# Supply and Demand for Education Personnel Serving Students with Low Incidence Sensory Disabilities in Ohio

## A Report to the Ohio Deans Compact

WordFarmers Associates
Craig B. Howley
Aimee Howley
Albany, OH

March 6, 2021

# Table of Contents

# List of Tables and Figures

# EXECUTIVE SUMMARY

This study produced findings about the supply of and demand for education personnel serving students with low incidence sensory disabilities (LISD) in Ohio. These are students with hearing, vision, and dual sensory loss (these categories include deafness, blindness, and deafblindness) judged sufficiently serious to impact learning and affect students' ability to benefit from their educational program. The study was sponsored by the Low Incidence Committee of the Ohio Deans Compact on Exceptional Children.

The research team began work on this study in August 2020. Literature reviews discovered no previous supply and demand studies for this population anywhere in the US (or other nations, for that matter), so the study reported here is likely a first effort.

## Studying the Supply and Demand for LISD Personnel

Examples of supply-and-demand studies, of course, abound—usually *to predict* the need for educators in verifiably difficult-to-fill positions: especially mathematics, science, and special education. By contrast, the sole focus of this study was *to describe* the demand for and supply of suitably licensed or certified educators in Ohio. The professional roles of concern were (1) teachers of the deaf/hard of hearing (D/HoH), also known as teachers of the hearing impaired (THIs), (2) teachers of the visually impaired (TVIs), (3) certified orientation and mobility (O&M) specialists (COMS), and (4) interveners (paraeducators prepared to support students with dual sensory impairment, also known as deafblindness). Although one qualifies to become a THI or TVI through a program of professional preparation and subsequent licensure leading to *intervention specialist: visually impaired* or *intervention specialist: hearing impaired*, many educators holding those licenses do not serve as THIs or TVIs. That is, they often are employed instead as intervention specialists in the areas of mild/moderate or moderate/intensive educational needs: special education teachers who may, in Ohio, serve any student with any identified disability. With appropriate licensure (e.g., in a general education teaching field), they may also work as general educators and not in special education at all.

Six questions guided the study: three questions for demand and three for supply.

The three demand questions asked: (1) What is the professionally established minimum demand for THIs, TVIs, and COMS in Ohio and in the 16 State Support Team (SST) regions[1]? (2)

[1] The study estimated variability across the state by apportioning statewide figures for supply and demand across SST regions based on the student population and educator employment within each SST region. The SST regional divisions serve only to help the study show regional variability across the state and not to mislead readers into believing SSTs have an organizational responsibility to provide services to students with hearing, vision, or dual sensory impairment. Educational Service Centers play a strong role in supplying services to districts, but both ESC regions (Ohio has 55 ESCs) and district attendance areas (over 610) are too numerous to use for this purpose. The regional analyses serve to illustrate variability in demand and supply across the state below that of the state as a

How many THI, TVI, and COMS positions have been advertised statewide and in the 16 SST regions across recent years? (3) How do Ohio's *smaller and more rural districts* access the services of THIs, TVIs, and COMS?

The three supply questions asked: (1) How many THIs and TVIs are licensed to practice in Ohio? How many professionals possess the COMS license[2]? How many trained interveners exist in Ohio? (2) What is the actual employment circumstance of licensed THIs, TVIs, COMS, and interveners in Ohio and as dispersed across the 16 SST regions? And (3) What do the educator preparation programs in Ohio contribute toward the supply of THIs, TVIs, COMS, and interveners statewide and in the 16 SST regions?

## Methods

In the field of education, demand is often defined as the ratio of relevant student population to a typical teacher load—class size, or in special education, consensus about what an appropriate caseload might be on average (Arnold et al., 1993; Lindsay et al., 2016). The task may seem simple, but the difficulty—especially challenging for this study—is to adopt reasonable and defensible values for those two quantities (i.e., prevalence and caseload). The full report offers a range of values for both quantities, but the median values are used in the executive summary to represent the simplest view of estimated statewide and illustrative regional demand. The full report provides extended details (see Appendix A, in particular, for a full account of the process used to estimate student populations and subpopulations; Appendix B provides a glossary for all acronyms and for key terms as used in the study).

For the sake of feasibility and usefulness, regional granularity is large grain in this study for both demand and supply. For this large-grain analysis, the study subdivided Ohio into its 16 State Support Team regions; a map identifying the regions appears after Table 10 in the main report narrative.

The second demand question sampled the educator jobs board maintained by the Ohio Department of Education (ODE, August 8, 2020) at three points from August to November 2020

whole. They do not represent definitive findings about local shortages, however, and should not be misinterpreted for such a purpose.

[2] The term "educator" is used to describe COMS. Not all COMS work in schools, where they are classified as "related service providers." Wiener and Sifferman (2000) reported that 33.7% of those the surveyed worked in schools and the remainder worked in private agencies, state agencies, residential schools, and colleges. For those choosing to work in Ohio schools, COMS receive a five-year pupil personnel license in the area of O&M from the Ohio Department of Education. The Ohio educator license for COMS is contingent on an individual's passing the ACVREP exam, the final qualification for certification, which is national. Once certified by ACVREP, a COMS may apply for the Ohio educator license. TVIs may also acquire COMS certification and subsequent licensure, but many COMS are licensed by the ODE *only* in O&M. Again, it appears that only a plurality of COMS work in school settings.

to discover postings for THIs, TVIs, and COMS. The analysis also compared the results thus obtained with the multi-year results reported by Fleeter and Driscoll (2002).

The third demand question was addressed through a series of interviews with the 16 SST directors and with 13 district-level special education administrators recommended by the directors. The focus of interview questions was the relevant experience of each interviewee with securing the services of THIs, TVIs, COMS, and interveners.

All three supply questions relied in part on the massive Educator Credentials Download File (ODE, August 13, 2020) of approximately half a million records, from which researchers extracted all records related to HI, VI, and COMS. That database, of course, contains no records for teachers of the deafblind (TDB) and interveners since Ohio, like most other states in the nation, does not recognize those roles. However, a national credentialling body exists for interveners, and so researchers examined its evidence to determine if any credentialed interveners were employed in Ohio. Researchers also sampled a subset of licensed teachers who did not occupy THI or TVI roles—according to the Educator Credentials Download File—to determine if they served any students with HI and VI. Finally, to help address the third supply question, the study obtained a spreadsheet that identified candidates who were enrolled in (or who had graduated from) the Compact's recently established statewide multi-institution collaborative preparation program leading to licensure as a TVI.

## Findings

Details about the derivation of findings appear in the full study report, including the assumptions on which the derivations are based. Here in the executive summary the narrative seeks to provide the clearest possible account of the major findings. Consult the full report for details and nuance.

At the conclusion of the effort to determine prevalence rates and caseload values, the study reported the following estimates for demand, *based on the median prevalence value* for the relevant subpopulation and for the determined caseload values for THIs, TVIs, TDBs, and COMS (see Table ES1).

*Table ES 1: Statewide Demand for LISD Personnel*

| Educator Role | Student Prevalence Rate | Student Population Estimate | Estimated Educator Demand |
|---|---|---|---|
| THI | .18% | 3,226 | 230 |
| TVI | .16% | 2,867 | 205 |
| TDB | .024% | 430 | 72 |
| COMS | .12% | 2,150 | 154 |
| Intervener | .012% | 215 | 215 |

Note. Average caseload for THIs, TVIs, and COMS set at 14 students per educator and at six per TDB. The student population for COMS is based on Chiang, Bassi, and Javitt's (1992) estimate for the proportion of students who are legally blind. Interveners generally serve students with dual impairment one-on-one; the figure given assumes that half of students with dual impairment would benefit from an intervener.

Demand question three investigated educators' experiences securing the services of THIs, TVIs, COMS, TDBs, and interveners. Many interviewees were unaware of the role of intervener, and none mentioned any attempt to secure specially trained TDBs. Analysis showed that metropolitan areas had fewer problems, in general, securing THIs, TVIs, and COMS. Suburban and rural districts faced greater challenges, though in all cases Educational Service Centers (ESCs) provided valuable assistance, and some were strongly praised. In remote rural areas the shortfall of supply was reportedly severe. In general, the qualitative analyses provided a finer-grained picture consistent with the findings from the quantitative analyses. The interviews showed the connection between demand (local districts in need) and supply (typically met by ESCs).

The supply analyses sought first to discover how many educators were licensed in HI and VI in Ohio. The answer, based on unduplicated records from the Educator Credentials Download File, is 963; 704 with HI licensure and 259 with VI licensure. An additional 73 educators were licensed in O&M (i.e., as COMS).

The second and third supply questions were more challenging to answer. The second question asked about the employment circumstance of those with licensure. The challenge rested on the fact that most of the 963 educators licensed in HI and VI *were not actually employed* as THIs or TVIs.[3] Instead, many were listed in the ODE dataset in positions as intervention specialists (or with an equivalent position title). Still others occupied administrative positions, higher education positions, or had moved out of state, were retired, or were deceased. Restricting the list only to those working as teachers, reduced the group of 963 licensed educators to a group of 561 licensed *teachers* (408 licensed in HI and 153 in VI). Among those licensed in COMS, 50 of the 73 were actively employed: 29 only as COMS and 21 as teachers (i.e., many educators with COMS licensure were also licensed in VI).

The attrition from career development (and retirement, migration, and death) is a notable finding. Of the 1,036 educators with HI, VI, and COMS licenses (963 + 73), just 611 (59%) were

[3] The role of THI and TVI, especially when teachers serve in an itinerant position, includes providing support to general education teachers ("educator support"), and not only teaching students. It is therefore possible that educators with HI or VI licenses who are not specifically employed in a THI or TVI *position*, and who themselves teach no students with HI or VI, may nonetheless provide "educator support" —formally or informally—to general education teachers who do teach such students. This study could not extend its inquiry to tabulate such distinctions, but readers should be aware of the opacity of the underlying reality when interpreting the findings presented in this report.

employed to work with students. Notable as this finding seems, it still does not usefully describe the employment situation of teachers with HI and VI licenses because so many seem to occupy teaching positions other than THI or TVI (e.g., intervention specialist in the area of mild/moderate or moderate/intensive educational needs). The assumption that educators with HI and VI licenses principally serve students with HI and VI seemed dubious. The study needed to clarify the issue.

Clarification took place slowly over several months. First, using a combination of information from the ODE dataset and internet searches for individual teachers, we obtained contact information for 261 licensed teachers working, according to available information, as intervention specialists and *not* explicitly in the role of THI or TVI. Researchers attempted to make contact with each teacher at least five times, with 137 responding within that upper limit. This effort was an initial sampling to determine the reliability of the position descriptions for these teachers. Of the 137 in the sample, 79 served one or two students with low incidence sensory impairments. The others served none. The research team concluded that licensed teachers identified as intervention specialists were (1) working in that role and not as THIs or TVIs and (2) on average serving one or two students with hearing, vision, or dual impairment.

The next task was to determine the proportion of the 561 licensed teachers who *were* working as THIs or TVIs and the proportion who *were not*. Table ES2 provides the supply results.

*Table ES 2: Statewide Supply of THIs and TVIs*

| | HI | | VI | | Total | |
|---|---|---|---|---|---|---|
| **Teacher Group** | **N** | **column %** | **N** | **column %** | **N** | **column %** |
| THI or TVI position | 155 | 38% | 95 | 62% | 250 | 45% |
| Other teaching positions | 253 | 62% | 58 | 38% | 311 | 55% |

In arriving at these estimates, the researchers classified all teachers with TVI and THI licensure who were working at ESCs as THIs and TVIs regardless of other available information (e.g., titles such as “teacher”). ESCs notably broker assistance to local districts, and it seems likely that a staff member with the requisite credentials would serve (perhaps irregularly) as an itinerant THI or TVI. A similar assumption, based on findings from the sample of 137 respondents to our effort to contact intervention specialists, would not be warranted for employees of local districts. Most were clearly in roles that served few students with low incidence sensory disabilities or none.

The employment circumstance of COMS is very different from that of teachers. The key distinction is between those working of Educational Service Centers (ESCs) and the Ohio State School for the Blind (OSSB) or someplace else (i.e., mostly in local districts) For the most part, school personnel working as COMS are licensed *only* in O&M; they do not typically hold other licenses.

Table ES 3: Statewide Supply of COMS

| | COMs Position | | Teacher Position | |
|---|---|---|---|---|
| **Employment** | **N** | **row %** | **N** | **row %** |
| Not at ESC | 14 | 74% | 6 | 26% |
| At ESC/OSSB | 30 | 100% | 0 | 50% |
| **Total** | 44 | 88% | 6 | 12% |

*Note*. All 30 educators with O&M licensure at ESCs or the OSSB are understood to work as COMS, whether or not they also serve as TVIs. The six teachers not at an ESC or the OSSB work primarily as intervention specialists in districts and are not serving primarily as COMS.

Table ES3 shows the estimated statewide COMS supply at 44 (see note for details). Of the 14 COMS not at an ESC or the Ohio State School for the Blind (OSSB), however, five actually work outside public education, two as private consultants. Thus, 44 is likely a liberal estimate of the supply of COMS statewide.

Finally, the estimated supply of trained TDBs and interveners is zero. Some paraprofessionals serving students with dual sensory impairment have received some training (e.g., according to interview data), and four educators hold both HI and VI licensure. These exceptions do not alter the estimate of zero in any way relevant to policy decisions, especially since the ODE does not yet recognize either of these roles by issuing relevant licensure.

Table ES4 combines supply and demand data in order to report the estimated statewide gap between supply and demand, which it represents as substantial.

*Table ES 4: Statewide Supply and Demand Estimates*

| **Employed in Role** | **SUPPLY** | **DEMAND** | **STATEWIDE GAP** |
|---|---|---|---|
| THIs | 155 | 230 | -75 |
| TVIs | 95 | 205 | -110 |
| TDBs | 0 | 72 | -72 |
| COMS | 44 | 154 | -110 |
| INTERVENERS | 0 | 215 | -215 |

The third supply question—the study's final question overall—dealt with the contribution of the personnel preparation pipeline to the statewide supply. The researchers selected cases from the ODE database for newly licensed educators in 2015-2020 (i.e., six years). During that timeframe an estimated total of 68 educators were identified as newly licensed: 44 in HI and 24 in VI. The analysis pays particular attention to the multi-institutional statewide collaborative sponsored by the Deans Compact, and referred to hereafter simply as "the statewide collaborative." The collaborative, as of February 2021, offers four personnel preparation programs: for THIs, TVIs, COMS, and interveners. The TVI program has graduated three cohorts.

The three other programs are in the first year of operation. The statewide collaborative, moreover, has graduated three cohorts of VI students (43 in total). Taken together, the other three programs of the collaborative (THI, COMS, interveners) currently enroll 41 students.

Regional apportionments of the estimated statewide need are presented in the full report in Tables 10, 20, 24, and 26 across all 16 SST regions. The findings in Tables 10, 20, 24, and 26 (not provided in the executive summary) illustrate the variability. Those analyses show that the statewide demand gaps (Table ES4) are dispersed *very unevenly* across the state. All regions experience some shortages, but in some groups of regions, shortages are *much worse* than statewide averages. The values for each region are not, however, definitive for at least three reasons: (1) the statewide prevalence values may not apply exactly across regions, (2) ESCs are primary actors, not SSTs, and (3) the variations of demography and geography across regions and the counties within regions are large. The regional analyses, again, were only illustrative; more exact regional analyses suitable for planning purposes should, in the future, focus on ESCs, Boards of Developmental Disabilities (BoDDs), and perhaps districts.

# Supply and Demand for Education Personnel Serving Students with Low Incidence Sensory Disabilities in Ohio: A Report to the Ohio Deans Compact

The Low Incidence Committee of the Ohio Deans Compact on Exceptional Children[4] authorized and approved the design of a study of the *demand for and supply of education personnel prepared to work with students who exhibit hearing, vision, and dual sensory impairment in Ohio's K12 school system*.[5] These personnel comprise (1) teachers of the deaf/hard of hearing also known as teachers of the hearing impaired (THIs), (2) teachers of the visually impaired (TVIs), (3) certified orientation and mobility (O&M) specialists (COMS), and (4) trained interveners (who work only with students who exhibit dual sensory impairments). This report also includes estimates for teachers of the deafblind (TDBs). One important caveat is that the values reported are estimates based on research about the prevalence of students with sensory impairment. The estimates produced substantially exceed the count of students served in the state; and the estimates are carefully calculated, grounded in evidence, and fully and transparently accounted for in this report. They must nonetheless be interpreted as approximations.

## Rationale and Background

Partly in view of the Compact's own efforts, the Committee realized that such a study would be needed to inform future policy decisions. In fact, no study of the supply and demand of personnel who work with students with sensory disabilities has ever been reported in the United States, though studies of this type are clearly needed (Summers et al., 2006). The populations are small, but the needs are often complex. Nonetheless, across the nation resources to support direct services to students with these needs are meager (Bruce et al., 2016; Johnson, 2013; Ludlow et al., 2005). In Ohio, however, pivotal organizations like the Office for Exceptional Children (OEC) at the Ohio Department of Education (ODE) and the Ohio Deans Compact have supported new initiatives whose efficiency and impact require accurate demand and supply data.

The Low Incidence Committee of the Deans Compact authorized this study to provide an estimate of (1) how many low-incidence sensory disability (LISD) personnel might be needed in Ohio and (2) how many qualified personnel (THIs, TVIs, COMS, trained interveners) are actually employed to teach students with hearing, vision, or dual sensory impairment in Ohio. The former quantity represents "demand" and the latter "supply."

[4] Also referred to in this report as the Ohio Deans Compact or Deans Compact.

[5] For this report, these terms include deafness, blindness, and deafblindness.

Demand on this basis is comparatively constant because the underlying population of students with hearing, vision, and dual sensory impairment is comparatively constant, even if different approaches to calculating prevalence estimates yield varying results. Indeed, such variation is part of the challenge in conducting this sort of study.

Supply, too, is comparatively static: Ohio has traditionally operated four programs (three at Ohio State University and one at Kent State University) to prepare personnel to serve students with hearing and vision impairment, reportedly producing THIs and TVIs in an approximately 3 to 1 ratio. Overall, Ohio's effort has been shown to be below national averages (Howley et al., 2017). Very recently, though, four additional programs have been established—in large measure through the Compact's advocacy of a multi-institutional collaborative with the support of the Ohio Departments of Education (ODE) and Higher Education (ODHE). A baseline estimate of supply and demand is timely given such developments.

This study differs from other supply and demand studies in education (e.g., Arnold et al., 1993; Lindsay et al., 2016) because it is not motivated by looming shortages across a wide variety of fields (e.g., math, sciences, languages, special education in general) or surpluses in specific fields (e.g., early childhood education). The task for this study is simply to characterize (and quantify) supply and demand, not to predict it for the future by extrapolations from current trends. Indeed, researchers in hearing, vision, and dual sensory impairment fields believe that the supply of teachers is inadequate nationwide (Johnson, 2013; Ludlow et al., 2005). This study provides data useful in assessing such a claim in Ohio.

# Methods

The study was guided by a main research question and six subordinate questions, three for demand and three for supply. The study was multi-method, using both quantitative and qualitative techniques. Quantitative methods developed numerical estimates for supply and demand. Qualitative methods (interviews) investigated the experience of State Support Teams (SSTs) and local districts securing qualified personnel to serve students with hearing, vision, and dual sensory impairments. The qualitative data, as it turned out, described the intersection of supply and demand from the vantage of local practice.

## Research Questions

The main research question is "How well does Ohio's supply of LISD teachers, trained paraprofessionals, and certified O&M specialists (COMS) address the statewide need for these personnel?" The subordinate questions follow:

### Demand.

1. What is the professionally established minimum demand for THI, TVI, and O&M services in Ohio and in the 16 SST regions?
2. How many THI, TVI, and COMS positions have been advertised statewide and in the 16 SST regions across recent years?
3. How do Ohio's smaller and more rural districts access the services of THIs, TVIs, and COMS?

### Supply.

1. How many THIs and TVIs are licensed to practice in Ohio? How many educators possess the O&M license? How many trained interveners exist in Ohio?
2. What is the actual employment circumstance of licensed THIs, TVIs, COMS, and interveners in Ohio and as dispersed across the 16 SST regions?
3. What do the Ohio training programs contribute toward the supply of THIs, TVIs, COMS, and interveners statewide and to the 16 SST regions?

## Methods for Demand Question One

Determination of "demand" for services in education typically (e.g., Arnold et al., 1993; Lindsay et al., 2016) relies on a prevalence-based definition of "demand." Demand under this definition is not determined by job offers, but by the ratio of two quantities: (1) student population and (2) reasonable teacher caseload (calculated as numbers of students). In other words, a study aiming to produce reasonable demand estimates for LISD fields in Ohio based on prevalence must make its own reasonable judgments about (1) prevalence (for HI, VI, and dual sensory impairment) and (2) caseload sizes (for THI, TVIs, COMS, and interveners). Once this difficult work is accomplished, calculating demand (via the prevalence-based formula) is simple. This study's effort to specify these quantities is based on the evidence of research for both prevalence estimation and caseload size.

The study examined the literature to select an appropriate and reasonable range of values for both prevalence (as a percentage of total student enrollment) and caseload, aiming ultimately at the derivation of defensible central values (given the data) using fully transparent methods. The approach to prevalence estimation was to derive central tendencies from a full range of estimates produced from major data sets by authoritative sources. This approach has the merit of averaging the varied purposes and samples (all related to children and youth) documented in the literature (Rosen, 2009) and it avoids arguing that one or another particular estimate must be "best."

Whereas in general education, teacher load might hover around 25 students per teacher (with substantial variation locally), caseload sizes for special education fields are subject to various standards that specify upper limits, or average, or appropriate size. And though the related

caseload desirable values are debatable and variable, both empirical and authoritatively recommended values are accessible to researchers.

To assess statewide demand, the resulting values for prevalence (HI, VI, and dual sensory impairment) were applied to the relevant population (state or regional) and the result divided by applicable caseload. To assess regional demand, the resulting values were applied to the sum of enrollment in each SST region for traditional districts, community schools not operated by traditional districts, and dropout recovery centers on the advice of a knowledgeable colleague (M. Moore, personal communication, October 5, 2020). The list of these entities matched to SST regions was obtained from the ODE website, and enrollment for the cited entities was summed to produce regional enrollment (http://education.ohio.gov/Topics/Data/Report-Card-Resources). The selected prevalence proportions were applied to that result to provide an estimate of the population with hearing, vision, or dual sensory impairment in each region.

## Methods for Demand Question Two

The Ohio Educator Jobs Board (http://education.ohio.gov/About/Education-Jobs) is one statewide location where agencies can post for openings for educator positions. The study examined postings for THIs, TVIs, and COMS at three points in time during the course of the study and compared the results with findings from a previous report (Fleeter & Driscoll, 2002). Examining other sources (e.g., local or regional agency postings) would have required effort that exceeded the project budget, and the previous study provided a convenient baseline.

## Methods for Demand Question Three

The study addressed this question qualitatively, through structured interviews with two sets of educators. The first set (SST directors) nominated the second set (district special education directors). Questions posed to SST directors asked about (1) the experience of Educational Service Center (ESC) in the ESC region (including the one hosting the SST staff[6]) in securing THIs, TVIs, COMS, and trained interveners for districts; (2) awareness of the new statewide collaborative for LISD personnel preparation; and (3) contact information for district special education leaders with the most experience serving students with LISD.

District-level special education leaders addressed six issues: (1) their experience securing the services of THIs, TVIs, COMS, and trained interveners; (2) whether they make direct hires (as district employees) or access educators through the ESC (via a fee-for-service arrangement) or some combination; (3) their degree of success in securing LISD personnel from the ESC; (4) their degree of success in making direct hires; (5) their insights about or suggestions for improving the supply of educators to serve students with hearing, vision, or dual sensory impairment; and (6) their awareness of the statewide collaborative for LISD personnel preparation headquartered at Shawnee State University.

[6] State Support Teams are usually located in the offices of one of the ESCs in the SST service region.

All interviews were recorded, transcribed, and analyzed to characterize answers to the specific questions (a form of *a priori* coding). Interviews were predictably short: from about five minutes for interviews with SST directors to no more than 20 minutes for interviews with district-level special education leaders.

## Methods for Supply Question One

This question was addressed using the records for individuals with the relevant licenses maintained by the ODE in a publicly accessible spreadsheet (the massive *Educator Credential Download File*) enumerating all individuals licensed to teach in Ohio (ODE; August 13, 2020). This dataset is most useful for THIs, TVIs, and COMS because Ohio grants licensure in these fields. It does not recognize the roles of intervener or TDB and so does not grant licensure in those fields. For trained interveners the study identified Ohio residents in the publicly accessible records of the relevant national organization: the National Resource Center for Paraeducators (NRCpara). The study also accessed the records of Academy for Certification of Vision Rehabilitation and Education Professions (ACVREP) as an additional source of data about COMS.

## Methods for Supply Question Two

The purpose of this question was to determine which professionals with LISD licenses actually teach or support students with LISD by serving in roles as THIs, TVIs, and COMS. The researchers used the ODE licensure database (ODE; November 30, 2020) to trace the employment circumstances ("assignment data"—employing districts, positions, courses taught) of those with HI, VI, and COMS licenses. The researchers attempted to verify this information via (1) web searches, (2) inspection of employing ESC and district websites, and by (3) contact via email or telephone with a sample of licensed LISD teachers occupying positions with titles related to special education (e.g., "intervention specialist") but without explicit mention of HI or VI. Many teachers are licensed in multiple fields, after all. To address the issue of dispersion, employed TVIs, THIs, and COMS (and not intervention specialists with licensure in areas other than HI or VI) were mapped to SST regions using the ODE database that categorized districts by SST regions (i.e., the same database used to address Demand Question One).

## Methods for Supply Question Three

To assess the contribution of IHE personnel preparation efforts, the study used two information sources. First, the *Educator Credential Download File* and the Educator Profile site (ODE; November 20, 2020) identified educators newly licensed in HI and VI. Second, the statewide collaborative program provided a spreadsheet of students enrolled in its four programs (HI, VI, O&M, and Intervener). This database was augmented with information from the ODE Educator Profile site (e.g., position, date of birth) and SST region, which was inferred from employer identity.

# Findings

This lengthy section presents findings for the six subordinate questions. Findings for the three demand questions precede those for the three supply questions.

The narrative begins with an explanation of the challenges confronting attempts to determine demand and the solutions adopted by the study. Then, separate subsections detail the derivation of the components of demand, prevalence (sources are meticulously reported in Appendix A), and caseload (fully explained in the main narrative). Appendix B provides a glossary for all acronyms and for key terms as used in the study. The findings for demand question two detail the calculations for the regional demand analysis. Findings for demand question three are presented in the subsequent subsection, reporting the results from data developed from the study's 29 interview transcripts.

Next come the findings for the three supply questions. The first simply reports the number of educators licensed to serve students with hearing, vision, or dual sensory impairment. Findings for the more difficult second question, addressed with multiple techniques and data sources, provide estimates of the number of educators actually occupying THI, TVI, and COMS roles. (Ohio does not recognize the role of intervener or the role of TDB.) These findings are also disaggregated in the question-two subsection by SST region. Findings for the last of the six study questions (supply question three) report on the so-called pipeline issue—contributions of personnel preparation programs to the supply chain. This final subsection of findings includes a first reporting of enrollment in and graduation from the new statewide collaborative for HI, VI, O&M, and interveners (championed by the Deans Compact).

## Demand Question One

The first demand question asked, "What is the professionally established minimum demand for THI, TVI, and O&M services in Ohio and in the 16 SST regions?" To develop an answer, the study adopted a prevalence-based definition of demand (Arnold et al., 1993; National Association of State Directors of Special Education, 1994), such that *demand = relevant student population ÷ relevant caseload*.

Challenges. Attempts to establish the number of school children with hearing impairment (HI), vision impairment (VI), and dual sensory impairment (also called "deafblindness" or DB) confront three substantial challenges. These are: (1) differing systems for the identification of children with hearing, vision, or dual sensory impairment; (2) the variability in judgments about qualification (given presenting conditions in particular children and youth) to receive special education services made by local Individualized Education Program (IEP) teams[7]; and (3) the conventions under which school children with impairments are reported to the federal government in the United States.

Children may be identified in population studies (like the U.S. Census), in surveys (such as those of the Gallaudet University Research Institute), or by schools themselves (Kirchner & Diament, 1999). Each of these identification vectors produces prevalence estimates that differ dramatically across all three populations (HI, VI, and dual sensory impairment). All are legitimate for some useful purpose, despite the wide variation in estimated prevalence (Rosen, 2005).

Because education, more than other institutions, treats the relevant disabilities *more intensively* (often providing special services) and *extensively* (all schools and districts must do so), the counts that districts report reflect that fact and carry an air of authority. Nonetheless, and in spite of the existence of state and federal guidelines, the actual conditions surrounding and infusing the act of local judgment (see IDEA, 2004, at 34 CFR § 300.8c) vary within and between schools, districts, and states and so do the conditions of practice. Such conditions, for instance, include (1) how IEP meetings are conducted; (2) what services are provided; (3) who provides the services (an intervention specialist with licensure in an area other than HI or VI, a THI, a TVI, or a general educator); (4) the state-level supply of needed teachers; (5) the local availability of such educators; and (6) state and district resourcing for services to students with low incidence sensory disabilities. The sources of variance are impressive, and although the resulting counts may appear authoritative, the judgments reflect sharply varied local circumstances and norms that belie their seeming authority (Hemmer & Baker, 2011). Children identified in one school might not be identified in another school. Children who should be identified, according to professional standards, may not be identified. And identified children may not be served appropriately. Children with dual sensory impairment are frequently not identified as DB, but as multiply handicapped, even though federal and state regulations specifically direct schools to identify them *not* as having multiple handicaps but as having deafblindness (Parker & Nelson, 2016).

[7] Students with mild loss may not be identified for services (i.e., either under 504 plans or IEPs) if their sensory loss is mild or, more unfortunately, even moderate. Students with HI who use cochlear implants, and whose underlying hearing loss is significant by definition, may also not be considered for services. Moreover, identification practices differ across districts (Hemmer & Baker, 2011). Thus, students with exactly the same sensory disability profile can easily be identified differently in initial IEP meetings in two different districts. For instance, a student with a moderate or mild disability might be identified in one district but not another.

Finally, the results of school identification processes (varied as just described) are reported annually to the Office of Special Education Programs (OSEP) at the U.S. Department of Education and aggregated into state and national counts. But the reporting system was designed almost 50 years ago with a focus on creating an unduplicated count of individuals. Children are reported only under their "primary" disability. Odd as it seems, children in many states are still reported solely under their (locally and variably determined) primary disability, and this remains true in Ohio. This antiquated reporting system ensures that children with visual, hearing, or dual sensory impairment are not reported when those impairments are determined to be secondary or tertiary. For example, a child with more than one disability (e.g., orthopedic disability and hearing impairment) might be reported only under "orthopedically disabled") and would not be counted as hearing impaired. The federal counts are now widely acknowledged as undercounts (Kirchner & Diament, 2009).

A related difficulty pertains to the identification of students with VI. Students with VI but who also have more than one disability are usually *also* classified as multiply disabled. In this case, IDEA does *not* insist that they be identified instead as VI. The upshot is that these students, too, are under-reported to OSEP (L. Ayer, personal communication, February 24, 2021). Estimates based on this underreporting are predictably low, though perhaps not as low as estimates of students with deafblindness, especially before the implementation of the national deafblind census (i.e., a 90% underestimate; NCDB, 2019). Cortical vision impairment (CVI) presents a somewhat different identification challenge. Children with CVI exhibit behaviors that are typically confused with the behaviors associated with other conditions, notably autism spectrum disorder (Swift et al., 2008). Moreover, CVI is a condition with rising prevalence. In other words, the identification of VI confronts unique challenges, and undercounts may be more severe than with HI.[8]

As Rosen (2005) explains, the widely differing prevalence rates presented in different reports reflect the differing purposes of data collection. And especially in education, the common rates—those collected and shared by the federal government (OSEP)—are the resultant aggregation of determinations of IEP teams acting under widely varied local circumstances and practices. A true figure, then, if not exactly a figment, would require a level of specificity and uniformity that is not possible in light of the legal delegation of judgment to local IEP teams to make determinations case by case. Thus, even if secondary and tertiary disabilities were represented in the OSEP counts (a needed improvement), a true figure would remain elusive.

In the best of circumstances, trained educators (THIs, TVIs, TDBs, COMS, and interveners) would be equally accessible and available to work with students in all schools; IEP teams would hold well-informed discussions; and their discussions would be characterized by generosity, good will, and careful listening and deliberation—all of it supported by ample resources (Johnson,

[8] Central Auditory Processing Disorder (CAPD) is regarded as "controversial" (Rosen, 2005) with unreported prevalence, but improved assessment practices (Fairchild & Gadke, 2018) may contribute to increased HI prevalence in the future.

2013). These provisions would seem a reasonable expectation for children, like many with LISD, with severe threats to their learning.

One might hope for such a reality, and even if unattainable, this best circumstance would still represent an arguable standard for practice. In this preferred circumstance, all children with sensory impairments from mild to profound would at a minimum receive intermittent attention from trained specialists. For students with mild impairments, the attention would be limited. For a proportion of those with moderate impairments (e.g., difficulty reading even with glasses), attention might lead to sporadic or routine instructional support. And for those with severe and profound impairments, attention and support would be intensive and very attentive. Under such a scenario, one might well see prevalence rates two to three times those characterized by OSEP data under current identification and reporting practices (the current Ohio prevalence rates, as a proportion of total student population, reported by OSEP are .06% for VI and .15% for HI[9]).

Because the best-estimate approach would be quite speculative, however, this study opted instead for an empirical approach. It derived a range of values based on the central tendency (means and medians) of unique prevalence estimates reported by authoritative sources (including the known OSEP underestimates). These sources do include among them specific estimates for Ohio, but also for the nation, and for other jurisdictions. The study was interested to represent a defensible range of values based on unique, reputable sources—in lieu of deciding which single estimate was "best."

Caseload values are less challenging to establish than prevalence values. Caseloads have been studied, and regulations for Ohio (like many states) have established caseload limits for *self-contained* HI and VI and dual sensory impairment classrooms, and for COMS. Most THIs and TVIs, however, no longer work in self-contained classrooms but travel among schools (Silvia Maria & Howell, 2004), and caseload limits have not been established in Ohio for itinerant teaching. Nevertheless, protocols[10] have been created in some U.S. states and Canadian provinces to establish local caseload sizes (workloads) that are judged professionally reasonable given the particular characteristics of students to be served by the individual teacher (e.g., De Souza, 2005; MacCuspie, 2010; National Agenda for Students Who Are Blind or Visually Impaired, 2019; Summers et al., 2006). A reasonable range of values based on evidence and professional standards was thus available to the study.

Next the narrative presents the findings for prevalence estimates. Then it reports findings for caseloads and then for demand of THIs, TVIs, teachers of students with dual sensory impairments, COMS, and trained interveners.

[9] HI, as used in this report, combines the OSEP categories of "deaf" and "hearing impaired."

[10] These protocols, in effect, judge the time required by a particular teacher's workload, in place of a less precise upper limit to numbers of students to be served. Investigating the application of such protocols was beyond the scope of this study.

Findings for prevalence estimates. In the case of prevalence, searches of the literature discovered unique estimates of prevalence among populations of children and youth for HI, VI, and dual sensory impairment. Values in the following tables derive from reports of original data analysis, not from incidental mentions. The qualifier *unique* is needed because the study sought to capture the extant variety of prevalence estimates (for children and youth) without bias. Many derivative reports in the literature repeat the OSEP annual survey data, for instance. The OSEP value needed to be represented no more than once under the procedures adopted (as did values produced by other studies). Appendix A gives extensive details for these ranges of values for all the prevalence estimates reported in the following tables (i.e., Tables 1-4).

Tables 1-3 report the prevalence estimates (with the prevalence basis specified as the percentage of total population) judged as unique and as appropriate to a level of severity sufficient to adversely affect educational performance. The relevant populations in all these studies were 21 or younger. The studies examined prevalence in the United States, except for one study in Britain (for visual impairment). The column labeled "reference population" identifies which values are based solely on Ohio data. Rows are ordered from lowest to highest estimates. Table 1 presents estimates for hearing impairment.

*Table 1: Hearing Impairment Prevalence Estimates*

| Source | Reference population | Data | Est. |
|---|---|---|---|
| GURI, 2010 | All reported OH students | 2009 | .05% |
| OSEP, 2019 | Age 3-21 IEP students in OH | 2018 | .13% |
| CDC, 2012 | U.S. Newborns (with documented impairment) | 2009 | .14% |
| Braun et al., 2015 | Metro Atlanta age 8 (moderate to profound) | 2010 | .14% |
| CDC, 1995 | Age 0-17 persons (deafness or serious HI) | 1991 | .18% |
| BCMOE, 2020 | All K12 students identified with DHH | 2019 | .20% |
| NIH, 2006 | Age 6-19 children (moderate to profound) | 1988-94 | .26% |
| ACS, 2020 | Persons in OH 0-20 (serious difficulty hearing) | 2018 | .53% |
| Mitchell, 2005 (SIPP) | Children age 6-17 (HH or functionally deaf) | 2001 | .55% |
| **MEAN** | | | .24% |
| **MEDIAN** | | | .18% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list. Prevalence estimates rounded to the nearest 100$^{th}$ of one percent.

The nine unique prevalence estimates in Table 1 yield a mean of .24% and median of .18%. These mark the range of values to be used in the demand formula for HI.

Table 2 presents the range of unique prevalence estimates for visual impairment. Note that of all the values, the OSEP estimate for Ohio is the lowest: matching the rate of students in Britain identified as exhibiting impairment in the severe and profound range.

*Table 2: Visual Impairment Prevalence Estimates*

| Source | Reference population | Data | Est. |
|---|---|---|---|
| OSEP | Age 3-21 IEP students in OH (primary disability) | 2018 | .06% |
| Rahi & Cable, 2003 | Age 0-15 children in Britain (severe and blind) | 2000 | .06% |
| APH 2019 | All registered students in OH (n=1675) | 2019 | .10% |
| Braun et al., 2015 | Metro Atlanta 8-year-olds (low vision, legal blindness) | 2010 | .15% |
| Wall & Corn, 2004 | All PK12 TX students with VI (TEA Annual Registry) | 2001 | .17% |
| NPTP, 1998 | Age 0-21 served students in 17 states | 1998 | .18% |
| CDC, 1995 | Age 0-17 persons (blindness or vision problems) | 1991 | .23% |
| ACS, 2020 | Age 0-20 persons (difficulty seeing even with glasses) | 2018 | .68% |
| **MEAN** | | | .20% |
| **MEDIAN** | | | .16% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list. Prevalence estimates rounded to the nearest 100$^{th}$ of one percent.

The nine unique prevalence estimates in Table 2 yield a mean value of .20% and a median value of .16%. Both values will be used to calculate demand in VI.

Table 3 provides the data for dual sensory impairment. Here, the study is not reporting the OSEP "primary" disability values, which, in fact, OSEP itself no longer reports. Instead, OSEP (2019) now reports the counts from the National Deafblind Census. The national census was created to produce a far more accurate count of students with dual sensory impairment (with data collected by state deafblind centers like the Ohio Center for Deafblind Education). The OSEP counts had been shown to underrepresent these students by *a factor of 10* because (1) these students have many additional disabilities and (2) local districts often misidentify them as having "multiple disabilities"—despite the clear injunction against the practice in federal law (IDEA, 2004, at 34 CFR § 800.89(c)7).

*Table 3: Dual Sensory Impairment Prevalence Estimates*

| Source | Reference population | Data | Est. |
|---|---|---|---|
| NCDB, 2019 | Age 0-21 counted students nationally | 2018 | .020% |
| NCDB, 2019 | Age 0-21 counted students in Ohio | 2018 | .024% |
| CDC/NHIS, 2009 | Age 5-17 national population sample | 2001-07 | .030% |
| **MEAN** | | | .025% |
| **MEDIAN** | | | .024% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list

For dual sensory impairment, the range of prevalence estimates is much narrower than for HI and VI: the high estimate is just 50% more than the low estimate (i.e., .03% vs .02%), as compared to 1100% higher (as for the HI and VI estimates). In any case, for the sake of

consistency, the nearly identical mean and median values in Table 3 will be used for calculating demand for dual sensory educators.[11]

Prevalence for the population needing orientation and mobility (O&M) training is estimated from the proportion of students with VI who have impairments that are severe to profound. Table 4 uses the prevalence estimates from Table 2 relevant to low vision, legal blindness, and blindness to derive estimates for calculating demand for COMS. The result is a *conservative* prevalence estimate, given that services are actually provided to students in the moderate range as well (Neal et al., 2004). Shortages of COMS are, in any case, reported to be severe nationally (Summers et al., 2006).

*Table 4: Prevalence Estimates (students needing assistance of COMS)*

| Source | Reference population | Data | Est. |
|---|---|---|---|
| Corn & Wall, 2004 | Legally blind PK12 in TX | 2001 | .11% |
| Chiang et al., 1992 | Age 0-21 persons in US (legally blind) | 1992 | .12% |
| Braun et al., 2015 | Metro Atlanta 8-year-olds (low vision and blind) | 2010 | .14% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list

Calculations for demand used the middle value (.12%) from these figures. In fact, all these estimates are appropriately lower than the estimated median value for VI prevalence overall (i.e., .16%).

Findings for caseload size. Although caseload size may be prescribed in some states for some service configurations (e.g., Ohio Department, 2014), the issue has also been studied empirically—sometimes with sufficient detail that prescriptions have been proposed on that basis (Bruce et al., 2016). The Ohio Department of Education (without a disclosed empirical warrant) imposes caseload size limits of 10 students per teacher for HI and VI (in self-contained classrooms) (Ohio Department of Education, 2014, p. 155). Such classroom placements, though, are now rarely used (K. Koehler, personal communication, September 11, 2020). Indeed, the fact that most districts in Ohio are small (enrolling an average of about 3,000 students) suggests that self-contained HI and VI classrooms would prove very seldom practicable in individual districts, especially in Ohio's even smaller-than-average rural school districts. Contemporary placements are, moreover, most often in regular education classrooms—even among students with dual sensory impairment (NCDB, 2019)—with licensed HI and VI teachers and COMS, most often itinerating among schools.

[11] One might observe that Table 3 perhaps suggests that more defensible prevalence estimates for HI and VI would be some multiple of the OSEP estimates, given an adequate national census for those impairments.

Bruce and colleagues (2016) reviewed the literature and determined that TVI caseloads *for itinerant teachers* between eight and 20 were justified by limited research. They advised lower caseload sizes for teachers of students with dual sensory impairment, in order to support small-group instruction.[12] Ohio (ODE, 2014, p. 156) has established six as the caseload size limit *in self-contained classrooms* for students with dual sensory impairment (i.e., TDBs). The caseload picture is complicated further still by the fact that part of the package of duties for THIs and TVIs may be "support for school personnel"—particularly support for general education teachers where students with sensory disabilities may spend most or all of their time.

Although Bruce and colleagues (2016) did not judge that caseload limits for THIs could be warranted by research, two studies with hundreds of respondents (Luckner & Dorn, 2017; Supporting Success, 2019) have subsequently documented extant caseload ranges, consistent with earlier findings from studies with very few participants:

- 7-18 in a national survey of 495 THIs in self-contained (Luckner & Dorn, 2017);
- 10-25 in a national survey of 267 THIs (Supporting Success, 2019)
- 5-15 in a national survey of 143 itinerant THIs in Australia (Power & Hyde, 2003)
- 12 as an average caseload for five itinerant teachers (Sallop & Butler, 1977)
- 5 as the average caseload of 14 itinerant teachers in Australia (Davison-Mowle et al., 2018)

The range in these values is 5 to 25—the highest is five-fold the lowest value: not so extreme as the range for HI and VI prevalence. This display shows that the empirical caseload size range does not stray far from the recommendations of Bruce and colleagues (2016) for VI. Indeed, the last two values on the preceding list might be excluded from calculations—their samples are very small (though nonetheless within the range of the values derived from the much larger samples). Note that the range of these values encompasses itinerant and self-contained (or single-school) caseload values; for instance, the range from Luckner and Dorn's study reflects data from all respondents, of whom 41% held itinerant positions, 30% were elementary or secondary teachers, and 30% something else (e.g., pre-school, home intervention, consultant).

Taking the middle ranges of the three studies with national samples (12.5, 17.5, and 10.0, respectively) and averaging them yields a value of 13.3. The middle of the range recommended by Bruce and colleagues (2016) for TVIs is 14 [(8 + 20)/2]. In this light, the study elects to adopt the same caseload size range for THIs as for TVIs (and in fact, as will be seen, for COMS). For teachers of students with dual sensory impairments, the study will use a caseload size limit of six as specified in current Ohio operating standards (Ohio Department of Education, 2014, p. 156) and recommended by Bruce and colleagues (2016).

[12] In Ohio educators specifically trained to serve students with deafblindness are extremely rare. In practice, then, TVIs and THIs may serve one or more students with dual sensory impairment along with the rest of their caseload.

As for COMS, caseload size limits are specified in Ohio for COMS at a surprising 50 for school-aged children and 40 for preschool children (Ohio Operating Standards, 2014, p. 156). This upper limit, however, is very difficult to justify in view of the experience of other states with caseloads for COMS. For instance, California (2014, p. 120) suggests an average caseload range of 8-12 students as an adequate staffing level statewide (with the itinerant service model predominating). The Texas School for the Blind and Visually Impaired (2017, p. 37) endorses that value as an appropriate average, but also usefully reports that, as of 2016, the actual 10-year average caseload for COMS in Texas was 16. In view of these facts, then, this study uses the same caseload value for COMS as for THIs and TVIs: 14 students per teacher.

*Trained interveners* are usually paraprofessionals who have received training to work specifically with students who have dual sensory impairments. Interveners are not mentioned in the current Ohio operating standards and their training and deployment remain unregulated. Several training programs exist in the US, including one recently established in Ohio (led by the Shawnee State University collaborative). The role, intervener, is of recent origin; practice and deployment are evolving (Parker & Nelson, 2016).

Parker and Nelson (2016) caution that interveners should not be authorized to work without the supervision of a teacher trained to work with students who have dual sensory impairments. In that well-reasoned view, provisions to augment the supply of qualified dual sensory teachers would need to occur simultaneously with provisions to augment the supply of interveners. Ohio, however, also does not recognize the role of TDB.

Not all students with dual sensory impairment would logically require the assistance of an intervener, and not all interveners would necessarily spend all their time working with a single such student; but the empirical staffing pattern is at present one-to-one, despite professional caution about overuse of such assignment, seen to enable dependence instead of to foster increasing independence (Giangreco, 2009).

In any case, according to a recent study of the Ohio Deafblind Census data, about 30% of students with dual sensory impairment in Ohio exhibited severe or profound HI; about 60% exhibited low vision, legal blindness, or total blindness; and about 50% reportedly experienced communication difficulties (WordFarmers Associates, 2019). In light of these findings, and keeping the cautions of researchers (Giangreco, 2009; Parker & Nelson, 2016) in mind, this study provides demand estimates for one-to-one intervener staffing both for 25% and for 50% of students with dual sensory impairment.

Findings about demand. Based on the preceding derivation of prevalence estimates and caseload values, the following tables (Tables 5-10) provide prevalence-based demand estimates for (1) the entire state and (2) the 16 SST regions.

The statewide tables provide estimates for both the mean and median prevalence estimates across three levels of caseload values for THIs and TVIs: the low value (8), the high value (20),

and the value midway between the extremes (14). Demand for TDBs uses only a caseload value of six (ODE, 2014). The variations offer an array of demand estimates that differ by a factor of three at the extremes. Users of this report should keep the context of the derivation of the prevalence estimates and caseload values in mind as they inspect the tables. The values given are estimates based on the assumptions previously described.

For COMS and trained interveners, the tables are based on fewer options. The population for COMS services used the prevalence value explained above (prevalence = .12%) and the 14 school-aged student caseload average suggested by the relevant literature. The demand for interveners used two prevalence values: 25% and 50% of those identified by the median prevalence estimate of .024%.

Note that the report of regional demand values (see Table 10) uses only the median prevalence values and only the middle caseload range (for THIs and TVIs). With less detail, this presentation offers a simpler display; but readers can still use the data reported in the foregoing discussion to fashion more complex arrays.

Table 5 presents estimates of statewide demand for THIs based on the mean and median prevalence values derived from Table 1 and three levels of caseload ranged, based on the foregoing discussion.

*Table 5: Statewide Demand for THIs*

| | | **Demand Ratios** | | |
|---|---|---|---|---|
| **Prevalence Estimate** | **Population Estimate (HI)** | **8/THI** | **14/THI** | **20/THI** |
| 0.24% | 4,301 | ***538*** | ***307*** | ***215*** |
| 0.18% | 3,226 | ***403*** | ***230*** | ***161*** |

*Note*. 2018 Population (ODE headcount) = 1,792,055; italicized boldfacing gives demand estimates. 8/THI = 8 students per THI, and similar for 14/THI and 20/THI. Note that 0.24% is the mean prevalence value; 0.18% is the median value.

The demand estimates in Table 5, in round numbers, exhibit an estimated high of 538 teachers given a generous average caseload of eight at the mean of all prevalence estimates (see Table 1). Also in round numbers, the low is an estimated 161 teachers for a crowded caseload of 20 at the median of all prevalence estimates. Between these extremes lie the values (in column 4) for a reasonable average caseload of 14 (Bruce et al., 2016). Here the evident range is, in very round numbers, between about 250 and 300 THIs. One might adopt either value or something in the middle.

Table 6 provides demand values, on the same basis as Table 5, for TVIs.

*Table 6: Statewide Demand for TVIs*

| | | Demand Ratios | | |
|---|---|---|---|---|
| **Prevalence Estimate** | **Population Estimate (VI)** | **8/TVI** | **14/TVI** | **20/TVI** |
| 0.20% | 3,584 | ***448*** | ***256*** | ***179*** |
| 0.16% | 2,867 | ***358*** | ***205*** | ***143*** |

*Note*. 2018 Population (ODE headcount) = 1,792,055; italicized boldfacing indicates demand estimates. 8/TVI = 8 students per TVI (and so forth, as in Table 5). Note that 0.20% is the mean prevalence value; 0.16% is the median value.

In Table 6 the range under the six applicable conditions (means or medians crossed with the caseload values) is almost fivefold: from about 150 to 450. But in the middle range of caseload values (14 students per TVI), the range is roughly between 200 and 250.

Table 7 reports demand values for teachers of students with dual sensory impairment (TDBs). The mean and median prevalence values adopted from Table 3 do not in fact differ in a practically significant way, as previously suggested. And only one caseload value (six students per teacher as mandated in Ohio) is used.

*Table 7: Statewide Demand for Teachers of the Deafblind (TDBs)*

| **Prevalence Estimate** | **Population Estimate (DS)** | **6/TDS** |
|---|---|---|
| 0.025% | 448 | ***75*** |
| 0.024% | 430 | ***72*** |

*Note*. 2018 Population (ODE headcount) = 1,792,055; boldfacing indicates demand estimates. Note that 0.25% is the mean prevalence value; 0.24% is the median value.

In light of state regulations that permit “intervention specialists” to serve students with any disability, the values reported in Table 7 must be understood *not* as demand for the role of intervention specialists, but as demand for *specially trained teachers of students with deafblindness* (or TDBs). Few such training programs exist, and national demand (on a prevalence basis) predictably far exceeds supply across the nation, not only in Ohio.

Table 8 reports statewide demand for COMS on the basis previously described: a prevalence rate of .12% of the population aged 0-21 reported as legally blind in the applicable study (Chiang and colleagues; see Table 4) and a caseload value of 14.

*Table 8: Statewide Demand for COMS*

| Prevalence Estimate | Population Estimate | 14/COMS |
|---|---|---|
| 0.12% | 2,150 | ***154*** |

*Note*. 2018 Population (ODE headcount) = 1,792,055; italicized boldfacing indicates demand estimates.

Table 9 reports statewide demand for trained interveners, also based on the foregoing discussion. The prevalence rates in Table 9 are simply 50% and 25% of the median prevalence adopted for students with dual sensory impairment (i.e., .024%).

*Table 9: Statewide Demand for Trained Interveners*

| Prevalence Estimate | Population Estimate | One-to-One |
|---|---|---|
| 0.012% | 215 | ***215*** |
| 0.006% | 108 | ***108*** |

*Note*. 2018 Population (ODE headcount) = 1,792,055; italicized boldfacing indicates demand estimates; .012% = half of DB prevalence; .006% = one-quarter of DB prevalence (see explanation in narrative).

The proportion of students to benefit from the services of an intervener is an issue for empirical study, so the 50% and 25% values given should be understood to reflect the assumption that not all students with dual sensory impairment would require the full-time services of a trained intervener. The assumption, as previously explained, is based on data about the severity of impairments among Ohio students counted by the census conducted by the Ohio Center for Deafblind Education on behalf of the national census effort. Again, readers should understand that Parker and Nelson (2016) argue that use of trained interveners requires the supervision of teachers trained to work with students who have dual sensory impairment.

Table 10 provides the estimates of *regional demand* (at median prevalence and, where applicable, median caseload values) for THIs, TVIs, TDBs, COMS, and trained interveners across all 16 SST regions. Because the 2018 summed enrollment for the three types of organizations represented (i.e., traditional districts, community schools, and dropout recovery schools) in the 16 regions was less than the 2018 statewide headcount used to estimate statewide demand (i.e., about 1.66 as compared 1.72 million, respectively), the regional enrollment values were calibrated proportionally to the 2018 statewide headcount: the resulting values are those reported in Column 4 of Table 10, and they are the basis for the demand estimates reported

across the table. For that reason, then, regional totals exactly match the statewide totals reported in Tables 1-9. The page following Table 10 supplies the map of SST regions to help readers contextualize the estimates. That context also includes the very different population sizes of the regions—data not available via the map.

*Regional estimates use the 16 large SST regions (i.e., far larger on average than counties or school districts) as a proxy unit to* illustrate *the geographic dispersion of educators serving students with hearing, vision, and dual sensory impairment. Users of this report should pay attention to the sharp variations evident across the state; they should not put too much emphasis on* particular *estimates for* particular *regions in comparison with one another. After all, the values in Table 10 are approximations from statewide estimates, and these estimated values are best used to show statewide variability. Note too that the report provides the basis for making alternative regional approximations (i.e., based on the alternative values for prevalence and caseload). The granularity of the findings in Table 10, moreover, is large: SST region. Demand exists in smaller-grain units: ESCs and districts. Both here (in Table 10) and later in the report (in Table 20, where supply is dispersed to the SST regions), users should be aware that geography and demography vary substantially both within and across regions and that these differences influence local prevalence, caseload norms, and professional practice.*

*Table 10: Regional Demand for THIs, TVIs, COMS, and Trained Interveners*

| SST | ORGS | ENR | Headcount | HI Pop | THIs | VI Pop | TVIs | DB Pop | TDB | COMS Pop | COMS | INTs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 108 | 153,161 | 166,288 | 299 | **21** | 266 | **19** | 40 | **7** | 200 | **14** | **20** |
| 2 | 36 | 62,137 | 67,463 | 121 | **9** | 108 | **8** | 16 | **3** | 81 | **7** | **8** |
| 3 | 88 | 154,043 | 167,246 | 301 | **22** | 268 | **19** | 40 | **7** | 201 | **14** | **20** |
| 4 | 16 | 39,499 | 42,884 | 77 | **6** | 69 | **5** | 10 | **2** | 51 | **4** | **5** |
| 5 | 67 | 82,170 | 89,213 | 161 | **11** | 143 | **10** | 21 | **4** | 107 | **7** | **11** |
| 6 | 48 | 55,698 | 60,472 | 109 | **8** | 97 | **7** | 15 | **2** | 73 | **4** | **7** |
| 7 | 51 | 64,753 | 70,303 | 127 | **9** | 112 | **8** | 17 | **3** | 84 | **7** | **8** |
| 8 | 51 | 117,342 | 127,399 | 229 | **16** | 204 | **15** | 31 | **5** | 153 | **11** | **15** |
| 9 | 41 | 73,511 | 79,812 | 144 | **10** | 128 | **9** | 19 | **3** | 96 | **7** | **10** |
| 10 | 79 | 142,696 | 154,926 | 279 | **20** | 248 | **18** | 37 | **6** | 186 | **14** | **19** |
| 11 | 126 | 308,254 | 334,674 | 602 | **43** | 535 | **38** | 80 | **13** | 402 | **29** | **40** |
| 12 | 47 | 68,084 | 73,919 | 133 | **10** | 118 | **8** | 18 | **3** | 89 | **7** | **9** |
| 13 | 77 | 228,493 | 248,077 | 447 | **32** | 397 | **28** | 60 | **10** | 298 | **21** | **30** |
| 14 | 18 | 29,882 | 32,443 | 58 | **4** | 52 | **4** | 8 | **1** | 39 | **4** | **4** |
| 15 | 29 | 34,850 | 37,837 | 68 | **5** | 61 | **4** | 9 | **2** | 45 | **4** | **5** |
| 16 | 24 | 36,013 | 39,100 | 70 | **5** | 63 | **4** | 9 | **2** | 47 | **4** | **5** |
| TOTALS | 906 | 1,650,586 | 1,792,055 | 3,226 | **230** | 2,867 | **205** | 430 | **72** | 2,150 | **154** | **215** |

*Note*. Prevalence conservatively set at medians (.18%, .16%, .024%). Caseload set at 14 per teacher for THIs, TVIs, and COMS; 8 for dual sensory; and one per intervener for 50% of DB population. 2018 enrollment basis is calibrated regionally to match the 2018 headcount of 1,792,055 (factor = 1.08570835). ORGS= number of traditional districts, community schools, and dropout recovery schools; ENR=estimate of regional student enrollment; Pop = population; INTS=interveners.

*Figure 1: State Support Teams Regions*

Across the SST regions, student population varies by a factor of 10: from about 30,000 in SST Region 14 (south central Ohio) to over 325,000 in Region 11 (Columbus and surrounding counties). The regions that include Ohio's largest metro areas thus show the highest levels of demand: Columbus (Region 11); Cincinnati (Region 13); Cleveland (Region 3); Toledo (Region 1); and Dayton (Region 10). Most SST regions, one must note, include a range of urban, suburban, and rural areas within them. For instance, in terms of its territory, Region 1 (Toledo) is mostly rural. Regions vary, as well, in the number of counties they encompass, from one region serving one county (Region 3) to two Regions serving 12 counties (Regions 1 and 12). That difference relates, as well, to the square miles associated with each region, to the variability of terrain, and indeed, to such influences within each county and each district. Such matters suggest the complexity and nuance of local demand, which Table 10 illustrates but cannot be relied upon to specify exactly. The report of findings now turns to demand question two.

## Demand Question Two

This question asked how many THI, TVI, and COMS positions had been advertised statewide and in the 16 SST regions across recent years. The study team was unable to access the multi-year database of position listings, so it addressed this question by accessing the Ohio Educator Jobs Board (http://education.ohio.gov/About/Education-Jobs) at three times during the course of the study. Surprisingly, an existing Ohio study (Fleeter & Driscoll, 2002) contributed relevant findings as well.

The Jobs Board lists very few positions for THIs, TVIs, and COMS. It listed just one position (a single THI position from a Board of Developmental Disabilities in an urban area) among 335 listings on August 9, 2020, and it listed none among 192 listings inspected on October 10, 2020. On November 11, 2020, among 416 postings it listed two positions: one for a TVI (advertised as an itinerant TVI position in Columbus City Schools) and one for a THI (also in Columbus, advertised as "working across multiple environments"). Spring postings, which might be expected to exhibit greater numbers, could not be accessed because the timeframe for conducting the study was summer through winter 2020-2021.

Although the study was unable to access multiple years (or even a full year) of these data, Fleeter and Driscoll (2002) studied all n=5805 postings for the period between 1999 and 2001 and found 42 relevant positions (THI, TVI, ASL)—about 14 annually. (Note that the current study did not consider ASL teachers to be THIs). In any case, the rate of posting reported by Fleeter and Driscoll is not so different from the results of our inspection of the Jobs Board from August 9 to December 16, 2020 (i.e., 3 positions in three months, equivalent to 12 postings annually).

## Demand Question Three

In order to assess how Ohio's *smaller and more rural districts* access the services of THIs, TVIs, and COMS, researchers interviewed all 16 SST directors and district special education directors recommended by the SST directors. The study was ultimately able to interview 13 educators

recommended by the SST contacts. Both sets of interviews were guided by structured interview questions.

Each of the 29 interviews was recorded and transcribed verbatim, and analysis used the transcripts as study data. Responses were coded by question. Because identifying, scheduling, interviewing, and transcript production required a long timeframe, the qualitative data were the last data source to receive analysis.

Findings from SST interviews. Among the SST directors, nine of the 15 with sufficient experience with the position to address the first question reported substantial challenges securing adequate numbers of licensed educators to serve students with hearing, vision, or dual sensory impairment. The following excerpts are typical:

- That is probably the one gap that we are consistently unable to support. We're always kind of beating the bushes to try and find supports and services that are more consistent. [SST16]
- We're in a very rural community, and we are having trouble in this area getting service. [SST15}
- We have four ESCs but procuring services is "limited in terms of success." [SST12]
- I would just say, there's probably a shortage but our involvement is not a whole lot, but I think they have difficulty doing that. [SST7]

The nuance around this finding also provides useful insight. First, in the big-city SSTs (i.e., regions containing Cleveland, Columbus, and Cincinnati), interviewees did not report that ESCs were experiencing difficulty, but arrangements were reportedly unstable (at the ESC level): "It's fully staffed as of right now, but … you never know from day to day." Second, SSTs in the most rural areas all reported substantial challenges. In general, if there were a statewide shortage, instability would be a concern everywhere (and the concern was widespread to judge from the interviews).

Findings from district interviews. All SSTs were able to point the study team to organizations (most of them local districts) and individuals employed by them who were able to address the six issues of concern to the study, as enumerated in the methods section. Briefly, those issues were supply of trained educators (including familiarity with the role of intervener), experience hiring directly or contracting with an ESC, suggestions for improving the supply of educators, and awareness of the statewide collaborative.

The study made multiple attempts to confirm interviewees and schedule interviews, and by mid-December 2020 researchers had conducted interviews with knowledgeable leaders in 13 local organizations: (1) 11 districts located in 10 of the 16 SST regions (two local districts in SST Region 4); (2) one special education school (located in SST Region 8, the only case from that region); and (3) one ESC (located in SST Region 9, also the only case from that region). Additional interviews had been scheduled, but they were cancelled at the request of

interviewees during the renewed pandemic spread in fall 2020. The enrollment of the 11 districts varied from about 750 to over 20,000. Excluding the large district, the average enrollment of the 10 other local districts was about 3,250. Most responding organizations, then, were small; about half were in rural places.

A clear finding from the interviews is that in more rural locales and among Ohio's typically smaller districts, ESCs provide THIs, TVIs, and COMS to local districts on contract. Hiring licensed educators in-house (rather than securing them on contract from ESCs) seemed to be a prerogative of larger and more metropolitan districts: just three of the 11 districts preferred to hire licensed THIs, TVIs, and COMS in-house. Interviewees in the eight districts that relied on ESCs characterized the experience as ranging from "fairly successful" (that district, located in a large suburb, actually preferred to hire its own employees but relied on the ESC when it could not) to "very successful" (a very small district in a remote rural town) to "rave reviews" (a small-town rural district in SST Region 16). Whereas local districts reported successful experiences with securing personnel through ESCs, the one ESC in the sample (in SST Region 9) reported substantial difficulty securing licensed educators; perhaps ESCs mitigate difficulties for local districts by assuming the inherent challenges directly.

In the course of the interviews, researchers also learned of inter-district collaborative arrangements beyond the ESC model. One very small district (located in a large suburb of Cleveland) served as the hub of a local HI collaborative; and another, larger district near Cleveland sent their students with HI to a neighboring district but received students with VI from two other districts.

Interviewees articulated a variety of approaches to improving access to licensed educators: (1) arranging for pre-service candidates to have clinical experiences in the local organization; (2) encouraging practicing educators (e.g., intervention specialists) to acquire licensure; (3) incentivizing program participation and licensure; (4) incentivizing universities to innovate program design and delivery; (5) adding new university programs; (6) motivating university faculty to direct many more students to HI and VI programs; and (7) recruiting early when retirements are announced (from a large district that did not contract with an ESC). One interviewee made two unique comments when asked about improved access. The first proposed that HI and VI qualification be offered in Ohio as *endorsement programs* for practicing teachers (rather than as full licensure programs—the current model). The second point was the observation that specialization in HI and VI (i.e., especially as a full licensure regime) "runs counter to the idea of inclusion." This comment seems to suggest the need to adjust the service delivery model for THIs, TVIs, and COMS (a trend evident in the professional literature, e.g., Silvia Maria & Johnson, 2004).

The researchers also asked about interviewees' awareness of two phenomena: (1) the role of intervener and (2) the existence of the statewide collaborative. Just four of the organizations indicated awareness of the role of intervener. Whether or not the interviewee was aware of the role of intervener, most reported that the training provided to parapros serving students with

dual sensory impairments was usually provided by the teacher of those students. As to the statewide collaborative, five of the 13 organizations indicated awareness. Two organizations had been involved in planning for the program, including one that had hired a reportedly enthusiastic VI graduate and was continuing to promote the statewide programs.

Next, discussion turns to the three supply questions. The "supply" considered in the questions pertains to positions that provide direct services to children and youth with hearing, vision, and dual sensory impairment.

## Supply Question One

The first supply question asked about the complete count of educators licensed (or with certified training in the case of interveners) to provide services: "How many THIs and TVIs are licensed to practice in Ohio? How many educators possess the O&M license? How many trained and certified interveners exist in Ohio?" To address both this question and the second supply question, the study used the ODE's *Educator Credentials Download File* (ODE, 2020, August 13). This dataset provided detailed information about all currently valid K12 licenses. It was a huge file (over half a million records), and the ODE updates the file every Monday. The supply of certified interveners relied on information from NRCpara, which issues the national certificate; the statewide collaborative has not yet graduated students from the intervener program.

THIs and TVIs. For this set of educators, the study worked with the file posted as of August 13, 2020, which contained 508,714 records. The objective for answering question one was to identify all cases with licensure in VI or HI (i.e., licenses for Hearing Handicapped (K12), Intervention Specialist: Hearing Impaired (PK12), Visually Handicapped (K12), or Intervention Specialist: Visually Impaired (PK12).[13] There were 1,112 cases. Some cases were duplicates representing valid dates of different licenses for a single individual. With duplicates removed, however, 963 individuals proved to hold valid HI (N = 704) or VI (N = 259) licenses.

*Table 11: Licensed Educators Teaching and Not Teaching*

| | HI | | VI | |
|---|---|---|---|---|
| **Group** | **N** | **Percent** | **N** | **precent** |
| Teaching | 408 | 58% | 153 | 59% |
| Not Teaching | 296 | 42% | 106 | 41% |
| Total | 704 | 100% | 259 | 100% |

Table 11 is based on the detailed examination of individual cases to (approximately) classify educators' professional roles, which will be explained at length in the discussion of findings for

[13] The ODE database covers many decades of licensure. The earliest birthdates of listed educators are in the second decade of the 20th century (e.g., 1914). Naturally in all that time, the names of certificates and licenses, with applicable grade levels and specialties, underwent many changes. And there have been changes even in the past decade. The researchers examined records for all relevant licensure details.

supply question two. For question one, however, Table 11 reports the applicable finding: 408 THIs and 153 TVIs represent the applicable supply in Ohio, that is, if one assumes that anyone who holds the appropriate license and has not stopped teaching is part of the supply. The researchers believe these figures are substantially correct. For both THIs and TVIs the proportion not teaching is about 40% (two fifths). The fact that the proportions are similar across both fields is predictable because the process that moves teachers out of the teaching force in both cases is likely to be the same: career evolution out of the K12 setting and retirement.

COMS. The *Educator Credentials Download File* (ODE, 2020, August 13) posted 73 cases of educators licensed in O&M (COMS). With duplicates, those retired or moved out of state, and those confirmed as not providing direct services eliminated, 50 COMS remained in the extracted file. As with educators who possessed HI or VI licensure, the researchers conducted a case-by-case audit of the ODE data to judge positions occupied. The inspection resulted in classification of individuals into two categories: (1) those in an identified COMS position and those in a teaching position. Table 12 provides the results.

*Table 12: COMS, by Initial Category*

| Initial Category | N | percent |
|---|---|---|
| COMS position | 29 | 58% |
| Teaching position | 21 | 42% |
| Total | 50 | 100% |

Table 12 shows that, statewide, Ohio has licensed 50 educators currently employed who are licensed in orientation and mobility (O&M). Of these individuals, 21 also possessed VI licenses, and most of these educators were in fact enumerated among the TVIs employed by ESCs. Greater detail on COMS appears among the more extended findings to be presented in the section of the report that addresses supply question two. The Academy for Certification of Vison Rehabilitation and Education Professions (ACVREP, 2020) listed 119 COMS as possessing their certification (58 of these appeared in the ODE list), but this report considered only those licensed by the ODE to work in schools.

Trained interveners. The Ohio Center for Deafblind Education (OCDBE) facilitates training for interveners using the Open Hand, Open Access (OHOA) modules promoted by the National Center on Deaf-Blindness. The training is extensive (six cohorts of trainees as of December 2020), but it is not designed as a pathway to certification. Altogether about 40 individuals, including five paraprofessionals, have participated in the training (D. Telfer, personal communication, December 2, 2020).

According to NRCpara (2020), 21 states have a limited number of nationally certified interveners. Although Ohio lacks nationally certified interveners, all the surrounding states except Kentucky have a few of them according to NRCpara (2020): Indiana, Pennsylvania, and

West Virginia reportedly have one to four certified interveners each, and Michigan reportedly has 5-10.[14] Each of these states also reportedly has additional interveners in training to qualify for national certification.

## Supply Question Two

As the presentation of findings for supply question one noted, 408 educators with HI and 153 with VI licenses were teaching in Ohio (as of August 2020). This fact provides no detail about what or whom they might be teaching.

Such detail is crucial because the existence of this group does not ensure that all, or even most members of the group, will actually be employed as THIs or TVIs. Educators exercise agency in their employment as well as in their own professional development. After they are initially licensed, they often acquire other licenses and teaching fields, and these assets influence their employment decisions and their actual employment, as well as their future training and further licensure. In short, one might well suspect that only a portion of these 561 teachers would be confirmed in actual THI and TVI roles.

Supply question two asks about exactly this circumstance, not only statewide but by SST region: "What is the actual employment circumstance of licensed THIs, TVIs, COMS, and interveners in Ohio and as dispersed across the 16 SST regions?" The report of findings begins with THIs and TVIs. In fact, defining and discovering these circumstances presented the most challenges for the supply phase of the study. Findings are presented, next, for (1) THIs and TVIs together, (2) COMS, and (3) trained interveners.

THIs and TVIs. The study adopted a case-by-case analysis, noting relevant details in the ODE dataset for each case, combined with personal contact for a sample of teachers. For the initial analysis (in August and September 2020) researchers conducted web searches for school district sites to determine district-applied position titles for the 963 licensed teachers, combined with searches of the ODE educator database. This initial effort confirmed a portion of teachers in positions that *explicitly mentioned* visual or hearing impairment. Moreover, this initial work showed that many teachers filled positions whose titles did not specify service to students with hearing, vision, or dual sensory impairments. Those licensed teachers might or might not serve even a single student with hearing, vision, or dual sensory impairment.

At the initial stage, then, researchers readily identified 261 such licensed teachers (i.e., those with HI or VI licensure, but whose actual service to students with sensory impairments was unknown). Researchers attempted personal contact with each of these 261 teachers. The contact protocol specified a maximum of five attempted contacts (by email and sometimes by phone) as needed to secure a response. At the end of this effort, the study had received 137

[14] NRCpara does not provide a dataset for certified interveners. The cited website (see reference list) provides the data in maps with ranges of value (i.e., 1-4 and 5-10, as reported here).

responses (a response rate of 52.4%).[15] Of these, 79 (58%) reported serving at least one student with hearing, vision, or dual sensory impairment; and 58 (42%) reported serving none. Among those who did serve students, the responses suggested their caseloads included one or two students with sensory impairment.

These results suggested two conclusions, first that the listed position (e.g., intervention specialist as opposed to THI or TVI) was accurate and, second, that as a statewide group these licensed teachers served very few students with hearing, vision, or dual sensory impairment. At this juncture, the researchers decided to make judgments on a case-by-case basis (for each teacher, using all available information to inform the judgment). During the analysis for the second supply question, then, the researchers searched carefully for information about individual teachers using the Educator Search portal (ODE, 2020, November 30)—the updated dataset for the individuals in the *Download File*—and often online as well (at employers' websites and via free-form Google searches).

For this case-by-case determination, the study used the eight-part coding scheme presented in Table 13 to characterize the relevant employment circumstances.

*Table 13: Codes for Employment Circumstance*

| Code | Description |
|---|---|
| **0** | **Educators confirmed with position title of THI or TVI.** |
| **1** | **Educators in intervention specialist role, contacted personally and confirmed to teach at least one student with HI or VI** |
| **2** | **Educators in intervention specialist role, personally confirming teaching no students with HI or VI[16]** |
| **3** | **Educators *not* in intervention specialist positions *and* possessing GENED license(s)[17]** |
| **4** | **Educators in supervisory or administrative position (e.g., principal)** |
| **5** | **Educators in higher education position (e.g., assistant professor)** |
| **6** | **Educators in other non-teaching role (e.g., counselor, private employment)** |
| **7** | **Educators without employment report in ODE database (November 2020)** |
| **8** | **Educators retired, deceased, or moved out of state** |

Green highlighting identifies the licensed educators currently serving in teaching positions. These educators would be those who are on site, in teaching roles, and able (because of licensure) to serve in the THI or TVI role regardless of whether or not they now occupy such a role. Additionally, licensed educators working in ESCs may serve in dual or triple roles and so it might not be apparent that the are serving in a THI or TVI role. The study team took the

[15] Of the non-respondents five either never opened any of the emails or actually opened the emails but refused to participate.

[16] Further investigations, described below, allowed for a more nuanced understanding of teachers in this category.

[17] Assignment to this category is described in the narrative below.

decision, at a subsequent stage of the work, to classify all teachers with HI or VI licensure who were working in ESCs as THIs and TVIs regardless of their position title.

Case-by-case inspection to categorize all teachers involved a systematic audit of publicly available data for all teachers, including for the 137 personal-contact respondents. At this stage, the researchers finalized the coding for all teachers with HI or VI position titles, confirming their employment circumstance with a November 2020 update to the ODE database. Researchers also examined employment details (year of birth, multiple licensure fields, licensure dates, employers, license restrictions, position titles, courses taught) in the November version of the database for each educator, as well, to make judgments about classification. The most difficult of these judgments was for code 3—licensed teachers occupying roles in general education. If nothing in the record indicated an intervention specialist assignment (e.g., position explicitly limited to students with disabilities, or delivering "courses" with an explicit connection to students with disabilities) *and* the educator possessed at least one general-education teaching license, we assigned that teacher to code 3. When coding was completed, just 5% each of the HI and VI cases had been assigned code 3. Table 14 reports the final counts for all codes by field and total.

*Table 14: All Licensed Teachers by Field, by Code*

| Code | HI | | VI | | TOTAL | |
|---|---|---|---|---|---|---|
| | **N** | **percent** | **N** | **percent** | **N** | **percent** |
| 0 | 124 | 18% | 84 | 32% | 208 | 22% |
| 1 | 38 | 5% | 11 | 4% | 49 | 5% |
| 2 | 208 | 30% | 45 | 17% | 253 | 26% |
| 3 | 38 | 5% | 13 | 5% | 51 | 5% |
| 4 | 51 | 7% | 11 | 4% | 62 | 6% |
| 5 | 6 | 1% | 4 | 2% | 10 | 1% |
| 6 | 20 | 3% | 7 | 3% | 27 | 3% |
| 7 | 107 | 15% | 67 | 26% | 174 | 18% |
| 8 | 112 | 16% | 17 | 7% | 129 | 13% |
| **Total** | 704 | 100% | 259 | 100% | 963 | 100% |

*Note*. Codes are described in column 2 of Table 13.

According to the study's coding process, 208 teachers were definitively confirmed as serving students with hearing, vision, or dual sensory impairments. The positions held suggested they served *only* students with VI, HI, or dual sensory impairment.

Table 14 also shows that many educators licensed to teach PK12 students with HI and VI are in positions that do not involve providing direct services (teaching) to any students whatsoever: all those cases coded 4-8 (N=402). Table 15 displays the coding results (by field, by codes 0-3) for the 561 educators who *do* occupy PK12 teaching positions.

*Table 15: Licensed Teachers Employed to Teach, by Field*

| CODE | HI | | VI | |
|---|---|---|---|---|
| | N | percent | N | percent |
| 0 | 124 | 30% | 84 | 55% |
| 1 | 38 | 9% | 11 | 7% |
| 2 | 208 | 51% | 45 | 29% |
| 3 | 38 | 9% | 13 | 9% |
| **Total** | 408 | 100% | 153 | 100% |

*Note*. Educators confirmed as employed in teaching role.

These 561 cases, 408 with HI licenses and 153 with VI licenses, represent the full pool of employed teachers with appropriate Ohio licensure. Cases coded 0 are teachers holding appropriate licenses and teaching a caseload of students with either VI or HI determinations. Cases coded 1 represent educators confirmed through personal contact as teaching at least one student with hearing, vision, or dual sensory impairment. Summing cases coded 0 and 1 produces totals of teachers confirmed as teaching at least one student with VI or HI. The sums are 162 for HI and 95 for VI. These figures (for codes 0 and 1) represent the pool of licensed teachers confirmed as providing, to any extent, direct services to students with hearing, vision, or dual sensory impairments.

Among the 253 intervention specialists, 208 in HI and 45 in VI, coded 2 existed a subgroup that is much more likely than the other cases coded 2 to occupy bona fide THI and TVI positions (i.e., serving only students with HI or VI). These are teachers with HI or VI licenses working as "teachers" at Educational Service Centers (ESCs), the Ohio State School for the Blind OSSB), and the Ohio School for the Deaf (OSD). Indeed, many of the teachers coded 0 do work at ESCs and are identified as such by the ESCs as THIs and TVIs (though not all are so identified and some ESCs do not provide staff listings on their websites). Table 16 shows licensed educators who are employed by ESCs, by field, by code.

*Table 16: Licensed Teachers at ESCs, by field, by Codes 0-3*

| CODE | HI | | VI | | Total | |
|---|---|---|---|---|---|---|
| | N | percent | N | percent | N | percent |
| 0 | 32 | 51% | 48 | 81% | 80 | 66% |
| 1 | 12 | 19% | 5 | 9% | 17 | 14% |
| 2 | 19 | 30% | 5 | 9% | 24 | 20% |
| 3 | 0 | 0% | 1 | 2% | 1 | 1% |
| **Total** | 63 | 100% | 59 | 100% | 122 | 100% |

*Note*. Percentages are by column.

Table 16 shows that two-thirds of the ESC teachers were classified as serving students with hearing, vision, or dual sensory impairment according to their published position titles. There were 32 THIs (51% of those ESC teachers with HI licenses) and 80 TVIs (81% of the ESC teachers with VI licenses). The number of licensed teachers employed by ESCs but apparently not as THIs or TVIs was 42 (cases coded 1-3: 31 with HI and 11 with VI licenses). ODE records, moreover, showed only an ESC assignment (and not any assignment to special schools or particular districts) for 31 of these 42 teachers.

For the purposes of estimating the supply of THIs and TVIs, the study determined to identify *all* VI- and HI-licensed teachers employed by ESCs as THIs or TVIs for three reasons: (1) employment at an ESC can imply a regional role; (2) most VI- and HI-licensed teachers employed at ESCs (66%) occupied positions specifically titled THI or TVI; and (3) all 122 ESC teachers possessed HI or VI licenses. This approach produces a *liberal estimate* of supply: 250 teachers statewide, 155 THIs and 95 TVIs. The figure includes, as well, all licensed teachers at the OSSB and the OSD (regardless of job title). This finding represents the study's estimation of supply for THIs and TVIs.

At the same time, 311 other licensed teachers *do not* occupy positions officially identified as THI or TVI, but (for the most part) as intervention specialists or in other positions restricted to serving only students with disabilities (but not distinguished as to disability category). Personal contact with the 137 respondents in the initial sampling of 261 such teachers suggested that perhaps 60% worked with one child with hearing, vision, or dual sensory impairment. Most contacts were by email, but many respondents offered details suggesting that the estimate of one student (on average across all intervention specialists, including even those who had reported serving no students in the sample) was a reasonable estimate. Accepting all 311 teachers as serving one (or even two) students likely provides a liberal estimate of those students with hearing, vision, or dual sensory impairment served by this group of teachers with HI or VI licenses. Table 17 provides the summative count of the statewide supply of THIs and TVIs, including licensed teachers in other positions.

*Table 17: Statewide Supply of THIs and TVIs*

| | HI | | VI | | Total | |
|---|---|---|---|---|---|---|
| **Teacher Group** | **N** | **column %** | **N** | **column %** | **N** | **column %** |
| THI or TVI position | 155 | 38% | 95 | 62% | 250 | 45% |
| Other teaching positions | 253 | 62% | 58 | 38% | 311 | 55% |

Table 17 presents a *liberal estimate* of the supply of THIs and TVIs in Ohio, whereas the estimates in Tables 5-9 present *conservative estimates* for demand. The combination of a liberal supply estimate and a conservative demand estimate produced estimations of any shortage (the tabulation appears later in the report) towards a more conservative value (i.e., away from producing an overestimate of any shortage).

COMS. As noted previously, 50 COMS licensed by the ODE provided direct services to students. The employment circumstances of these 50 educators vary. Some possess COMS licensure in addition to VI licensure, and some possess licensure only as COMS (and not as teachers). Among those with VI licensure, many are (in this study) also classified as TVIs (e.g., in the count given in Table 17). Tables 18 shows the details of COMS' employment circumstances, with Table 19 exhibiting a key decision of the study, visible in the second row of the second column in Table 19. The focus of these Tables is the employment of COMS at ESCs or the OSSB. Details follow next.

*Table 18: Educators with COMS License, by ESC/OSSB employment, by Position*

| | COMs Position | | Teacher Position | |
|---|---|---|---|---|
| **Employment** | **N** | **row %** | **N** | **row %** |
| Not at ESC/OSSB | 14 | 70% | 6 | 30% |
| At ESC/OSSB | 15 | 50% | 15 | 50% |
| **Total** | 29 | 59% | 21 | 41% |

Table 18 shows that most of the educators with COMS licensure *who do not work at ESCs or the OSSB* occupy positions (70%) with titles that indicate provision only of O&M services. *By contrast*, among those *who are employed at ESCs or the OSSB*, about half occupy positions that do not specifically reference O&M services, but these teachers also possess VI licenses and are classified as occupying teacher positions in Table 18.

Table 19 reclassifies these educators for the purposes of assigning individuals with COMS licensure to a single educator category (TVI or COMS). As with the decision to reclassify all educators with HI and VI licenses working at ESCs as THIs and TVIs, it seemed that educators working at ESCs or the OSSB—providing direct services to a caseload of all or mostly students with VI—ought also to be reclassified as (likely) working (perhaps for part of their time) as COMS.[18] This reclassification would render 44 of these 50 educators as providing O&M services: 30 of them at ESCs and 14 elsewhere. Just six educators licensed as both TVIs and COMS would remain classified as teachers. Table 19 simply makes this change to the data in Table 18. The decision avoids the use of separate columns to report very small numbers of educators who hold multiple relevant licenses.[19]

[18] The study's classification decisions are for the purposes of estimation only and are not based on confirmation of assignments with employed teachers. For instance, a number of teachers at OSSB possess O&M certification but reportedly work only as TVIs.

[19] Readers may also be interested to know that only four educators in the *Educator Download File* are licensed in both HI and VI, though their employment circumstance is not ambiguous.

*Table 19: Statewide Supply of COMS*

| | COMs Position | | Teacher Position | |
|---|---|---|---|---|
| **Employment** | **N** | **row %** | **N** | **row %** |
| Not at ESC | 14 | 74% | 6 | 26% |
| At ESC/OSSB | 30 | 100% | 0 | 50% |
| **Total** | 44 | 88% | 6 | 12% |

*Note*. In Table 19, all educators with O&M licensure working at ESCs or the OSSB have been presumed to work for at least some of their time as COMS (i.e., even if they also possess VI licensure); compare with Table 18.

Table 19 estimates the statewide supply of COMS at 44: 88% of the 50 educators with O&M licensure who provide direct services. Notably, of those 14 COMS not at ESCs or the OSSB, five work outside of public education (two as private consultants). Here too, then, the supply estimate is a liberal one.

Trained interveners. Ohio has no nationally certified interveners, and none are in the training pipeline (NRCpara, 2020). As noted in response to supply question one, however, five parapros took part in training provided (2015-2020) by the Ohio Center for Deafblind Education. Most OCDBE training participants, however, occupied other roles: teachers, parents, interpreters, intervention specialists, nurses, and special-language pathologists. As noted previously, the Ohio Operating Standards (ODE, 2014) do not recognize the role of intervener (nor do they recognize the role of TDB, despite citing a caseload limit for classrooms serving students with dual sensory impairments).

Regional supply. The next concern in supply question two addresses the regional dispersion of the statewide educator pool serving students with hearing, vision, or dual sensory impairment. For THIs and TVIs, this analysis used the licensed teachers actually occupying THI and TVI positions.

Table 20 presents the regional supply estimates for THIs, TVIs, COMS, and NRCpara-certified interveners.

*Table 20: Regional Supply of THIs, TVIs, COMS, and Trained Interveners*

| SST Region | HI Pop | Employed THIs | VI Pop | Employed TVIs | DB Pop | Employed TDBs | COMS Pop | COMS | NRCpara Certified INTs |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 299 | **11** | 266 | **7** | 40 | **0** | 200 | **0** | **0** |
| 2 | 121 | **1** | 108 | **4** | 16 | **0** | 81 | **1** | **0** |
| 3 | 301 | **25** | 268 | **9** | 40 | **0** | 201 | **5** | **0** |
| 4 | 77 | **0** | 69 | **1** | 10 | **0** | 51 | **0** | **0** |
| 5 | 161 | **2** | 143 | **3** | 21 | **0** | 107 | **2** | **0** |
| 6 | 109 | **1** | 97 | **5** | 15 | **0** | 73 | **3** | **0** |
| 7 | 127 | **4** | 112 | **3** | 17 | **0** | 84 | **2** | **0** |
| 8 | 229 | **9** | 204 | **4** | 31 | **0** | 153 | **1** | **0** |
| 9 | 144 | **2** | 128 | **4** | 19 | **0** | 96 | **1** | **0** |
| 10 | 279 | **7** | 248 | **9** | 37 | **0** | 186 | **9** | **0** |
| 11 | 602 | **61** | 535 | **26** | 80 | **0** | 402 | **12** | **0** |
| 12 | 133 | **0** | 118 | **4** | 18 | **0** | 89 | **0** | **0** |
| 13 | 447 | **23** | 397 | **10** | 60 | **0** | 298 | **6** | **0** |
| 14 | 58 | **5** | 52 | **2** | 8 | **0** | 39 | **1** | **0** |
| 15 | 68 | **4** | 61 | **3** | 9 | **0** | 45 | **1** | **0** |
| 16 | 70 | **0** | 63 | **1** | 9 | **0** | 47 | **0** | **0** |
| TOTALS | 3,226 | **155** | 2,867 | **95** | 430 | **0** | 2,150 | **44** | **0** |

*Note*. HI, VI, DB, and COMS populations are those reported in Table 10; Pop = population; NRCpara=National Resource Center for Paraeducators; INTS=interveners.

As information from the personal contact effort indicates, the researchers estimated that licensed teachers who *do not occupy such positions* were likely, on average, to serve just one student with a low incidence sensory disability. The contribution of licensed teachers in positions other than THI and TVI to meeting demand is therefore comparatively small: less than 10% of the total under such a scenario. Although their contribution to meeting demand is excluded from the findings in Table 10, users of this report can adjust the figures upward by 10% if preferred. As it turns out, such an adjustment would affect calculation of statewide and regional shortages very little. Comparison of the supply (Table 20) and demand (Table 10) estimates will be considered in the discussion section of this report.

## Supply Question Three

Supply question three asked about the contribution of professional preparation programs to the supply of THIs, TVIs, COMS, and interveners statewide and in the 16 SST regions. The researchers concluded that publicly accessible data did not permit tracking graduates of particular programs to eventual employment in Ohio. Nonetheless, data in the *Educator Credentials Download File* (ODE, August 13, 2020) permitted a proxy accounting, as explained

next. That is, the data presented next are a substitute for exact figures. No doubt, they vary from records maintained at the institutional level.

The ODE data served as the basis of the overall supply estimate and regional approximations. The file, however, also included a field, "professional classification name," of which one value was "resident educator" (also "alternative resident educator"). Resident educators are teachers who recently received an initial license: They are first-time licensees without previous licenses. These new teachers are "resident" because they receive mentoring and professional development support (ODE, December 8, 2020) in the district where they work. This approach to the analysis means that most of the teachers licensed in the statewide collaborative program, nearly all of whom possess prior licenses, are not included (see Table 25 for the analysis pertinent to that portion of the supply chain).

Records that contained both values—"resident educator" and "new in state" (or "new out of state")—likely identified first-time teachers. The fields were triangulated with the educators' publicly accessible birth year to help assess this inference (see Table 22). Finally, the file also identified the issue date of the license for each educator: The resident educator program was inaugurated in 2011 and seemed functional, according to these records, beginning in 2015.

Taken together, this information makes it possible to identify *initially licensed teachers* in HI and VI from 2015 to 2020. Table 21 presents the findings for this group of teachers, by field.

*Table 21: Newly Licensed Teachers, 2015-2020 by Field*

| Year | HI | VI | Total |
|---|---|---|---|
| 2020 | 1 | 16 | 17 |
| 2019 | 8 | 3 | 11 |
| 2018 | 6 | 1 | 7 |
| 2017 | 13 | 3 | 16 |
| 2016 | 14 | 1 | 15 |
| 2015 | 2 | 0 | 2 |
| Total | 44 | 24 | 68 |

Perhaps the most notable fact in Table 21 is the number of new licenses awarded in 2020 for VI: exactly two-thirds of the five-year total. At the same time, Table 21 shows the number of new licenses in HI sharply declining. Finally, the proportion of VI licenses to HI licenses in Table 21 (i.e., 24/44 = 55%) is notably higher than among the overall supply of 561 teachers (153/408 = 38%; see Table 15).

As a check on the inference that this group of 68 teachers did represent newly licensed educators, Table 22 reports the distribution of their ages in relevant age bands. Individuals born in 1995 to 1998 would be aged 22 to 25 in 2020: young teachers indeed. Those born before 1990 would be aged 30 or older.

*Table 22: Newly Licensed Teachers, 2015-2020, by Year of Birth*

| | LICENSURE YEAR | | | | | | |
|---|---|---|---|---|---|---|---|
| **BIRTH YEAR** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **TOTAL** |
| 1995-98 | 0 | 0 | 5 | 3 | 5 | 17 | 30 |
| 1990-94 | 1 | 8 | 4 | 3 | 4 | 0 | 20 |
| 1982-89 | 1 | 7 | 7 | 1 | 2 | 0 | 18 |
| ALL | 2 | 15 | 16 | 7 | 11 | 17 | 68 |

Table 22 shows that about three-quarters of the members of this group (N=50, or 74%) are aged 30 or younger. This fact supports the inference that the study had identified the recent additions of the higher education pipeline to the supply of educators with HI and VI licensure. All educators, in fact, were younger than 40. The HI and VI licenses were the only teaching licenses held by these educators: They had not completed residency under a different license.

Another supporting fact is that the researchers could confirm employment for only about half the group of 68: indeed, searches of the web showed that many of the youngest group (born 1995-1998) as having completed their programs in May of 2020. Given the 2020 pandemic, it was hardly an auspicious time for securing employment quickly.

As to the regional distribution of these newly licensed teachers, apportioning them by SST region is illustrative given the tenuous employment circumstance of recent graduates. Nonetheless, place of residence was retrievable for nearly all these educators, and assignment to a region was possible on that basis. Table 23 shows the results—which need to be interpreted with even more caution than was advised for Tables 10 and 20.

*Table 23: Newly Licensed Teachers by SST Region, by Field*

| **SST** | **HI** | **VI** | **TOTAL** |
|---|---|---|---|
| 1 | 2 | 1 | 3 |
| 2 | 1 | 0 | 1 |
| 3 | 6 | 0 | 6 |
| 4 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 |
| 7 | 0 | 1 | 1 |
| 8 | 1 | 0 | 1 |
| 9 | 1 | 1 | 2 |
| 10 | 3 | 0 | 3 |
| 11 | 10 | 12 | 22 |
| 12 | 0 | 0 | 0 |
| 13 | 9 | 0 | 9 |
| 14 | 0 | 0 | 0 |
| 15 | 0 | 1 | 1 |
| 16 | 0 | 0 | 0 |
| unknown | 6 | 6 | 12 |
| out-of-state | 5 | 2 | 7 |
| Total | 44 | 24 | 68 |

Fine-grained conclusions from Table 23 are unwarranted (particularly because the employment status of half of these educators could not be confirmed), but the overall pattern is predictable from the other regional supply-and-demand analyses: Newly licensed teachers are mostly located in the major cities (regions 3, 11, and 13), with Columbus (region 11) predictably dominant.

The study was also able to access information about enrollees and completers of the new statewide collaborative. The first of the four programs (VI) to be established began enrolling students in 2017. Since inception, the VI program has enrolled four cohorts, graduating teachers in 2018, 2019, and 2020. The fourth cohort will graduate in summer 2021. Of the 56 members in all four cohorts, 55 were employed as of November 2020; one became unemployed due to pandemic-related budget cuts. The first three cohorts have completed training, adding 43 teachers eligible for VI licensure, of whom, as of November 2020, 28 had received licenses according to updated data (ODE, November 30). About half the graduates with VI licenses (N=15) were working as TVIs by December 2020: eight at ESCs, three at BDDs, three at the OSSB, and one in a local district. The other graduates (as of December 2020) remained in the role of intervention specialist in local districts, where they now possessed expertise in VI. The statewide collaborative's recruitment strategy targets already-employed intervention specialists, intending to recruit candidates from poorly served counties.

Beginning this year, as well, the statewide collaborative effort added first cohorts for HI licensure (14 students), O&M licensure (six students), and interveners (eight students—all of them parapros). On program completion, interveners trained by the collaborative would be eligible for national certification from NRCpara. In total, then, the collaborative has enrolled 84 students. Of these, 41 are currently working toward program completion—33 on track to graduate in summer 2021 (14 in HI, 13 in VI, and six in O&M) and the eight interveners in spring 2022. Table 24 provides enrollment data for the statewide collaborative.

*Table 24: Statewide Collaborative Enrollment, by Program and Cohort*

| Program & Cohort | Completion | N | percent |
|---|---|---|---|
| TVI Cohort 4 | summer 2021 | 13 | 16% |
| TVI Cohort 3 | summer 2020 | 16 | 19% |
| TVI Cohort 2 | summer 2019 | 14 | 17% |
| TVI Cohort 1 | summer 2018 | 13 | 16% |
| THI Cohort 1 | summer 2021 | 14 | 17% |
| O&M Cohort 1 | summer 2021 | 6 | 7% |
| Intervener Cohort 1 | spring 2022 | 8 | 10% |
| Total | | 84 | 100% |

Unlike the teachers described in Table 23, those enrolling in the statewide collaborative are already practicing educators seeking additional licensure, and all the intervener students are practicing paraprofessionals (according to ODE data). This claim was confirmed by searches of the ODE Educator Profile utility (ODE, 2020, November 30) to confirm employment status and to retrieve educators' birth year data. The average birth year for all enrolled students (with three records missing values) was 1978 (compare with Table 22).

The cautions about analyses by SST region apply to Table 25, which shows the distribution of students (by place of employment) across Ohio. The VI program, now in its fourth year of enrolling students, dominates the display.

*Table 25: Students in Collaborative, by Program by SST Region*

| SST | INT | O&M | HI | VI | TOTAL |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 2 | 4 | 6 |
| 2 | 0 | 0 | 1 | 2 | 3 |
| 3 | 0 | 0 | 0 | 3 | 3 |
| 4 | 0 | 0 | 0 | 2 | 2 |
| 5 | 0 | 0 | 0 | 7 | 7 |
| 6 | 0 | 0 | 1 | 3 | 4 |
| 7 | 1 | 0 | 0 | 1 | 2 |
| 8 | 0 | 0 | 1 | 6 | 7 |
| 9 | 0 | 0 | 0 | 3 | 3 |
| 10 | 0 | 0 | 1 | 1 | 2 |
| 11 | 1 | 3 | 2 | 8 | 14 |
| 12 | 0 | 0 | 0 | 2 | 2 |
| 13 | 1 | 1 | 3 | 3 | 8 |
| 14 | 0 | 1 | 1 | 3 | 5 |
| 15 | 3 | 1 | 2 | 6 | 12 |
| 16 | 2 | 0 | 0 | 2 | 4 |
| Total | 8 | 6 | 14 | 56 | 84 |

Table 25 shows that the Collaborative's students have been drawn from across the state's districts and other employers. Eighteen of the 84 are employed by ESCs or Boards of Developmental Disabilities (BDDs).

Although the collaborative could not possibly have planned to distribute its students across the state according to need (estimated with this report for the first time), one can nonetheless compare the VI total by region with the demand estimates generated by the present study. Table 26 provides such an analysis (for VI only, with its four-year history). Table 26 combines the information about VI students in the collaborative and contrasts them with the findings for the estimated regional demand for TVIs (given in column 8 of Table 10).

*Table 26: Collaborative Enrollment Compared to Demand, by SST Region*

| SST | VI Students in Collaborative | VI Students, Percent | TVI Demand by Region | TVI Demand, Percent |
|---|---|---|---|---|
| 1 | 4 | 7% | 19 | 9% |
| 2 | 2 | 4% | 8 | 4% |
| 3 | 3 | 5% | 19 | 9% |
| 4 | 2 | 4% | 5 | 2% |
| 5 | 7 | 13% | 10 | 5% |
| 6 | 3 | 5% | 7 | 3% |
| 7 | 1 | 2% | 8 | 4% |
| 8 | 6 | 11% | 15 | 7% |
| 9 | 3 | 5% | 9 | 4% |
| 10 | 1 | 2% | 18 | 9% |
| 11 | 8 | 14% | 38 | 19% |
| 12 | 2 | 4% | 8 | 4% |
| 13 | 3 | 5% | 28 | 14% |
| 14 | 3 | 5% | 4 | 2% |
| 15 | 6 | 11% | 4 | 2% |
| 16 | 2 | 4% | 4 | 2% |
| Total | 56 | 100% | 205 | 100% |

Table 26 shows, first, that enrollment in the statewide collaborative actually covered the state: students came from every SST region. Second, comparison of the percentage of VI students by region with TVI demand by region, showed a pattern of closer approximation than might have been anticipated. Less surprising is the "over-representation" of students from SST Region 15 (11% of all VI students): That region is home to the collaborative's lead institution (i.e., Shawnee State University, in Portsmouth). Nonetheless, regions of demonstrated need (e.g., 16, 12, 1, 8) exhibit roughly proportionate representation in the program: No regions are without students, and the percentage of students in the program is not so far different from demand as one might expect (i.e., compare with data from Table 23 or Table 20).

One must realize, however, that Table 26 compares unlike quantities: Demand represents teachers actually employed in the role of TVI, whereas most of the collaborative's VI students are already employed in districts as intervention specialists—in roles like their 58 colleagues not working as TVIs (see Table 17). At any rate, with respect to VI licensure, Tables 25 and 26 provide evidence that the statewide collaborative does enroll students whose statewide dispersion is surprisingly close to the dispersion of need at the regional level.

# Discussion

This section first combines the findings for supply and demand into inferences about statewide and regional shortages. Then it considers inferences from findings, key issues, and recommendations to the Compact.

## Statewide Shortages

The goal of this study was simply to quantify supply and demand in order to gauge likely shortages in Ohio. Thus far in the report, the values for supply and demand have been reported separately. Discussion requires that supply and demand be considered together. Table 27 therefore presents the statewide results of this effort for both supply and demand. Substantial gaps between supply and demand are clearly evident statewide.[20]

*Table 27: Statewide Supply and Demand Estimates*

| Employed in Role | SUPPLY | DEMAND | STATEWIDE GAP |
|---|---|---|---|
| THIs | 155 | 230 | -75 |
| TVIs | 95 | 205 | -110 |
| TDBs | 0 | 72 | -72 |
| COMS | 44 | 154 | -110 |
| INTERVENERS | 0 | 215 | -215 |

If users of this report accept the study's middle-of-the-road estimations, the shortfall in statewide supply is substantial. This finding corresponds to what most of the interview data suggested and professional opinion has claimed about the nation as a whole (e.g., Johnson, 2013). To meet estimated demand, the data in Table 21 suggest that the state would need to place an additional 75 educators *in the role of THI* (approximately a 50% increase), 110 in *the role of TVI* (an increase of about 100%), and 110 *in the role of COMS* (a 200% increase). As for educators to support students with dual sensory impairment (TDBs and interveners), those roles are very badly staffed nationwide (Parker & Nelson, 2016), not only in Ohio.

[20] Overall, the values of Table 21 represent a middle-of-the road estimate. But other displays are possible with data provided by the study. One might, for instance, have used the mean prevalence value as for the numerator of the demand formula, which would have yielded substantially larger statewide shortages. Alternatively, one might have adopted a caseload value at the top of the range recommended by Bruce and colleagues (2016)—20 students per teacher instead of 14. That change would have minimized the gap. Or, alternatively, one might have used the bottom of the caseload range—8 students, which would have yielded much larger statewide gaps. And instead of using educators as employed as the basis of supply, one might instead have used all licensed educators actually teaching (N=561), regardless of position. In light of these alternatives (separately or in combination), the middle-of-the-road estimate seemed the most appropriate choice to the research team.

Table 27, on the basis of the middle-of-the-road assumptions adopted in the study, estimates a severe supply shortfall of THIs, TVIs, TDBs, COMS, and interveners in Ohio. Arguably, the shortfall has implications for the quality of support to students with hearing, vision, and dual sensory impairment in Ohio and their families.

The supply shortfall, large as it seems, may nonetheless relate to *position availability* more than to the supply of licensed teachers in Ohio, so many of whom (55%) seem not to be employed in the role of THI or TVI, in which they might (depending on community or organization where employed) serve larger numbers of students. To work *in the role of* THI, TVI, COMS, or certified intervener, *positions must, however, be available* for educators with the relevant training. It seems that such positions may not be offered in the numbers required by the actual prevalence-based demand. The circumstantial conditions (large district or small district; rural locale or suburban; district or ESC; well-funded or poorly funded district) likely exert substantial influence. For instance, positions might not be offered because one THI might serve 30 students, with half or more served under a "support for school personnel arrangement."[21] Or the district might be so remotely located or so poorly funded that it could not secure a THI. Or the district might be so small that a student with HI seldom enrolls. Or an ESC's relationship with supplying institutions might be problematic because of location or other reasons. The overall complexity and the influence of circumstance, however, do not justify overlooking an evident shortfall.

The likelihood that positions are not open is suggested by the evidence from the Jobs Board analysis: Just 14 or so positions seem to be advertised annually on the Board. The research team stresses the concept of *in the role of* because *any intervention specialist in Ohio* is authorized to provide service to all students with disabilities, no matter the impairment. Possibly, some intervention specialists are assigned to teach only students with sensory disabilities, but contact with 178 teachers did not confirm such an arrangement.

Despite the Ohio arrangement, federal law (IDEA) and national professional standards and recommendations (e.g., NPTP) would in fact seem to require a higher level of service (from the state and from local districts). That service would seem to involve ready access to substantially more educators working *in the roles of* THI, TVI, COMS, TDB, and certified intervener. Quite possibly, VI- and HI-licensed teachers now working as intervention specialists would serve more frequently in the role of THI and TVI if more positions were opened statewide. This possibility can be investigated empirically with a survey of the 311 licensed teachers working as intervention specialists and not apparently in the role of THI or TVI.

Positions are, of course, offered locally—in schools, districts, ESCs, or other organizations. As the previous (separate) analyses of regional supply and demand suggested, local need and

[21] Support for school personnel refers to assistance provided to teachers or other educators in serving a students with low-incidence disabilities. This role contrasts with the role of providing direct services (i.e., teaching). The role is a now well-recognized part of being a THI or TVI and it is particularly in play when THIs and TVIs itinerate.

supply vary. But they likely vary together, for instance, so that shortfalls of supply seem relatively deeper in some regions while adequacy would exist elsewhere. Combining regional supply and demand in one table will show the complex variability. Caution is required in reading such a table, as explained next.

## Regional Shortages

The regional data provide *a message about dispersion* across the state. The message is not about the particularities, but about statewide variability. This message would be misunderstood if taken to be an accurate report of demand or supply in *each* of the SST regions. The distinction between these two ways of reading the data is critical. One reading is dubious and the other is more cautious.

Why? The regional analysis takes the statewide estimates and distributes them across the 16 SST regions. But these regional estimates are, in fact, the same statewide estimates simply distributed proportionately according to student population in each region. Thus, the estimates would be misread as an accurate picture of regional shortages.

*A more accurate assessment of need in the SST regions would require study of all the districts, ESCs, and BDDs statewide.* The required granularity would not be 16 divisions, but hundreds (e.g., districts) or scores (e.g., counties, ESCs, BDDs). The method of this study *helps to illustrate* the dispersion of demand and supply across Ohio, but it is *not sufficient to define local supply and demand* with sufficient sensitivity to guide planning for districts or even for ESCs. The SST analysis is, for the study, a reasonable proxy to show that dispersion magnifies the problem in some places and eliminates it elsewhere. The cautious reading is that shortages are not experienced equally across the state but are concentrated in some places. Additional effort is needed to assess local shortages and relate them to the overall picture of statewide shortage, to improved identification and child-find activities, to the state's and localities' capacity to fund positions, and to plans for supplying LISD personnel outside the state's large metropolises.

In fact, disaggregating statewide estimates to SST regions in the manner explained above taxes several key assumptions made by the study. First, the characteristics of populations of students actually varies across regions, so *the prevalence values likely differ* as well (Kirchner & Diament, 1999; Picard, 2004). This fact means that the demand estimates are more unstable at SST regional levels and should therefore not be read as definitive. Second, supply has been traditionally produced in metropolitan centers, and this fact exerts a sort of "gravitational" restraint on the dispersion of supply. In other words, educators trained in Columbus tend to remain in or near Columbus. More remote areas lack the economic and cultural power to pull trained educators into their commuting "orbit." All else equal, organizations further from the centers of production would be predicted to have restricted access to THIs and TVIs. Third, the SST regions differ substantially from one another in three ways: (1) number of counties in the region (i.e., varying from 1 to 12; (2) geographic extent in square miles and number of districts; and (3) population demography, including race, economic power, and population density and

sparsity. Each of these differences—separately and jointly—influences dispersion. Fourth (to repeat the main point), the SST region is simply a convenient proxy for segmenting the state in order to illustrate dispersion.

In other words, the selection of SST regions is a compromise between too much granularity for the purpose of the study (e.g., 614 traditional districts) and none (the state as a whole). The SST regional data, then, should be read for overall—and suggestive—regional patterns rather than for specifics about any particular region. This point can hardly be overemphasized: Readers are likely to look for their locale without running through the distinctions just enumerated.

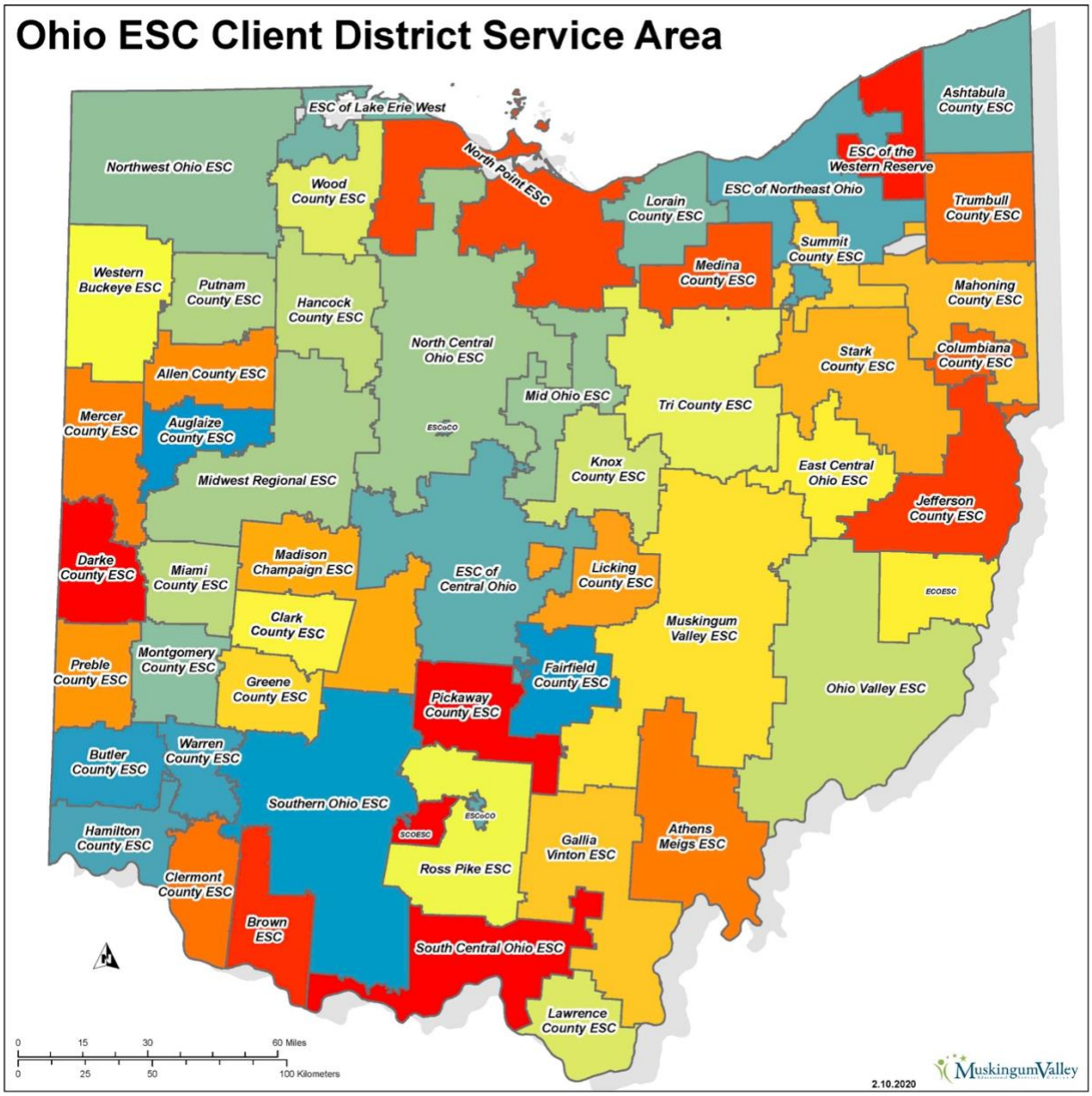
Given these very important caveats, Table 28 provides the combined regional supply and demand results on the assumption they will be appreciated as just described. The purpose of Table 28 is to illustrate dispersion across Ohio of teachers and COMS working with caseloads of students with hearing, vision, and dual sensory impairment. For ease of scanning, supply values in Table 28 are represented in red font and demand values in blue font.

*Table 28: Regional Supply and Demand Approximations*

| SST | THIs | | TVIs | | COMS | |
|---|---|---|---|---|---|---|
| Region | Supply | Demand | Supply | Demand | Supply | Demand |
| 1 | 11 | 21 | 7 | 19 | 0 | 14 |
| 2 | 1 | 9 | 4 | 8 | 1 | 7 |
| 3 | 25 | 22 | 9 | 19 | 5 | 14 |
| 4 | 0 | 6 | 1 | 5 | 0 | 4 |
| 5 | 2 | 11 | 3 | 10 | 2 | 7 |
| 6 | 1 | 8 | 5 | 7 | 3 | 4 |
| 7 | 4 | 9 | 3 | 8 | 2 | 7 |
| 8 | 9 | 16 | 4 | 15 | 1 | 11 |
| 9 | 2 | 10 | 4 | 9 | 1 | 7 |
| 10 | 7 | 20 | 9 | 18 | 9 | 14 |
| 11 | 61 | 43 | 26 | 38 | 12 | 29 |
| 12 | 0 | 10 | 4 | 8 | 0 | 7 |
| 13 | 23 | 32 | 10 | 28 | 6 | 21 |
| 14 | 5 | 4 | 2 | 4 | 1 | 4 |
| 15 | 4 | 5 | 3 | 4 | 1 | 4 |
| 16 | 0 | 5 | 1 | 4 | 0 | 4 |
| TOTALS | 155 | 230 | 95 | 205 | 44 | 154 |

Overall Table 28 suggests a single, important inference: that educators serving students with hearing, vision, and dual sensory impairment are poorly distributed across the state. The statewide supply is in fact dispersed in ways that magnify the statewide gap between supply and demand evident in Table 27. This insight is important because it means that dispersion is

the main challenge for service delivery across the state. Any arrangement that allowed candidates and graduates to earn licensure while continuing to live and work where they currently are located would likely help the state address the documented shortages. A more granular view focused on ESCs, districts, and schools would be needed for careful planning. Analysis by SST region is only a start, useful as an initial effort to describe the challenge. For reference and comparison with the SST map that appears on page 27, this page provides a map of the service regions for Ohio's 55 ESCs (ESCs may conduct business beyond these boundaries, however).



Region 11—highlighted in gray in Table 28—represents the metropolitan center of the state (including, as it does, the state's largest city and environs), where the approximate supply of THIs substantially exceeds approximate demand and where the programs that have traditionally produced the largest portion of the statewide supply exist.[22]

The yellow highlighting in Table 28 identifies a *group of regions* that seems most consistently underserved (consult the map that follows Table 10). This is the level at which the illustration of dispersion is salient: groups of regions, rather than regions individually.

At this level of inference (i.e., groups of regions), what do the patterns highlighted in Table 29 suggest? The yellow-highlighted group seems, perhaps, to fragment into two subgroups. First, SST regions 1, 12, and 16 are remote from the metropolitan center—in the extreme northwest (region 1) and the extreme southeast (regions 12 and 16). Regions 12 and 16 cover 20 counties from Carroll to Gallia. Region 1 is largely rural, but it also includes Toledo (much smaller and not the economic powerhouse that Columbus is). Overall, this group might be characterized as remote, largely rural, and not economically powerful.

A second regional group surrounds Cleveland (SST regions 2, 4, and 8). This group includes Portage County, home to one of Ohio's THI programs, though the entire group is remote from any TVI program. The dynamic of supply and demand in these three contiguous regions likely involves Cleveland's economic power to pull the available THIs and TVIs: In region 3 (Cuyahoga County) the estimated supply of THIs is commensurate with estimated demand. As for TVIs, 83% of the estimated TVI supply across regions 2, 3, 4, and 8 is located in region 3.

The two subgroups seem to represent different dynamics: One is rural and remote, whereas the other may be metro-centric to the detriment of surrounding suburban and rural places. These sorts of patterns might repeat themselves in finer-grained analyses, with distance, sparsity, and economic power exerting familiar influence down to the level of individual schools. The second subgroup (the ring of regions around Cleveland) seems to point to a set of circumstances worth further inquiry. Possibly, the large-grain analysis (with SST regions) obscures differences in the economic power of the varied suburban and rural districts that ring Cleveland.

These two prominent groups of regions—exhibiting a largely rural and a large metropolitan dynamic—could be joined by a third group of regions running diagonally from southwest (SST region 10) to northeast: SST regions 10, 6, 7, 9 and 5—from Preble to Ashtabula counties. In many cases across this group, approximate demand exceeded approximate supply by a factor of 5.

In the end, the regional analysis of supply and demand shows that dispersion of service providers beyond the metropolitan spheres of influence is the major challenge for the system. Clearly, however, a foundation for addressing the challenge already exists, for instance, in the experience of many ESCs supplying THIs, TVIs, COMS, and (in some cases) parapros with some training to work with students with dual sensory impairments.

[22] Certainly, state residential schools (OSSB and OSD), located in Columbus, serve some students from across the state.

# References


Academy for Certification of Vison Rehabilitation and Education Professions. (2020). Verify certificants. https://www.acvrep.org/verify

American Community Survey. (2020). Disability statistics (Lisa K. Yang and Hock E. Tan Institute, Cornell University). https://www.disabilitystatistics.org/reports/acs.cfm?statistic=1

American Printing House for the Blind. (2019). *Annual report, fiscal year 2019*. https://nyc3.digitaloceanspaces.com/aph/app/uploads/2020/04/28130037/Annual-Report-FY2019-accessible.pdf

Arnold, C. L., Choy, S. P., & Bobbitt, S. A. (1993). *Modeling teacher supply and demand, with commentary*. National Center for Education Statistics (ED359330). ERIC. http://files.eric.ed.gov/fulltext/ED359220.pdf

Braun, K. V. N., Christensen, D., Doernberg, N., Schieve, L., Rice, C., Wiggins, L., Schendel, D., & Yeargin-Allsopp, M. (2015). Trends in the prevalence of autism spectrum disorder, cerebral palsy, hearing loss, intellectual disability, and vision impairment, metropolitan Atlanta, 1991-2010. *PLOS One*, *1371*, 1–21. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4414511/pdf/pone.0124120.pdf

British Columbia Ministry of Education. (2020). *Student headcount by special needs category.* Analysis and Reporting Unit. https://catalogue.data.gov.bc.ca/dataset/1e730ea9-dd19-4c22-aa95-fe644efc7a06/resource/8910a337-1535-4218-b635-07af626f065c/download/student-headcount-by-special-needs-category-field-definitions-2020-12.pdf

Bruce, S., Ferrell, K., & Luckner, J. L. (2016). Guidelines for the administration of educational programs for students who are deaf/hard of hearing, visually impaired, or deafblind. *Journal of the American Academy of Special Education Professionals*, Fall, 47–59. http://files.eric.ed.gov/fulltext/EJ1129776.pdf

California Department of Education. (2014). *Guidelines for programs serving students with visual impairments* (Revised ed.). https://www.csb-cde.ca.gov/resources/standards/viguidelines.aspx

Centers for Disease Control and Prevention. (2012). *Summary of 2009 national CDC EHDI data (revised)*. https://www.cdc.gov/ncbddd/hearingloss/2009-Data/2009_EHDI_HSFS_Summary_508_OK.pdf

Centers for Disease Control and Prevention. (2009). *Summary of 2009 national CDC EHDI data* [2009 CDC EHDI Hearing Screening & Follow-up Survey (HSFS)]. Retrieved from www.cdc.gov/ncbddd/hearingloss/2009-Data/2009_EHDI_HSFS_Summary_508_OK.pdf.

Centers for Disease Control and Prevention. (1995). Disabilities among children aged < or = 17 years—United States, 1991-1992. *MMWR. Morbidity and Mortality Weekly Report*, *44*(33), 609–613. https://www.cdc.gov/mmwr/PDF/wk/mm4433.pdf

Chiang, Y.-P., Bassi, L. J., & Javitt, J. C. (1992). Federal budgetary costs of blindness. *The Milbank Quarterly*, *70*(2), 319–340.

Corn, A., & Spungin, S. (2003). *Free and appropriate public education and the personnel crisis for students with visual impairment and blindness.* University of Florida, Center of Personnel Studies in Special Education. http://copsse.education.ufl.edu/copsse/docs/IB-10E/1/1B-10E.pdf

Davison-Mowle, J., Leigh, G., Duncan, J., & Arthur-Kelly, M. (2018). Description of the direct teaching activities of itinerant teachers of deaf and hard of hearing students. *Deafness & Education International*, *20*(1), 23–40.

De Souza, J. (2005). *Educating children with visual impairments: A caseload analysis for British Columbia* [Masters thesis, University of British Columbia]. https://open.library.ubc.ca/media/download/pdf/831/1.0092012/2

Fairchild, L., & Gadke, D. L. (2018). Central auditory processing disorder: Considerations and cautions for school psychologists. *Communique*, *47*(1), 1–27.

Fleeter, H., & Driscoll, W. (2002). *Preliminary analysis of Ohio's labor market for teachers and other education professionals*. Ohio Board of Education. http://files.eric.ed.gov/fulltext/ED469721.pdf

Gallaudet University Research Institute. (2010). *Annual survey of deaf and hard of hearing children and youth: 2009-2010*. Washington, DC: Gallaudet University. Retrieved from https://research.gallaudet.edu/Demographics/

Giangreco, M. (2009). *Critical issues brief: Concerns about the proliferation of one-to-one paraprofessionals*. Council for Exceptional Children, Division on Autism and Developmental Disabilities. http://www.dddcec.org/positionpapers.htm

Hemmer, L., & Baker, C. (2011). Federal accommodation policy in practice: Implications for a substantive process. *Administrative Issues Journal: Education, Practice, and Research*, *1*(2), 83–93.

Howley, C., & Howley, A. (2016). *Improving service to students with low-incidence sensory disabilities in Ohio: A mixed-methods study to examine national context and district experience* (ED570178). http://files.eric.ed.gov/fulltext/ED570178.pdf

Howley, C., Howley, A., & Telfer, D. (2017). National provisions for certification and professional preparation in low-incidence sensory disabilities: A 50-state study. *American Annals of the Deaf*, *162*(3), 277–294.

Individuals with Disabilities Education Improvement Act, P.L. 108-476. (2004). 20 USC §1400 et seq.

Johnson, H. (2013). Initial and ongoing teacher preparation and support: Current problems and possible solutions. *American Annals of the Deaf*, *157*(5), 439–449.

Kirchner, C., & Diament, S. (1999). Estimates of the number of visually impaired students, their teachers, and orientation and mobility specialists: Part 1. *Journal of Visual Impairment & Blindness*, *93*(9), 600–606.

Lindsay, J., Wan, Y., Berg-Jacobson, A., Walston, J., & Redford, J. (2016) *Strategies for estimating teacher supply and demand using student and teacher data.* REL Midwest. http://ies.ed.gov/ncee/edlabs http://files.eric.ed.gov/fulltext/ED570977.pdf

Luckner, J. L., & Dorn, B. (2017). Job satisfaction of teachers of students who are deaf or hard of hearing. *Journal of Deaf Studies and Deaf Education*, *22*(3), 336–345.

Luckner, J., & Muir, S. (2002). Suggestions for helping students who are deaf succeed in general education settings. *Communication Disorders Quarterly, 24*(1), 23–30.

Ludlow, B., Conner, D., & Schechter, J. (2005). Low-incidence disabilities and personnel preparation for rural areas: Current status and future trends. *Rural Special Education Quarterly*, *24*(3), 15–24.

MacCuspie, P. A. (2010). *APSEA guidelines for determining caseload size for teachers of students with visual impairments*. Texas Schools for the Blind and Visually Impaired. http://faculty.sfasu.edu/cadyd/indexpagextra/Documentation/APSEA-caseload.docx

Mitchell, R. E. (2004). National profile of deaf and hard of hearing students in special education from weighted survey results. *American Annals of the Deaf*, *149*(4), 336–349.

National Agenda for Students Who Are Blind or Visually Impaired. (2019, June 8). *National agenda*. https://www.teachingvisuallyimpaired.com/national-agenda.html

National Association of State Directors of Special Education. (1994). *A Report on the personnel supply and demand data collected by states: Networking system for training education personnel* (ED377645). http://files.eric.ed.gov/fulltext/ED377645.pdf

National Center on Deaf-Blindness. (2019). *The 2018 national child count of children and youth who are deaf-blind*. https://www.nationaldb.org/media/doc/2018_National_Deaf-Blind_Child_Count_Report_FINAL_a.pdf

National Institutes of Health. (2006). *Statistical report: Prevalence of hearing loss in U.S. children, 2005.* https://www.nidcd.nih.gov/research/workshops/statistical-report-prevalence-hearing-loss-us-children/2005

National Resource Center for Paraeducators. (2020). *National intervener credential.* https://nrcpara.org/intervener/

Office of Special Education Programs. (2019). Number of students ages 6 through 21 served under IDEA, Part B, by disability and state, 2018-2019. https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/part-b-data/child-count-and-educational-environments/bchildcountandedenvironments2018-19.csv

Office of Special Education Programs. (2015). *Number of students ages 6 through 21 served under IDEA, Part B, by disability and state, 2014-2015*. Washington, DC: US Department of Education, Office of Educational Research and Improvement. Retrieved from http://www2.ed.gov/programs/osepidea/618-data/static-tables/2014-2015/part-b/child-count-and-educational-environment/1415-bchildcountandedenvironment-2.xlsx

Ohio Center for Deafblind Education. (2014). *Students with deafblindness: Implications from the 2013 preliminary child count data*. https://ohiodeafblind.org/images/pdfs/AAA_OCDBE_Census_Report_Draft_final_w_TOC_6-15-14.pdf

Ohio Department of Education. (2020, December 9). *Resident educator program*. http://education.ohio.gov/Topics/Teaching/Resident-Educator-Program

Ohio Department of Education. (2020, November 30). *Educator profile*. https://core.ode.state.oh.us/CORE4/ODE.CORE.Lic.Profile.Public.UI/Home/Index

Ohio Department of Education. (2020, October 5). Ohio school report cards data spreadsheets. http://education.ohio.gov/Topics/Data/Report-Card-Resources

Ohio Department of Education. (2020, August 13). *Educator credentials download file*. ftp://ftp.ode.state.oh.us/misc/credentials.txt

Ohio Department of Education (2020, August 9). Education jobs. http://education.ohio.gov/About/Education-Jobs

Ohio Department of Education. (2014). *Ohio operating standards for the education of children with disabilities*. https://education.ohio.gov/getattachment/Topics/Special-Education/News/2014-Ohio-Operating-Standards-for-the-Education-of/2014-Ohio-Operating-Standards-for-the-Education-of-Children-with-Disabilities.pdf.aspx

Parker, A. T., & Nelson, C. (2016). Toward a comprehensive system of personnel development in deafblind education. *American Annals of the Deaf*, *161*(4), 486–501.

Pastor, P., Reuben, C., & Loeb, M. (2009). *Functional difficulties among school-aged children: United States, 2001-2007*. National Center for Health Statistics, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. http://www.cdc.gov/nchs/data/nhsr/nhsr019.pdf

Picard, M. (2004). Children with permanent hearing loss and associated disabilities: Revisiting current epidemiological data and causes of deafness. *Volta Review*, *104*(4), 221–236.

Power, D., & Hyde, M. (2003). Itinerant teachers of the deaf and hard of hearing and their students in Australia: Some state comparisons. *International Journal of Disability, Development & Education*, *50*(4), 385–401. https://doi.org/10.1080/1034912032000155185

Rahi, J. S., & Cable, N. (2003). Severe visual impairment and blindness in children in the UK. *The Lancet*, *362*, 1359–1365.

Rosen, S. (2005). "A riddle wrapped in a mystery inside an enigma": Defining central auditory processing disorder. *American Journal of Audiology*, *14*(2), 139–142. https://doi.org/10.1044/1059-0889(2005/015)

Rosen, R. S. (2009). Surveys of the American deaf population: A critical review. *International Journal of Special Education*, *24*(1), 82–99.

Sallop, M. B., & Butler, J. W. (1977, June 30). *Itinerant teachers of the hearing impaired: What do they really do?* ED144273. [Paper presentation]. Convention of American Instructors of the Deaf, Los Angeles, CA, United States.

Silvia Maria, C. T., & Howell, J. J. (2004). Facing the challenges of itinerant teaching: Perspectives and suggestions from the field. *Journal of Visual Impairment and Blindness, 98*(7), 420–433.

Snyder, T. D., de Brey, C., & Dillow, S. A., National Center for Education Statistics (ED), & American Institutes for Research (AIR). (2019). *Digest of education statistics 2018* (54th ed.). *National Center for Education Statistics*. https://files.eric.ed.gov/fulltext/ED601992.pdf

Summers, S., Leigh, L., & Arnold, J. (2006). Personnel shortage and caseload management of students with visual impairments: Children at risk. *Journal of Visual Impairment and Blindness*, *October*, 593–594.

Supporting Success for Children with Hearing Loss. (2019). *The role of the itinerant DHH teachers*. https://successforkidswithhearingloss.com/2019/05/14/too-many-students-to-serve-2/

Swift, S. H., Davidson, R. C., & Weems, L. J. (2008). Cortical visual impairment in children: Presentation intervention, and prognosis in educational settings. *TEACHING Exceptional Children Plus*, *4*(5), 1-14. ERIC. https://files.eric.ed.gov/fulltext/EJ967486.pdf

Texas School for the Blind and Visually Impaired. (2017). *2017 guidelines and standards for educating students with visual impairments in Texas*. http://www.tsbvi.edu/attachments/EducatingStudentswithVIGuidelinesStandards.pdf

Wall, R., & Corn, A. L. (2004). Students with visual impairments in Texas: Description and extrapolation of data. *Journal of Visual Impairment and Blindness*, *98*(6), 341–350.

Wiener, W. R., & Siffermann, E. (2000). A demographic study of certified orientation and mobility specialists. *Re:View*, *32*(1), 39.

# APPENDIX A: PREVALENCE ESTIMATION NOTES

**(post JT ck 11-5-20)**

Estimates for HI and VI are rounded to the nearest one-one-hundredth of 1%, and for dual sensory impairment to the nearest one-thousandth of 1%

**HI Prevalence Estimation Notes**

Hearing Impairment Prevalence Estimates
[reproduced from main report narrative, Table 1]

| Source | Reference population | Data | Est. |
|---|---|---|---|
| GURI, 2010 | All reported OH students | 2009 | .05% |
| OSEP, 2019 | Age 3-21 IEP students in OH | 2018 | .13% |
| CDC, 2012 | U.S. Newborns (with documented impairment) | 2009 | .14% |
| Braun et al., 2015 | Metro Atlanta age 8 (moderate to profound) | 2010 | .14% |
| CDC, 1995 | Age 0-17 persons (deafness or serious HI) | 1991 | .18% |
| BCMOE, 2020 | All K12 students identified with DHH | 2019 | .20% |
| NIH, 2006 | Age 6-19 children (moderate to profound) | 1988-94 | .26% |
| ACS, 2020 | Persons in OH 0-20 (serious difficulty hearing) | 2018 | .53% |
| Mitchell, 2004 (SIPP) | Children age 6-17 (HH or functionally deaf) | 2001 | .55% |
| MEAN | | | .24% |
| MEDIAN | | | .18% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list. Prevalence estimates rounded to the nearest 100th of one percent.

- GURI, 2010. In its most recent, now aging, survey data, the 2009-2010 Gallaudet University Research Institute (https://research.gallaudet.edu/Demographics/) survey (of deaf and hard of hearing children and youth) received responses from 796 students of all ages (262 were older aged 18 and older). The 2009-2010 Ohio enrollment K12 (https://reportcard.education.ohio.gov/advanced) was 1,744,968.7 Prevalence is = .046% https://research.gallaudet.edu/Demographics/, rounded to .05%.
- OSEP, 2019. The Office of Special Education Programs provides state-level data (https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html#bcc) and the Ohio data for students with HI in 2018-2019 give the unduplicated count for ages 3-21: 2,152. (From the cited file, the study extracted the HI and VI Part C and Part B totals for each and then summed the Part C and B totals.) The 2018 K12 enrollment for Ohio (https://reportcard.education.ohio.gov/advanced) was 1,660,354.2 and the prevalence on this basis is .130%.

- CDC, 2012. The Centers for Disease Control provide summary data reports of the Early Hearing Detection and Intervention surveys that report and hearing loss at birth https://www.cdc.gov/ncbddd/hearingloss/2009-Data/2009_EHDI_HSFS_Summary_508_OK.pdf It reports 1.4 per thousand infants as diagnosed with hearing loss (.14%).

- Braun et al., 2015. This Georgia team reported (p. 11) a .14% prevalence for 8-year-olds (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4414511/) with moderate to profound impairment in metro Atlanta (Metro Atlanta Developmental Disability Surveillance Project) based on the average prevalence from 1991-2010; see https://catalogue.data.gov.bc.ca/dataset/student-headcount-by-grade-range/resource/f00a14bf-4e99-450c-b7ad-eac1aa544c2b. Annual incidence varied from .09% (1993) to .18% (2008).

- BCMOE, 2018. The British Columbia Ministry of Education collects data about K12 students who are deaf or hard of hearing (DHH) in that province https://catalogue.data.gov.bc.ca/dataset/student-headcount-by-special-needs-category

In 2019, the province identified 1,345 students as hearing impaired in a total provincial student enrollment (https://catalogue.data.gov.bc.ca/dataset/student-headcount-by-grade-range/resource/f00a14bf-4e99-450c-b7ad-eac1aa544c2b) of 663,224. Prevalence = .20% (i.e., 1,345/663,224).

- NIH, 2006. The National Institutes of Health produced a multi-year estimate of bilateral hearing loss based on data gathered in the National Health and Nutrition Annual Survey III from 1988 to 1994 (https://www.nidcd.nih.gov/research/workshops/statistical-report-prevalence-hearing-loss-us-children/2005). The survey produced population estimates for children aged 6-19 and reported estimates by impairment level. The rate reported in Table 1 in the main narrative of this report is the sum (.255%) for moderate (.17%), severe (.028%), and profound combined (.057%). Data are old but the CDC regards the estimated prevalence as currently applicable.

- CDC, 1995. This CDC mortality and morbidity report was devoted to disability prevalence among children aged 0-17 (https://www.cdc.gov/mmwr/PDF/wk/mm4433.pdf) using data from the Survey of Income and Program Participation (SIPP) conducted by the US Bureau of Census: 2.4% of about 4,858,000 students with disabilities were reported as deaf or hard of hearing ("serious difficulty hearing"); and about 3.0% with blindness or vision problems ("difficulty seeing even with glasses"). These rates were applied to derive proportions of the general population with HI and VI. Table A-1 provides the general population values based on data in Table 14 of the 1990 general census report (https://www2.census.gov/library/publications/decennial/1990/cp-1/cp-1-1.pdf). These are the values used to derive the reported prevalence rates in Tables 1 (for HI) and 2 (for VI).

*Table A 1: Prevalence Estimation for HI and VI Based on CDC, 1995*

| **1990 0-17 General Population, Table 14** | | **1990 0-17 General Population with Disabilities** | |
|---|---|---|---|
| Age | N | Category | N |
| 0-4 | 18,354,443 | Total 0-17 | 4,858,000 |
| 5-9 | 18,099,179 | 2.4% with HI | 116,592 |
| 10-14 | 17,114,249 | 3.0% with VI | 145,740 |
| 15-17 | 10,036,561 | | |
| Total 0-17 | 63,604,432 | HI prevalence | **0.183%** |
| | | VI prevalence | **0.229%** |

*Note*. HI prevalence = 91,200/31,020,154; VI prevalence = 114,000/31,020,154

- ACS, 2020. The American Community Survey provides population estimates between the decennial population counts. Cornell University's Lisa K Yang and Hock E. Tan Institute on Employment and Disability provides state-level estimates of the population with disabilities (https://www.disabilitystatistics.org/reports/acs.cfm?statistic=1). The Cornell utility permits users to calculate prevalence by age band and disability. Table A-2 provides the details for HI.

*Table A 2: Estimation of HI Prevalence in Ohio, Ages 0-20 (ACS 2018)*

| Age | Prevalence | General Population N | HI Estimated N |
|---|---|---|---|
| <5 | 0.40% | 690,500 | 2,762 |
| 5-15 | 0.50% | 1,587,400 | 7,937 |
| 16-20 | 0.70% | 769,800 | 5,389 |
| TOTAL | **0.53%** | 3,047,700 | 16,088 |

*Note.* Total prevalence (boldfaced) is weighted by population (i.e., 16,088/3,047,700).

- Mitchell, 2004. This study analyzed 2001 data from SIPP and reported population estimates for ages 6-17. The prevalence estimate reported for the current study (.55%) is based only on the categories of "some trouble hearing conversation even with hearing aid," "unable to hear normal conversation even with hearing aid," and "person is deaf" (Mitchell, 2005, Table 1, p. 116). Our estimate, on this basis, is a more conservative one than the author's estimate of .64% (given in Figure 1, p. 117), which includes children who hear normal conversation with a hearing aid, in addition to the three more severe categories of impairment.

# VI Prevalence Estimation Notes

Visual Impairment Prevalence Estimates
[reproduced from main report narrative, Table 2]

| Source | Reference population | Data | Est. |
|---|---|---|---|
| OSEP, 2019 | Age 3-21 IEP students in OH (primary disability) | 2018 | .06% |
| Rahi & Cable, 2003 | Age 0-15 children in Britain (severe and blind) | 2000 | .06% |
| APH, 2019 | All registered students in OH (n=1675) | 2019 | .10% |
| Braun et al., 2015 | Metro Atlanta 8-year-olds (low vision, legal blindness) | 2010 | .15% |
| Wall & Corn, 2004 | All PK12 TX students with VI (TEA Annual Registry) | 2001 | .17% |
| NPTP, 1998 | Age 0-21 served students in 17 states | 1998 | .18% |
| CDC, 1995 | Age 0-17 persons (blindness or vision problems) | 1991 | .23% |
| ACS, 2020 | Age 0-20 persons (difficulty seeing even with glasses) | 2018 | .68% |
| MEAN | | | .20% |
| MEDIAN | | | .16% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list. Prevalence estimates rounded to the nearest 100$^{th}$ of one percent.

- OSEP, 2019. The Office of Special Education Programs provides state-level data (https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html#bcc) and the Ohio data for students with VI in 2018-2019 give the unduplicated count for ages 3-21: 946. The 2018 K12 enrollment for Ohio (https://reportcard.education.ohio.gov/advanced) was 1,660,354.2 and the prevalence on this basis (946/1,660,354.2) was .057%.
- Rahi & Cable, 2003. This medical study from Britain (claimed at the time as the only extant population-based study in Britain) derived national prevalence estimates for VI for "severe impairment and blindness": 5.9 per 10,000 (or .059%) according to Table 2, p. 1360.
- APH, 2019. The 2019 annual report from the American Printing House for the Blind (http://www.aph.org/annual-reports) gives the number of registrants in 2018 as N=1675 (p. 18). Ohio enrollment in 2017-18 (APH data were collected in January) was 1,667,307.4. Prevalence (1675/1,667,304.4) = .100%.
- Braun et al., 2015. This Georgia team (p. 11) reported a .15% prevalence for metro Atlanta 8-year-olds (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4414511/) with low vision, legal blindness, and blindness for 2010 (Metro Atlanta Developmental Disability Surveillance Project). The average rate from 1999-2010 was .13%.

- Wall & Corn, 2004. This study used data from the 2001 Texas Education Agency's Annual Registration of Students with Visual Impairment. The study specifies the VI prevalence estimate as .17%.
- NPTP, 1998. Estimates from the National Plan for Training Personnel (NPTP) to Serve Children with Blindness and Low Vision, were reported by Kirchner & Diament (1999, p. 7), who estimated size of *the IEP population with VI* uniquely, in this estimate, including IEP students with secondary and tertiary disabilities (and not only with VI as the primary disability) at 93,600. Subtracting 10,800 cases with dual sensory impairment yields 82,800 students. Public-sector K12 enrollment in 1998 was 46,539,000 (https://files.eric.ed.gov/fulltext/ED601992.pdf) according to the 2018 *Digest of Education Statistics* (p. 44, Table 105.3). These values give a prevalence estimate of .177% (82,800/46,539,000). In fact, Kirchner and Diament judge the NPTP estimate low because unidentified and misidentified students and those students on 504 plans (classroom modifications) but without IEPs are not included. Notably, in this context, they approve the ACS criterion for visual impairment ("difficulty seeing even with glasses") as producing useful estimates.
- CDC, 1995. See above, in the notes for the HI estimate, for the full relevant discussion, including derivation of the prevalence estimate for VI.
- ACS, 2020. See the previous ACS entry for discussion. Cornell's Tan Institute provides state-level estimates (https://www.disabilitystatistics.org/reports/acs.cfm?statistic=1), and Table A-3 provides the details for VI.

*Table A 3: Estimation of VI Prevalence in Ohio, Ages 0-20 (ACS 2018)*

| Age | Prevalence | General Population N | HI Estimated N |
|---|---|---|---|
| <5 | .30% | 690,500 | 2,072 |
| 5-15 | .60% | 1,587,400 | 9,524 |
| 16-20 | 1.2% | 769,800 | 9,238 |
| TOTAL | **.68%** | 3,047,700 | 20,834 |

*Note.* Total prevalence (boldfaced) is weighted by population (i.e., 20,834/3,047,700).

## DB Prevalence Estimation Notes

Dual Impairment Prevalence Estimates
[reproduced from main report narrative, Table 3]

| Source | Reference population | Data | Est. |
|---|---|---|---|
| NCDB, 2019 | Age 0-21 counted students nationally | 2018 | .020% |
| NCDB, 2019 | Age 0-21 counted students in Ohio | 2018 | .024% |
| CDC/NHIS, 2009 | Age 5-17 national population sample | 2001-07 | .030% |
| MEAN | | | .025% |
| MEDIAN | | | .024% |

*Note*. Data = year of data collection; est. = estimated prevalence (proportion of total population); sources appear in the reference list

- NCDB, 2019: Both values (national and for Ohio) are from the 2018 annual census report of the National Center (https://www.nationaldb.org/media/doc/2018_National_Deaf-Blind_Child_Count_Report_FINAL_a.pdf). The national NCDB count for 2018 was 9,904; Fall 2016 public-sector K12 enrollment (http://files.eric.ed.gov/fulltext/ED594978.pdf) in the *2019 Condition of Education* (p. xxi) was 50,615,000, yielding a prevalence estimate of .0196% (9,904/50,615,000). For the Ohio value, the 2018 census count was 405 and the 2018 K12 enrollment (https://reportcard.education.ohio.gov/advanced) for Ohio was 1,660,354.2. Estimated prevalence is .024% (405/1,660,354.2).
- CDC/NHIS, 2009. Pastor and colleagues (2009) examined the National Health Interview Survey data for the years 2001-2007. Theirs is one of the few reports anywhere to offer a population-based estimate for dual sensory impairment (Pastor et al., 2009, p. 4, in para. 3; and in figure 3). They estimate that 1% of those with sensory impairments are dual-impaired (i.e., 1% of 3% of the general population).

# APPENDIX B: GLOSSARY

| Term or Acronym | Gloss |
|---|---|
| 504 plan | Student support plan specified in Section 504 of the Rehabilitation Act of 1973 |
| ACS | American Community Survey (Bureau of Census) |
| ACVREP | Academy for Certification of Vison Rehabilitation and Education Professions (certifies COMS) |
| APH | American Printing House for the Blind |
| *a priori* coding | *A priori* = "at first"; qualitative research technique that categorizes statements using categories created in advance of the analysis |
| ASL | American Sign Language |
| BBDs | Boards of Developmental Disabilities |
| BCMOE | British Columbia Ministry of Education |
| Caseload and Workload | *Caseload* refers to the number of students served by teachers, apportioned to each teacher; workload refers to the varied duties assigned to a particular teacher (including teaching, meetings, technical support to other educators, and so forth) |
| CDC | Centers for Disease Control |
| COMS | Certified Orientation and Mobility Specialist |
| Conservative estimate | A value on the low side of an estimation range. This study aims for conservative estimates. |
| D/HoH | Deaf or hard of hearing |
| Deans Compact | The Ohio Deans Compact on Exceptional Children |
| Demand | In this study, the ratio of caseload to size of LISD student population, calculated from estimated prevalence values |
| Dual-sensory impairment | Simultaneous vision and hearing impairment; a synonym for deafblindness |
| ESC | Educational Service Center |
| Granularity | Graininess: as when dividing a territory into regions, counties, townships or some other subdivision; the smaller the subdivision (e.g., townships versus counties), the finer the granularity |
| GURI | Gallaudet University Research Institute |
| Headcount | Number of students enrolled (different from average daily attendance) |
| HH | Hard of hearing |
| HI | Hearing impairment |
| IDEA | Individuals with Disabilities Education Act |
| IEP | Individualized Education Program |

| Term or Acronym | Gloss |
|---|---|
| IEP team | Multidisciplinary team that creates IEPs; must always include parents, and for students with LISD, THIs and/or TVIs, and/or COMS. Also typically includes administrators, psychologists, general education teachers, and may include others |
| Intervener | Educator, often a paraeducator, who assists students with dual sensory disabilities in schools; often assigned one-on-one |
| Liberal estimate | A value on the high side of an estimation range; this study aims for conservative estimates. |
| LISD | Low-incidence sensory disabilities |
| Low Incidence Committee | Committee of the Deans Compact that sponsored this study |
| NCDB | National Center on Deaf-Blindness |
| NIH | National Institutes of Health |
| NPTP | National Plan for Training Personnel to Serve Children with Blindness and Low Vision |
| NRCpara | National Resource Center for Paraeducators |
| O&M | Orientation and mobility; curricular area for students with visual impairment, dealing with orienting to and navigating the world. |
| OCDBE | Ohio Center for Deafblind Education |
| ODE | Ohio Department of Education |
| ODHE | Ohio Department of Higher Education |
| OEC | Office for Exceptional Children at the ODE |
| OHOA | Open Hands, Open Access (intervener training modules) |
| OSD | Ohio School for the Deaf |
| OSEP | Office of Special Education Programs (U.S. Department of Education) |
| OSSB | Ohio State School for the Blind |
| Prevalence | Estimated spread; in this study, an estimated proportion of the total student population |
| SST | State Support Team; one of 16 teams statewide |
| SST Region | Territory assigned to SSTs (assignment is by county) |
| Supply | In this study, the number of teachers estimated to serve students with LISD |
| TDB | Teacher of the deafblind |
| THI | Teacher of the hearing impaired |
| TVI | Teacher of the visually impaired |
| VI | Visual impairment |