidson, K. C., Rourke, B. P., & Shaywitz, S. E. (1989). Comparisons of cutoff and regression-based definitions of reading disabilities. *Journal of Learning Disabilities, 22*, 334-338. https://doi.org/10.1177/002221948902200603

Gerber, M. M. (1984). The department of education's sixth annual report to congress on P.L. 94-142: Is congress getting the full story? *Exceptional Children, 51*, 209-224. https://doi.org/10.1177/001440298405100305

Hallahan, D. P., Keller, C. E., & Ball, D. W. (1986). A comparison of prevalence rate variability from state to state for each of the categories of special education. *Remedial and Special Education, 7*, 8-14. https://doi.org/10.1177/074193258600700204

Hallahan, D. P., Keller, C. E., Martinez, E. A., Byrd, E. S., Gelman, J. A., & Fan, X. (2007). How variable are interstate prevalence rates of learning disabilities and other special education categories?: A longitudinal comparison. *Exceptional Children, 73*, 136-146. https://doi.org/10.1177/001440290707300201

Henkel, R. E. (2017). *The significance test controversy: A reader*. Routledge.

Holbrook, M. C. (2009). Supporting students' literacy through data-driven decision-making and ongoing assessment of achievement. *Journal of Visual Impairment & Blindness, 103*, 133-136. https://doi.org/10.1177/0145482X0910300302

Holler, R. A., & Zirkel, P. A. (2008). A national survey concerning "section 504-only" students. *NASSP Bulletin, 92*; 19-43. https://doi.org/10.1177/0192636508314106

Individuals with Disabilities Education Act of 2004. 34 CFR §300.8(c) (13)

Kaiser, J. T. & Herzberg, T. S. (2017). Procedures and tools used by teachers when completing functional vision assessments with children with visual impairments. *Journal of Visual Impairment & Blindness, 111*, 441-452. https://doi.org/10.1177/0145482X1711100505

Kapperman, G. G., & Love, C. (1999). An analysis of federal and state identification of students who are blind and visually impaired. *RE:view, 31*, 139-143.

Kirby, R. S., Wingate, M. S., Van Naarden Braun, K., Doernberg, N. S., Arneson, C. L. Benedict, R., E.,… Yeargin-Allsopp, M., (2011). Prevalence and functioning of children with cerebral palsy in four areas of the United States in 2006: A report from the autism and

developmental disabilities monitoring network. *Research in Developmental Disabilities, 32*; 462-469. https://doi.org/10.1016/j.ridd.2010.12.042

Labovitz, S. (1968). Criteria for selecting a significance level: A note on the sacredness of .05. *The American Sociologist*, 220-222.

*Lester, G., & Kelman, M. (1997). State disparities in the diagnosis and placement of pupils with learning disabilities. *Journal of Learning Disabilities, 30*, 599-607. https://doi.org/10.1177/002221949703000603

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Lohmeier. K., Blankenship. K. E. & Hatlen. P. (2009). Expanded core curriculum: Twelve years later. *Journal of Visual Impairment & Blindness, 103*, 103-112. https://doi.org/10.1177/0145482X0910300209

Louisiana Board of Elementary and Secondary Education (2017). Bulletin 1508-Pupil appraisal handbook. Retrieved from http://bese.louisiana.gov/documents-resources/policies-bulletins

Lusk, K., Lawson, H., & McCarthy, T. (n.d.). Literacy media decisions for students with visual impairments. Position Paper for the Association for Education and Rehabilitation of the Blind and Visually Impaired https://aerbvi.org/wp-content/uploads/2016/01/LV-Div-7-Position-Paper-3_LiteracyMediaDecisionsPositionPaperUpdatedVersion2014.docx

McKenzie, A. R. (2007). The use of learning media assessments with students who are deaf-blind. *Journal of Visual Impairment & Blindness, 101*, 587-600. https://doi.org/10.1177/0145482X0710101004

*McLaughlin, M. J., & Owings, M. F. (1992). Relationships among states' fiscal and demographic data and the implementation of P.L. 94-142. *Exceptional Children, 59*, 247-261. https://doi.org/10.1177/001440299305900308

*MacFarlane J. R. & Kanaya, T. (2009). What does it mean to be autistic? Inter-state variation in special education criteria for autism services. *Journal of Child and Family Studies, 18*, 662-669. https://doi.org/10.1007/s10826-009-9268-8

McMahon, E. (1997). The incidence of visual impairment and the child count. *RE:view, 29*(2).

MacMillan, D. L., Gresham, F. M., & Bocian, K. M. (1998). Discrepancy between definitions of learning disabilities and school practices: An empirical investigation. *Journal of Learning Disabilities, 31*, 314-326. https://doi.org/10.1177/002221949803100401

McNicholas, P. J., Floyd, R. G., Woods, I. L., Singh,L. J., Manguno, M. S., & Maki, K. E. (2018). State special education criteria for identifying intellectual disability: A review following revised diagnostic criteria and Rosa's law. *School Psychology Quarterly, 33*, 75-82. https://doi.org/10.1037/spq0000208

Maki, K. E., Floyd, R. G., & Roberson, T. (2015). State learning disability eligibility criteria: A comprehensive review. *School Psychology Quarterly, 30*, 457-469. https://doi.org/10.1037/spq0000109

*Mandell, D. S., & Palmer, R. (2005). Differences among states in the identification of autistic spectrum disorders. *Archives of Pediatrics and Adolescent Medicine, 159*, 266-269. https://doi.org/10.1001/archpedi.159.3.266

Mason, C., & Davidson, R. (2000). *National plan for training personnel to serve children with blindness and low vision*. Reston, VA: The Council for Exceptional Children. https://eric.ed.gov/?id=ED439549

Mercer, C. D., Jordan, L., Allspp, D. H., & Mercer, A. R. (1996). Learning disabilities definitions and criteria used by state education departments. *Learning Disabilities Quarterly, 19*, 217-232. https://doi.org/10.2307/1511208

Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., …Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: Results from the national comorbidity survey replication-adolescent supplement (NCS-A). *Journal of American Academy of Child & Adolescent Psychiatry, 49*; 980-989. https://doi.org/10.1016/j.jaac.2010.05.017

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis* (3rd ed.). Sage.

Moore, D. (2009). Demographics and sample bias estimates of the deaf and hard of hearing school age population. *American Annals of the Deaf, 154*, 261-262. https://doi.org/10.1353/aad.0.0101

Morrier, M. J., & Hess, K. L., (2012). Ethnic differences in autism eligibility in the United States public schools. *The Journal of Special Education, 46*, 49-63. https://doi.org/10.1177/0022466910372137

Muller, E. (2006). Blindness and visual impairment: State infrastructures and programs. Prepared for Project FORUM. http://www.nasdse.org/publications-t577/blindness-and-visual-impairment-state-infrastruct.aspx

Muller, E., & Markowitz, J. (2004). Disability categories: State terminology, definitions & eligibility criteria. Prepared for Project FORUM. http://www.nasdse.org/DesktopModules/DNNspot-Store/ProductFiles/129_93348e64-20a3-48ec-a070-5679d85a4725.pdf

Musgrove, M. (2014, Nov 12). Untitled letter to Ms. Michelle Kotler. https://www2.ed.gov/policy/speced/guid/idea/memosdcltrs/acc-13-020197r-md-kotlereligibilitycriteria.pdf

NCAEM (n.d.). AEM state contacts and SEA information. Retrieved from http://aem.cast.org/supporting/aem-state-contacts-sea-information.html

*Noel, M. M., & Fuller, B. C., (1985). The social policy construction of special education: The impact of state characteristics on identification and integration of handicapped children. *Remedial and Special Education, 6*, 27-35. https://doi.org/10.1177/074193258500600307

OSEP (2016, December). IDEA part B child count and educational environments for school year 2015-16. https://www2.ed.gov/programs/osepidea/618-data/collection-documentation/index.html

*Oswald, D. P. (1995). Identification of special education students with mental retardation: Correlates of state child-count data. *Journal of Child and Family Studies, 4*, 389-397. https://doi.org/10.1007/BF02237270

*Oswald, D. P., & Coutinho, M. J., (1995). Identification and placement of students with serious emotional disturbance. Part 1: Correlates of state child-count data. *Journal of Emotional and Behavioral Disorders, 3*, 224-229. https://doi.org/10.1177/106342669500300404

Palmer, R. F., Blanchard, S., Jean, C. R., & Mandell, D. S. (2005). School district resources and identification of children with autistic disorder. *American Journal of Public Health, 95*, 125-130. https://doi.org/10.2105/AJPH.2003.023077

Pastor, P. N., & Reuben, C. A. (2008). Diagnosed attention deficit hyperactivity disorder and learning disability: United States 2004-2006. National Center for Health Statistics, Vital Health Stat 10(237). https://www.cdc.gov/nchs/data/series/sr_10/sr10_237.pdf

*Patrick, J. L., & Reschley, D. J. (1982). Relationship of state education criteria and demographic variables to school-system prevalence of mental retardation. *American Journal of Mental Deficiency, 86*, 351-360.

Peterson, C. A., Wall, S., Jeon, H., Swanson, M. E., Carta, J. J., Luze, G. J., Eshbaugh, E., (2013). Identification of disabilities and service receipt among preschool children living in poverty. *The Journal of Special Education, 47*, 28-40. https://doi.org/10.1177/0022466911407073

*Phillips, B. A. B., & Odegard, T. N. (2017). Evaluating the impact of dyslexia laws on the identification of specific learning disabilities and dyslexia. *Annuals of Dyslexia, 67,* 356-368. https://doi.org/10.1007/s11881-017-0148-4

Ryder, R. E. (2017, May 22). Eligibility determinations for children suspected of having a visual impairment including blindness under the Individuals with Disabilities Education Act. Retrieved from https://sites.ed.gov/idea/files/letter-on-visual-impairment-5-22-17.pdf

Saldaña, J. (2015). The coding manual for qualitative researchers (3rd ed.). Sage.

Sansosti, J., & Sansosti, F. (2012). Inclusion for students with high-functioning autism spectrum disorders: Definitions and decision making. *Psychology in the Schools, 49,* 917-931. https://doi.org/10.1002/pits.21652

Sapp, W. & Hatlen, P. (2010). The expanded core curriculum: Where have we been, where are we going, and how can we get there. *Journal of Visual Impairment & Blindness, 104,* 338-348. https://doi.org/10.1177/0145482X1010400604

Schles, R. A. (in press). Population data for students with visual impairments in the United States. *Journal of Visual Impairments and Blindness.*

Schles, R. A. (2019). *A comparison of state policies and select factors influencing prevalence rates of students with visual impairments.* (Unpublished doctoral predissertation). University of Pittsburgh, Pittsburgh, Pennsylvania.

Shaw, R., Russotti, J., Strauss-Schwartz, J., Vail, H., & Kahn, R. (2009). The need for a uniform method of recording and reporting functional vision assessments. *Journal of Visual Impairment & Blindness, 103,* 367-371.

Shogren, K. A., Wehmeyer, M. L., Palmer, S. B., Rifenbark, G. G., & Little, T. D. (2015). Relationships between self-determination and postschool outcomes for youth with disabilities. *The Journal of Special Education, 48,* 256-267. https://doi.org/10.1177/0022466913489733

*Skiba, R., Grizzle, K., & Minke, K. M. (1994). Opening the floodgates? The social maladjustment exclusion and state SED prevalence rates. *Journal of School Psychology, 32,* 267-282. https://doi.org/10.1016/0022-4405(94)90018-3

Soke, G. N, Meanner, M. J., Christensen, D., Kurzius-Spenser, M., & Schieve, L. A. (2017). Brief report: Estimated prevalence of a community diagnosis of autism spectrum disorder by age 4 years in children from selected areas in the United States in 2010: Evaluation of birth cohort effects. *Journal of Autism and Developmental Disorders, 47*; 1917-1922. https://doi.org/10.1007/s10803-017-3094-4

South Dakota Department of Education (2016). Eligibility Guide. http://doe.sd.gov/sped/documents/16-Eligib.pdf

Sullivan, A. (2013). School-based autism identification: Prevalence, racial disparities, and systemic correlates. *School Psychology Review, 42*, 298-316.

Tallmadge, G. K., Gamel, N. N., Munson, R. G., & Hanley, T. V. (1985). Special study on terminology: Comprehensive review and evaluation report. Report No. MV-85-01. SRA Technologies.

Tennessee Department of Education (2017). Deaf-blindness and visual impairment evaluation guidance. https://www.tn.gov/content/dam/tn/education/special-education/eligibility/se_deaf_blindness_visual_impairment_evaluation_guidance.pdf

Thompson, B., Diamond, K. E., McWilliam, R., Snyder, P., & Snyder, S. W. (2005). Evaluating the quality of evidence from correlational research for evidence-based practice. *Exceptional Children, 71*, 181-194. https://doi.org/10.1177/001440290507100204

Thorpe, H., & Chiang, B. (1996). *A study of Wisconsin's application of state and federal LD eligibility criteria*. https://archive.org/details/ERIC_ED399702/page/n1

US Census Bureau (2018). Understanding and using American Community Survey Data: What all data users need to know. https://www.census.gov/content/dam/Census/library/publications/2018/acs/acs_general_handbook_2018.pdf

US Department of Education (2016). Teacher shortage areas nationwide listing 1990-1991 through 2016-2017. Washington, DC. https://www2.ed.gov/about/offices/list/ope/pol/tsa.pdf

US Department of Education (2020). IDEA section 618 data products: static tables. https://www2.ed.gov/programs/osepidea/618-data/static-tables/index.html

*Velazquez-Ramos, M., Sanchez-Cardona, I., & Coll C. G. (2018). Social position variables of specific learning disabilities: A national perspective. *Hispanic Journal of Behavioral Sciences, 40*, 504-515. https://doi.org/10.1177/0739986318788562

Virginia Department of Education (n.d.) Reports, plans & statistics: Special education child count. http://www.doe.virginia.gov/special_ed/reports_plans_stats/child_count/

Ward, M. J., & Zambone, A. M., (1992). The U.S. federal data-collection process for children and youths who are deaf-blind. *Journal of Visual Impairment & Blindness, 86*, 429-434. https://doi.org/10.1177/0145482X9208601006

*Wiley, A., & Siperstein, G. (2011). Seeing red, feeling blue: The impact of state policy leaning on state identification rates for emotional disturbance. *Behavioral Disorders, 36,* 195-207. https://doi.org/10.1177/019874291003600305

Wolffe, K., Sacks, S., Corn, A., Erin, J., Huebner, K., & Lewis, S. (2002). Teachers of students with visual impairments: What are they teaching? *Journal of Visual Impairment & Blindness, 96,* 293-304. https://doi.org/10.1177/0145482X0209600502

Zablotsky, B., & Black, L. I. (2020). Prevalence of children aged 3-17 years with developmental disabilities, by urbanicity: United States, 2015-2018 (National Health Statistics Reports Number 139) https://www.cdc.gov/nchs/data/nhsr/nhsr139-508.pdf?deliveryName=USCDC_3_11-DM20741

Zambone, A. M., & Allman, C. (1988). Accessing services: State procedures for identifying and determining eligibility of young children with visual impairments. *Topics in Early Childhood Special Education, 8,* 75-85. https://doi.org/10.1177/027112148800800307