

The Supply of and Demand for Special Education Teachers: A Review of Research Regarding the Nature of the Chronic Shortage of Special Education

Prepared for the Center on Personnel Studies in Special Education

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COPSSE research is focused on the preparation of special education professionals and its impact on beginning teacher quality and student outcomes. Our research is intended to inform scholars and policymakers about advantages and disadvantages of preparation alternatives and the effective use of public funds in addressing personnel shortages.

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ABSTRACT

There is a critical shortage of special education teachers in the U. S. This chronic and severe shortage exists in every geographic region of the U. S. This paper analyzes factors influencing the supply of and demand for special education teachers. The magnitude of this shortage with variations by personnel type, locality, and job description are addressed. An analysis of trends in supply and demand considers factors such as student enrollment, production of teacher education programs, and the reserve pool. Illustrative examples of strategies used by specific states and districts to resolve shortage problems are provided. The paper concludes with priorities for future research to address critical unanswered questions regarding the supply of and demand for special education teachers.

INTRODUCTION

Information available from professional organizations (ERIC Clearinghouse on Disabilities and Gifted Education [ERIC], 2001; National Education Association [NEA], 2001; National Governors Association [NGA], 2000) and data from the research literature (American Association for Employment in Education [AAEE], 2000; Boe, Cook, Bobbitt, & Terhanian, 1998; Carlson, Schroll, & Klein, 2001; Carlson, Brauen, Klein, Schroll, & Willig, 2002; U. S. Department of Education [USDOE], 2000, 2001) indicate that there is a severe, chronic shortage of fully certified special education teachers in the U. S. This paper reviews the literature on this shortage. The data sources that were used are described and critiqued. Shortages are reviewed by location, job description, and diversity of personnel. Trends in supply and demand and state and local policies that are being used to ameliorate teacher shortages are described. Research findings and recommendations for future research are discussed, emphasizing research that informs policy makers as they seek to resolve supply and demand imbalances.

DATA SOURCES

Although data from numerous sources are used in the investigations cited in this paper, the most frequently used data come from three primary sources: (1) USDOE's Office of Special Education Program [OSEP]'s data on the shortage of certified teachers; (2) the National Center for Education Statistics [NCES]'s Schools and Staffing Survey (SASS) and companion Teacher Followup Survey (TFS); and (3) AAEE's data on regional and national teacher shortages.

Personnel Data from *Annual Reports to Congress*

Each year since 1976-1977, states have been required to report data on personnel who teach students with disabilities for OSEP's *Annual Reports to Congress*¹. These data yield valuable information about personnel in special education. Currently, each state is required to provide a count of personnel on December 1 each year. Data reported include age groups of students served (3–5 years and 6–21 years) and personnel classifications (employed/fully certified, employed/not fully certified).

OSEP provides states with reporting definitions. *Employed/fully certified* indicates personnel employed or contracted to provide special education and related services who have appropriate state certification or licensure for their position, including personnel categories that do not require certification or licensure if the staff meet existing state standards or requirements for the position held. *Employed/not fully certified* indicates personnel employed or contracted who were employed on an emergency, provisional, or other basis if they did not hold standard state certification or licensure for the position to which they were assigned or if they did not meet other existing state requirements for the position, including long-term substitutes.

Over the years, the data that states are required to collect have changed, resulting in a lack of compatibility with previous data. For example, from 1982-1983 to 1992-1993, personnel were reported by type of disability served. Beginning in 1993-1994, states were given the option of reporting personnel categories for teachers either by disability conditions (Option 1) or by a personnel classification taxonomy of their choice (Option 2). This change was influenced by the wide range of categorical classifications systems used across states and the difficulty in translating state data into the federal categorical system. In 1994-1995, Option 1 was eliminated, and states were required to report on teachers by area of specialization using their own taxonomy. Thus, it is no longer possible to aggregate data across states by disability category.

Another major change in reporting requirements is related to the personnel categories used to describe teachers. From 1993-1994 to 1997-1998, states reported data in five categories, including *employed/fully certified*, *employed/not fully certified*, *vacant*, *retained/fully certified*, and *retained/not fully certified*. Beginning in 1998-1999, the reporting requirement was changed to only include *employed/fully certified* and *employed/not fully certified*. Thus, data are no longer collected on vacant positions or certification status of retained teachers.

¹ Data are also provided for related services personnel, but this review addresses teachers only.

Data from the *Annual Reports to Congress* provide valuable information on the national shortage of certified teachers in the U. S. The reliability of these data is supported by the stability of the data over time (*20th Annual Report to Congress*, 1998, pp. III-1 to III-23) as well as the comparability of the findings from these data with other data sources (for example, see Boe, Cook, et al., 1998). In contrast to national data, comparisons of state-to-state data should only be done after careful consideration of data notes provided in *Annual Reports to Congress* that describe changes that have occurred in how states collect data and technical problems with data collection in particular states.

Several factors are important to note when interpreting data from the *Annual Reports to Congress*.² OSEP offers the following considerations:

- Data collected from 1976-1977 through 1981-1982 are not compatible with data in subsequent years.
- Variations in state data from year to year may be the result of changes in state data collection and reporting procedures. (The data notes in each *Annual Report to Congress* explain year-to-year and state-to-state differences.)

National Center on Education Statistics (NCES) Data: Schools and Staffing Survey (SASS) and Teacher Followup Survey (TFS)

The U. S. Census Bureau administered surveys for NCES to a nationally representative sample of teachers for both SASS and TFS. These surveys were administered in tandem during the following school years: 1987-1988, SASS; 1988-1989, TFS; 1990-1991, SASS; 1991-1992, TFS; 1993-1994, SASS; and 1994-1995, TFS.³ Initially, a random sample of schools was selected to represent the U. S. A random sample of teachers from each school was then selected and administered the SASS. The next year, the TFS was administered to the same teachers in the same schools. Teachers who had left the schools were given a questionnaire about their departure (Ingersoll, 2001). The response rate for the surveys was 86% or higher. The total number of special education teachers who were surveyed for the SASS ranged from 4,307 to 5,288 and for the TFS from 518 to 639.

The reliability of the SASS and TFS surveys is well established (Kalton, Winglee, Krawchuk, & Levine, 2000). However, Boe, Bobbitt, and Cook (1997) point out four important limitations of these data. First, the data are subject to sampling error, measurement errors, and recording errors. These errors are a problem with small samples and subsamples (e.g., teachers who departed the profession). Second, rather than longitudinal data, the SASS and TFS surveys give a cross-sectional analysis of teachers over two years. Boe and colleagues note that the data provide national probability samples that can reveal trends in national data over time. Third, the national data from the SASS and TFS surveys provide little information on local variations and little

²For more on the technical aspects of these data, see <http://www.IDEAdata.org/documents.Html#datahistory>.

³ A more recent version of SASS and a subsequent TFS were conducted by the NCES during 1999-2000 and 2000-2001 respectively, but these data have not yet been analyzed.

practical guidance for local decision makers. Finally, the SASS and TFS surveys, which are self-report, are subject to bias, recall error, and selective non-response.

In spite of these limitations, the SASS and TFS surveys are “excellent sample surveys with high response rates” (Boe et al., 1997, p. 374). Furthermore, these data represent “the largest and most comprehensive data source available on staffing, occupational, and organizational aspects of schools, and was specifically designed to remedy the lack of nationally representative data on these issues” (Ingersoll, 2001, p. 11).

American Association for Employment in Education (AAEE): Educator Supply and Demand in the U. S.

The 24th AAEE study of teacher supply and demand was conducted in 2000. Deans or Directors of Teacher Education at all institutions preparing teachers listed in the *Higher Education Directory* (HED) were sent surveys in May 2000. Participants responded for each field in which they prepared teachers. For the most recent survey, 1,267 surveys were distributed and 454 returned, a response rate of 36%.

The AAEE survey is designed to collect information on employment opportunities for education professionals in 62 teaching, support, and administrative fields. Likert-type questions measure shortages or surpluses in teaching and related areas. Data are collected in 11 geographic regions and aggregated regionally and nationally.

Two methods tested the reliability of AAEE survey data. First, data from the last five years were compared to determine the stability of the data over time. These results revealed that respondent's perceptions about shortages or surpluses remained very stable with a median correlation of .92. A second method was the test-retest reliability of the survey, which for these data resulted in correlations from .70 to .90 (Towner-Larsen, 1998), indicating moderate to high reliability for the survey.

Although the respondents to this survey are likely to be well informed about job opportunities for teachers in their states or local areas, one weakness is that these surveys are based on self-reports. A second weakness of the data is the low response rate. There may be systematic bias in the responses, and the authors of this investigation do not address the representativeness of the respondent sample. These limitations strongly suggest that these data should be interpreted with caution.

MAGNITUDE OF THE SPECIAL EDUCATION TEACHER SHORTAGE

Data available from professional organizations (ERIC, 2001), USDOE (1998, 1999, 2000, 2001), and the professional literature⁴ (AAEE, 2000; Boe, Cook, et al., 1998; Carlson et al., 2001; Carlson et al., 2002) show a severe, chronic shortage of special education teachers in the U. S. Ninety-eight percent of the nation's school districts report special education teacher shortages (ERIC, 2001; Fidler, Foster, & Schwartz, 2000). According to an American Federation of Teachers (AFT) survey (1999), special education is the area of teaching with the greatest shortage in the 200 largest U. S. cities.

AAEE lists five areas of special education (emotional/behavioral disorder, multicategorical disability, severe/profound disability, learning disability, mild/moderate disability (in AAEE terms) as the teaching fields with the greatest national shortages (AAEE, 2000). All other areas of special education rank in the top 15 shortage areas nationally, including mental retardation (6th tied), visually impaired (9th tied), hearing impaired (11th), dual certificate in special education and general education (13th), and early childhood special education (15th). General education teaching fields that rank in the top 15 include mathematics education (6th tied), physics (8th), bilingual education (9th tied), chemistry (12th), and computer science education (13th). The special education teacher shortage is not a recent development. According to USDOE data (1998, 2000), throughout the 1990s, more than 30,000 special education positions in the U. S. annually were filled by uncertified personnel.⁵

⁴To obtain the information provided here, the ERIC data bases were searched from January, 1990, to August, 2001, using the following subject headings: *supply*, *demand*, *special education*, *teacher*, *teacher shortage*, and *special education personnel*. A hand search of relevant literature was also conducted, ensuring a thorough coverage of available information. Reviews of data bases from WESTAT; the Office of Special Education Programs (OSEP) (including *Annual Reports to Congress*); the Bureau of Labor Statistics (BLS); and the National Center for Education Statistics (NCES) served as the source for much of the data reported. Finally, information and data were obtained from the web sites of several professional organizations, including the American Association for Employment in Education (AAEE); American Council on Education (ACE); American Federation of Teachers (AFT); CEC; National Association of State Directors of Special Education (NASDSE); National Commission on Teaching and America's Future (NCTAF); National Education Association (NEA); and National Governor's Association (NGA). After reviewing the preceding information, it became apparent that the best data available on teacher supply and demand came from three data sources: NCES's SASS and TFS surveys; OSEP's *Report to Congress* data; and AAEE's annual surveys of teacher shortages. Although other data sources are used for specific issues (e.g., teachers in the pipeline), investigations that used these three data sources are primarily cited when the supply of and demand for teachers is addressed in this review.

⁵Determining the shortage of special education teachers in the U. S. is more complex than it initially appears. Different types of vacancies reflect a range of different skills held by those teaching students with disabilities. An unfilled position may mean that no teacher was available

In the most recent data from USDOE (2003), 47,532 individuals filling special education positions in 2000-2001 (11.4% of all teachers) lacked appropriate special education certification. This 23% increase in uncertified teachers from the 1999-2000 school year is the largest ever reported by USDOE. Data from *Reports to Congress* (USDOE, 1998) suggest that one special educator teaches nearly 17 students on average (Carlson et al., 2001). Using this ratio for 2000-2001 indicates that a shortage of 47,532 teachers resulted in 808,000 students taught by personnel who were not fully certified. Projections show the situation worsening. The Council for Exceptional Children (CEC) predicted that the U. S. will need over 200,000 special education teachers to fill open positions by 2005 (Kozleski, Mainzer, Deshler, Coleman, & Rodriguez-Walling, 2000). The Bureau of Labor Statistics (1999) projected that between 1998 and 2008 there will be a need for over 135,000 special education teachers. Acknowledging this lack of agreement about how many teachers will be needed in the near term, there are no indications that the shortage of fully certified personnel will abate in the near future.

SHORTAGE VARIABILITY

Shortages by location. As noted previously, the percentage of uncertified special education personnel nationally was 11.4% during the 2000-2001 school year (USDOE, 2003). Special education personnel shortages vary greatly by state. Connecticut and Massachusetts reported that all special education teachers for children ages 6-21 were fully certified in 2000-2001 (USDOE, 2003). At the other extreme, these states reported the following percentages of teachers not fully certified in their main special education teaching position for the 6–21 age group: Colorado, 21.6%; California, 23.6%; New York, 25.2%; Hawaii, 27.6%; Louisiana, 31.2%; and Delaware 31.8%.

Data from AAEE (2000) reveal that shortages exist in **all** special education teaching fields in the West, Rocky Mountains, Great Plains/Midwest, and Alaska. In 6 to 9 of the 10 special education teaching fields, there are shortages in the Northwest, South Central, Southeast, Great Lakes, and Middle Atlantic regions. Only the Northeast Region does not have considerable shortages in most special education teaching fields. This region has some shortages in 8 of the 10 special education fields and a balance between supply and demand in the other 2 fields (early childhood, special education, and visually impaired).

Recent research has shown that the variation in hiring difficulties among schools (for all teachers, not just special education teachers) is greater within states than it is across states (National Commission on Teaching and America's Future [NCTAF], 1997). There is also large variation at the school level: some schools within a district have waiting lists of qualified teacher

or that a long-term substitute teacher assumed teaching responsibilities for a class. Most children with disabilities have a teacher, but many are uncertified. The qualifications of uncertified teachers range widely: no degrees; college degrees in other concentrations (e.g., English, drama, home economics); and degrees in special education but certification to teach children with another type of disability (i.e., certified for learning disabilities but teaching children with visual disabilities). Regardless of the training level (or lack of training), these teachers are all considered to be *uncertified*.

applicants, while other schools in the same district have difficulty finding any qualified applicants. In a review of research related to inequality of access to competent teachers, Darling-Hammond and Sclan (1996) concluded that minority and low-income students in urban settings are most likely to find themselves in classrooms staffed by teachers who are not certified for their teaching assignment. Similarly, Ingersoll (2001) found that high-poverty public schools (student poverty levels at least 50% of enrollment) had higher turnover rates than wealthier public schools (poverty enrollment below 15%). The limited data available in special education regarding this issue reveal that shortages are more severe in high-poverty school districts (Carlson et al., 2002). Moreover, the same factors that lead to general education teacher shortages—funding inequities, labor market inequities, working conditions, and distribution of local power (Darling-Hammond & Sclan, 1996)—would produce disproportionate shortages of special education teachers.

Shortages by job description. The type of special education position can also affect teacher turnover and subsequent demand for teachers. AAEE (2000) lists emotional/behavioral disorders as the teaching field with the greatest national shortage, followed closely by multicategorical, severe/profound disabilities, learning disability, and mild/moderate disabilities (AAEE terms). Considerable shortages exist in the emotional/behavioral disorders category in 10 of the 11 regions of the U. S. as defined by AAEE. Multicategorical, severe/profound disabilities, learning disability, and mental retardation also have shortages in all but one geographic region. The mild/moderate disabilities category has shortages in 9 of 11 regions, early childhood special education and dual certificate in 7 of 10 regions, and visually impaired and hearing impaired in 6 of 10 regions.⁶ Over the last three years, national shortages in the areas of emotional/behavioral disorders, learning disability, mental retardation, and visual impaired have increased, while teacher shortages in other areas of special education have remained level. Although shortages in behavioral disorders is greatest nationally (rank:1), shortages in multicategorical (rank:2), severe/profound disabilities (rank:3), learning disability (rank:4), and mild/moderate disabilities (rank:5)—as fields with a "considerable shortage" of teachers—are not substantially different (AAEE, 2000).

Shortages of diverse personnel. While 38% of the students with disabilities in the U. S. are culturally and linguistically diverse (CLD) (USDOE, 2000), only 14% of those currently teaching in special education and 14% of those in the teacher education pipeline are from historically underrepresented groups (Kozleski et al., 2000). Moreover, there is some evidence that the number of special education teachers from diverse backgrounds is declining (Olson, 2000; Shipp, 1999). In 1978, 12% of America's teachers were African American; in 1993 that number declined to 9%, despite an increased enrollment of African American students in colleges and universities (Shipp, 1999). As recently as 1996, over 40% of the nation's schools had no teachers of color on their faculty (Riley, 1998). These data are more compelling when disaggregated by race and ethnicity. Seventeen percent (17%) of the nation's public school children are African American, compared to 8% of their teachers. Corresponding percentages for teachers and students are 14% and 4% for Hispanics/Latinos, 5% and under 1% for Asian/Pacific Islanders, and 1% and under 1% for American Indian and Alaska Natives (Fenwick, 2001). Clearly, the diversity of teachers does not reflect the general population or that

⁶ Data are not available for all certificates in all 11 regions.

of the students with whom they work. The existence of diversity in the teaching force of the future is tenuous. Olson (2000) notes that if current trends continue, by the year 2009, 40% of the students but only 12% of the teaching force will be from diverse backgrounds. Fenwick's (2001) predictions are even more extreme, as she estimates that only 5% of the teaching force will be non-white by 2005. According to AAEE (1999), 64.7% of colleges and universities anticipate no change in the number of diverse teacher candidates graduating from their programs.

The small number of CLD teacher education students is not surprising, given the barriers these individuals face in the educational system. Inequalities in public education, impacted by inadequately staffed schools in high-poverty areas and low teacher expectations, too often produce students who are ill prepared for college (Michael-Bandele, 1993). Increasing tuition and lack of financial support further discourage potential college-bound students from CLD backgrounds (Ford, Grantham, & Harris, 1997). The convergence of these factors contributes to the inadequate college preparation of many students. This limits their access and lowers their chances of success in higher education.

Family perceptions, regardless of income level, negatively impact the special education teaching pipeline. Students and parents from lower income backgrounds must concentrate their efforts on daily survival and so have difficulty conceiving long-term goals that include college and a career (Gordon, 1994). Minority students from middle- and upper-income families cite reasons similar to their majority peers for avoiding a teaching career: student discipline problems, lack of public respect for teaching as a profession, inability to relate to students from impoverished urban neighborhoods, poor working conditions, low salaries, and better opportunities in other fields (Gordon, 1994). Parents from all income levels encourage careers in fields such as business, medicine, and law and actively discourage careers in education (Cartledge, Gardner, & Tillman, 1995; Gordon, 1994; Su, 1996). As diversity is increasingly valued in other professions (Mangan, 2002), CLD students are aggressively recruited by disciplines considered more prestigious than education, and many of these professions offer greater financial incentives (Dilworth, 1990; Ford et al., 1997). The result is that teaching is not viewed as a favorable career (Wald, 1996), a view supported by evidence from the American Council on Education (ACE) (1999). CLD individuals earned nearly 20% of all bachelors degrees awarded in 1997. However, individuals from diverse backgrounds earned only 13.5% of all education degrees that year, compared to 20.7% of all degrees in business, 21.9% in the social sciences, 17.3% in the health professions, 25.2% in the biological and life sciences, and 21.6% in engineering.

In summary, it is clear that there is a dire shortage of CLD teachers in special education. Although some research suggests that CLD individuals are more likely to be recruited into special education through alternative certification programs (Shen, 1998), more research is needed to explore approaches that may be used to recruit CLD teachers into the profession. Indeed, unless measures to address this shortage are taken soon, it is likely to get worse in the coming years (Olson, 2000; Fenwick, 2001) and further exacerbate an overall shortage of certified teachers in special education. For more detailed information about the shortage of diverse personnel and related areas of needed research, see Tyler, Yzquierdo, Lopez-Reyna, and Saunders (2002).

TRENDS IN THE DEMAND FOR SPECIAL EDUCATION TEACHERS

Three factors are primary determinants of the demand for special education teachers. These factors are student enrollment, teacher case load, and teacher attrition. A range of data is available, primarily from federal agencies, about current and projected future student enrollment in special and general education. In addition, much research in the professional literature over the last ten years has provided insights into special education teacher attrition. Much less is known about how case loads influence the demand for special education teachers. This paper addresses research on: (1) student enrollment, teacher case loads, and the influence of these factors on the demand for special education teachers; (2) the influence of teacher attrition on the demand for special education teachers and the factors that influence teacher attrition in special education; and (3) the possibility of retaining special education teachers who leave their teaching assignments or leave the profession.

Student Enrollment

The U. S. population between the ages of 3 and 21 grew significantly through the 1990s, according to data from the *20th, 21st, 22nd, and 23rd Annual Reports to Congress on the Implementation of IDEA* [USDOE, 1998, 1999, 2000, 2001]. Between 1992 and 1999, the nation's student population grew by 6.8% from 68.86 million to 73.55. During the same period, the number of students with disabilities aged 3-21 grew more rapidly. In 1992-1993, 5.08 million students with disabilities between the ages of 3 and 21 were identified. This number increased by 20.3% to 6.11 million in 1998-1999. Thus, the number of students with disabilities grew almost three times faster than the overall student population. In 1992-1993, students with disabilities accounted for 7.38% of all students. By 1998-1999, this proportion had risen to 8.3%. Although rapid, the growth in demand for special education teachers did not keep pace with growth in student enrollment. In 1992-1993, there were 357,521 positions for teaching students with disabilities aged 3-21 in public schools. By 1998-1999, this figure had increased by 8.0% to 386,133. This growth rate for teaching positions is about 40% of the enrollment growth rate for students with disabilities during this six-year period. Thus, the disproportionate increase of students identified with disabilities has been a significant factor in the increasing demand for special education teachers in the U. S. It is anticipated that this disproportionate growth will continue over the next decade, thus continuing to affect the increasing demand for special education teachers.

For this decade (until 2010), NCES (2001) has forecasted that public school enrollment will remain virtually unchanged. However, the population at different grade levels will rise and fall during this time. For example, enrollment in Grade 1 is projected to increase through 2005, decrease in 2006, and then increase through 2010. In contrast, enrollment in Grade 8 is projected to increase through 2003, and then decrease through 2010. These changes will require a redistribution of special education teachers across grade levels, but will have little impact on the overall demand for special education teachers in the U. S.

In spite of the fact that little change is expected in the overall student population in the U. S. in the next decade, the population will vary considerably in different regions of the country and from state to state within regions. For example, in the northeast, all states are expected to experience enrollment declines during the next ten years, ranging from -9% in New Hampshire to -7% in Maine (NCES, 2001). In contrast, all of the states in the west are expected to experience enrollment increases, ranging from $+1\%$ in Oregon to $+16\%$ in Idaho. In the south, 7 states are expected to experience increases, ranging from $+4\%$ in Maryland to $+7\%$ in Georgia, and 10 states are expected to experience decreases in student enrollment from -6% in North Carolina to -8% in West Virginia. In the midwest, 10 states are expected to decline in enrollment from -5% in Kansas to -7% in North Dakota, while Illinois is expected to remain unchanged and Indiana to increase by $.3\%$. Regionally, these changes are expected to result in overall declines in student enrollment in the northeast (-7%), midwest, (-4%) and southeast (-1%), although states in the west are expected to increase in enrollment ($+5\%$). Thus, if these enrollment projections hold, changes in overall student enrollment over the next decade should have little impact on teacher demand in the U. S. at large. However, differences in enrollment growth in different regions of the country will likely result in significant changes in the demand for special education teachers for states and regions.

It is important to consider the previously noted growth rate of students with disabilities, which was almost three times greater than the growth rate of the entire school-aged population during the 1990s. This is a long-term trend in special education programs, because enrollments have increased for over 20 years faster than for general education. For example, between 1977 and 1995, the general education population decreased by 2% , and the population of students with disabilities increased by 47% (Russ, Chiang, Rylance, & Bongers, 2001). If the proportion of students identified with disabilities continues to increase as it has since 1992, the result by 2010 will be an additional 1,256,000 students. According to the *22nd Annual Report to Congress* (USDOE, 2000), this level of growth will result in the need for approximately 80,000 more special education teachers by 2010.

Although further research is needed to explore this issue fully, available data support the perspective that the number of special education teaching positions in the U. S. will continue to grow over the next decade. This demand could also be influenced by teacher case loads, which have been the focus of concern for many professionals in recent years (Russ et al., 2001).

Teacher Case Loads

Although teacher case loads have a significant effect on the demand for teachers and the quality of services delivered to students with disabilities (Russ et al., 2001), little research has been conducted on this topic. State case load guidelines (i.e., student-to-teacher ratios) for special education vary dramatically across the U. S. (National Association of State Directors of Special Education [NASDSE], 2000). This inconsistency occurs because case loads, which are not addressed in federal law, are left to state education agencies (SEAs) and legislatures. Some states have prescriptive regulations for case loads (NASDSE, 2000), typically using a combination of criteria to determine case loads. Regulations may address type of program (e.g., resource, self-contained); type of staff (e.g., resource specialist, speech and language therapist); disability label;

and grade level. States that do not use these criteria typically include a regulatory statement such as: "The case load allows the teacher to meet the individual needs of each student."

Several initiatives have aimed at reducing general education class sizes. For example, USDOE included a class size initiative to reduce the national average class size in grades 1-3 to a student-teacher ratio of 18:1 as part of the 1999 Education Appropriations Act (NASDSE, 2000). This initiative sought to improve educational achievement for students with and without disabilities by enhancing the student-teacher ratio. Several states—including California, Georgia, Indiana, Nevada, and Washington—have begun initiatives to reduce class sizes, especially at the early elementary level. Indeed, reduction of class sizes is so strongly supported in the U. S. that more than half of all states have initiatives to reduce class sizes (Russ et al., 2001; Wexler et al., 1998).

Although general education class sizes are being reduced, there is evidence that special education case loads are increasing. In a review of special education teachers' case loads, McCrea (1996) found that the maximum student-teacher ratio in special education was usually 15:1, which is identical to the ratio reported in the *20th Annual Report to Congress* (USDOE, 1998). However, by the *22nd Annual Report to Congress* (USDOE, 2000), this ratio had risen to 16:1. A recent *Study of Personnel Needs in Special Education* (SPeNSE) found that the average case load for special education teachers, grades K-12, was 17:1 (Carlson et al., 2001). The study also found that waivers for class size/case load regulations (i.e., waivers to exceed case load standards) were commonplace: 10,849 waivers were sought by administrators in 1999-2000. These data, which must be interpreted with caution, suggest that case loads of special education teachers may have increased to nearly the 18:1 ratios of primary general education classrooms in many states.

Available data do not provide a clear picture of the impact case loads have had in the past or will have on the demand for teachers over the next decade. This is an area in which more research is needed to understand fully how case loads are determined from state to state, how case loads differ across the U. S., how case loads are influenced by teacher shortages, and how differences in case loads influence outcomes for students with disabilities.

Teacher Attrition

The departure of special educators from the teaching profession (exit attrition) is a major contributing factor to teacher demand (Boe, Bobbitt, Cook, & Barkanic, 1998; Ingersoll, 2001). Ingersoll argues that teacher shortages are primarily the result of a *revolving door*—"where large numbers of teachers depart their jobs for reasons other than retirement" (p. 5). He found that the number of teachers leaving annually exceeded the number of new teachers recruited. To support this perspective, Ingersoll analyzed data from SASS (available through 1993-1994). He reports an overall teacher exit attrition and migration (moving from one teaching position to another) rate of 15% in 1988-1989, 13.2% in 1991-1992, and 14.3% in 1993-1994. In addition, Ingersoll found that special education teachers were more likely either to leave the profession or to migrate to another position than general education teachers.

Boe, Bobbitt, et al. (1998) analyzed these data further, addressing special education teachers in more detail. These researchers found that in 1993-1994, 84.8% of all special education teachers remained in special education, compared to 92.4% of all general education teachers. Boe and his

colleagues found that in 1993-1994 exit attrition from the teaching profession was 6.3% for special education teachers and 6.6% for general education teachers. However, a significantly greater proportion of special education teachers transferred to general education (8.8%) than general education teachers transferred to special education (1%). Thus, when transfers to general education are added to the proportion of special education teachers who left teaching, the result is a total attrition rate of 15.1%, compared to 7.6% in general education.

To provide a more stable measure of teacher attrition over time, Boe, Bobbitt, et al. (1998) examined SASS data from 1987-1988, 1990-1991, and 1993-1994. Combining the three time periods, the investigators found that 6.1% of special education teachers left the profession per year, compared to 5.7% of general education teachers, 7.4% of special education teachers switched each year to general education positions, and 0.7% of general educators switched to special education. These figures yield a total annual attrition rate of 13.5% for special education and 6.4% for general education.

While the proportion of special education teachers who transfer to general education is significantly larger than the reverse, these transfers result in a smaller net loss of teachers for special education than might be anticipated, because there are nine times more general educators than special educators. For example, in the three years combined Boe, Bobbitt, et al. (1998) found that when 60,022 special educators switched to general education, 44,375 general educators switched to special education. Although the proportion of transfers differs significantly, the overall impact on demand for special education was an annual loss of slightly over 5,000 teachers.

While these data reveal that attrition is a serious problem affecting the demand for special education teachers, the most recent data are from the 1994-1995 school year. More recent data are needed to determine whether these trends continued through the remainder of the 1990s. It is also important to determine the extent to which special education teachers transferred into general education, and how often general educators moved into special education, because these trends could have changed significantly in the latter part of the 1990s with the increased use of inclusive programs across the U. S. (McLeskey, Henry, & Hodges, 1998).

Factors affecting teacher attrition. Special education teachers enter the field and subsequently depart in large numbers for positions in general education, or they leave the field altogether, thus creating a revolving door into and out of the profession (Boe, Bobbitt, Cook, Barkanic, & Maislin, 1999; Darling-Hammond, 2001; Ingersoll, 2001). The many reasons that special education teachers leave teaching are similar to those of general education teachers. For example, attrition for both groups follows a U-shaped distribution associated with teaching experience. Relatively high attrition rates are seen at the beginning and at the end (retirement) of teachers' careers (Boe, Barkanic, & Leow, 1999; Ingersoll, 2001; Miller, Brownell, & Smith, 1999; Singh & Billingsley, 1996). Specific variables contribute to attrition for both groups (Billingsley, 2003; Billingsley, Gersten, Gillman, & Morvant, 1995; Boe, Barkanic, et al., 1999; Brownell, Smith, McNellis, & Lenk, 1997; Darling-Hammond, 2001; Darling-Hammond &

Sclan, 1996; Gersten, Keating, Yovanoff, & Harniss, 2001; Ingersoll, 2001; Miller et al., 1999; Singh & Billingsley, 1996). Some of these variables⁷ include:

- employability—teachers with more employment opportunities outside of teaching are more likely to depart
- personal decisions—teachers depart for reasons unrelated to work, e.g., health considerations, pregnancy, move to another city or state
- level of education and certification status—teachers who are better prepared to teach are less likely to depart teaching
- salary—teachers in higher paying jobs are more likely to stay in teaching
- mentoring—teachers who have high-quality mentoring programs when they enter teaching are less likely to depart
- decision-making power—teachers who are involved in decision making in their school are less likely to depart
- administrative support—teachers who have strong administrative support are less likely to depart
- school climate—teachers who work in a more collaborative, supportive school climate are less likely to depart
- job design—teachers who have job design characteristics that limit paper work, provide a reasonable case load, provide resources to support students (e.g., paraprofessionals) and/or provide time for collaboration and curriculum development—are less likely to depart.

Possibilities for retention. For insight into the reasons teachers leave special education and ways they might be retained, Boe et al. (1997) studied 19,500 special education teachers, who account for 2 of every 3 special education teachers who left education in 1988-1989. Of those studied, about 3,000 were unqualified for their positions, 3,500 advanced to administration or other specialized positions, 4,000 retired or became disabled, and 2,500 planned to return to teaching within a year. The vast majority of these teachers were not reasonable candidates for retention efforts. However, the 6,500 teachers who left the profession for reasons other than those listed above (e.g., employment out of education or homemaking/childcare) might be candidates for retention efforts. Moreover, Singer (1993) has shown that as many as one third of the teachers who leave special education teaching positions do later return to teaching.

In addition to teachers who left the profession, 18,900 more special education teachers transferred from special to general education during this time (Boe et al., 1997). These teachers may also be candidates for retention, although some evidence indicates that it may be difficult to retain these teachers in special education unless teaching conditions are improved (Billingsley, 1993; Billingsley & Cross, 1991; Singer, 1992; Singer, 1993). Particular concerns in special education expressed by teachers who transfer to general education include: lack of administrative support, excessive paper work, and student factors, e.g., lack of progress made by students (Billingsley & Cross, 1991).

⁷For a more extensive discussion of issues related to the attrition/retention of special education teachers, see Billingsley (2003).

Boe et al. (1997) suggest that a critical issue in retaining these teachers relates to efforts to make special education teaching more appealing, using strategies such as increasing resources, improving the qualifications of special education teachers through professional development, and increasing salaries. Based on the available teacher attrition data, Boe et al. conclude that reducing attrition alone, although important, does not “have sufficient power to upgrade and stabilize the qualifications of the teaching force in special education” (p. 383). These authors further suggest that “policymakers in special education should also consider actions that will increase the yield of qualified recruits from major sources, such as from teacher preparation programs and the reserve pool” (p. 383). However, considering that the data Boe and his colleagues had to use in their 1997 publication is well over 10 years old and that IDEA requirements have increased job demands for special education teachers since then, new research efforts are warranted regarding this issue, which is closely related to supply and demand.

TRENDS IN THE SUPPLY OF SPECIAL EDUCATION TEACHERS

Almost all 30,000 special education teaching positions open in public schools are filled by the beginning of each school year (USDOE, 1998). Only about 1% of positions remain vacant during any year (USDOE, 2000). However, persons not fully certified fill many positions. Boe, Cook, et al. (1998) reported that an average of 9%-10% of all special education teachers are less than fully certified in the area of their primary assignment. The most recent USDOE data indicate that the shortage of special education teachers has increased to 47,532 or 11.4% of all special education teachers (USDOE, 2003). This chronic shortage of fully qualified special education teachers exists in every region of the U. S. (AAEE, 2000).

Four sources of supply of teachers are subsequently addressed: (1) the production of new, traditionally prepared teachers; (2) the reserve pool (e.g., teachers who are certified but not currently teaching); (3) the increasing number of persons who enter teaching after completing alternative teacher certification programs; and (4) uncertified teachers hired to fill vacant positions. This is followed by a review of factors affecting the supply of special education teachers.

Production of Teacher Education Programs

Data from the 1993-1994 SASS survey, the most recent data available, revealed that approximately 40% of all beginning teachers were recent graduates of teacher education programs (Boe, Cook, Paulsen, Barkanic, & Leow, 1999). These programs are thus a major source of beginning special education teachers. In response to the shortage of special education teachers during the 1990s, the production of teachers by these programs increased 21% from 16,697 graduates in 1993 to 20,274 graduates in 1998 (NCES, 2001). In spite of this growth, evidence remains that these numbers will not fill the available teaching positions with fully certified teachers or keep up with the continuing growth of the field (Boe, Cook, Kaufman, & Danielson, 1996; Boe, Cook, et al., 1999; USDOE, 1998). For example, the shortage of fully certified teachers in special education remained steady at 9%-10% throughout the 1990s (USDOE, 1998), despite growth in teacher production.

It is informative to compare the U. S. production of special education teachers to the production of teachers in elementary education, where there is a balance or surplus of teachers (AAEE, 2000). These data should provide insight into the shortage of teachers in the pipeline for special education. Data from a national study of the surplus or shortage of general and special education teachers from preparation programs (Boe, Cook, et al., 1999) found that for every general education elementary school teaching position available for entering teachers in 1993-1994, 1.68 teachers graduated from preparation programs.⁸ In contrast, for every entering teacher position available in special education, only .86 teachers were prepared. This level of production has

⁸ The *net graduates* excluded those who were continuing teachers (already employed while finishing school).

created a surplus of elementary teachers and a shortage of special education teachers in many parts of the U. S. (AAEE, 2000; USDOE, 1998).

These data suggest that the production of teachers in special education preparation programs would have to increase significantly to adequately address the teacher shortage. For example, the elementary education production level, which is approximately twice the size of the special education production level, has produced a balance or surplus of elementary teachers across the country, suggesting the need to increase the production of special education teacher preparation programs significantly.

In summary, the limited number of graduates of teacher preparation programs in special education programs in the U. S. remains a significant, contributing factor to the shortage of fully certified teachers in special education (USDOE, 1998). As noted in the *20th Annual Report to Congress*, “it appears that graduates from teacher preparation programs must serve as the major source of supply (of special education teachers) in the future. Yet the current level of production of such teachers nationally is far from adequate” (p. III-19). Research is needed to explore this issue, especially in light of increasing numbers of teachers who graduate from alternative programs (Rosenberg & Sindelar, 2000).

The Reserve Pool

A large proportion of teachers who fill open positions in special education each year are from a *reserve pool* of experienced teachers who are not currently teaching and teacher preparation program graduates who delay entry into the profession for one or more years (Boe et al., 1996). Data regarding the size of the reserve pool in special education are very limited. Boe et al. note that returning experienced teachers are the main source of supply for the reserve pool. Experienced teachers not currently working in the profession comprised two thirds of all newly hired special education teachers in 1987-1988; in 1990-1991, one half; and in 1993-1994, one third (USDOE, 1998). Data have recently become available from the 1999-2000 SASS survey. Preliminary analyses reveal that the available reserve pool of beginning teachers has rebounded to some degree, because approximately 42% of new teachers are returning experienced teachers (Erling Boe, personal communication, September 17, 2003).

Trends in general education seem to match trends in special education. Between 1988 and 1994, the percentage of new teachers hired from the reserve pool dropped from 33% to 23% (Baker & Smith, 1997), suggesting that this source for new teachers was becoming significantly depleted. However, similar to the trend in the supply of special education teachers, more recent data reveal that this source has rebounded, and approximately 40% of new teachers who entered general education in 1999-2000 were experienced teachers returning to the profession (Erling Boe, personal communication, September 17, 2003).

In summary, available data suggest that the reserve pool declined significantly during the early 1990s in both general and special education but may have been rebounding at the end of the decade. Further research is needed to determine factors that influence this reserve pool of potential teachers (Darling-Hammond & Sclan, 1996) and why a rebound in supply from this source has apparently occurred.

Alternative Teacher Education Programs

A small but growing source of certified special education teachers are generically referred to as *alternative teacher education programs* (Rosenberg & Sindelar, 2000). In response to both teacher shortages and concerns about the quality of graduates of traditional teacher preparation programs, many SEAs have developed teacher education programs that offer an alternative to traditional, university-based, 4-year or 5-year teacher education programs (Zeichner & Schulte, 2001). Some alternative programs are designed to provide older, non-traditional students who may already have a bachelors degree a means for entering the profession (Rosenberg & Sindelar, 2000; Zeichner & Schulte, 2001). Little, however, is known about the content or actual production rates of these varied programs.

In 1983, only 8 states had alternative teacher certification programs (Zeichner & Schulte, 2001). By 2001, 45 states and the District of Columbia had some form of alternative program (Feistritzer, 2001). While there is evidence in one state that as many as 27% of newly certified teachers were graduates of these programs (Huling, Resta, & Rainwater, 2001), most evidence points to small but growing numbers of graduates of alternative programs nationally. For example, 5% of teachers receiving certificates in California and 15% in Texas were recent graduates of alternative programs (Huling et al., 2001). Feistritzer (2001) estimated that more than 150,000 persons had been certified through alternative programs in the past 20 years.

One particularly encouraging feature of alternative certification programs is their success in recruiting and preparing CLD teachers (Shen, 1998). Some reports estimate that CLD teachers represent up to 40% of those alternatively certified; indeed, several states have reported that alternative certification is a primary or significant means of attracting teachers from diverse backgrounds (Cornett, 1990; Stoddart, 1990).

Limited data are available on the number of teachers who have received certification in special education through alternative means. Data from SPeNSE (2002) indicates that approximately 7% of all special education teachers earned their certification through an alternative route, compared to 4.5% of their general education counterparts. These investigators also report that the number of teachers in special education who are certified through alternative routes is apparently increasing, because approximately 10% of teachers who have been teaching less than five years were certified through one of these alternative routes. It is noteworthy that teachers in classrooms often considered the most difficult to staff (i.e., classrooms for students with emotional/behavioral disorders) are most often certified through alternative routes; 12% of these teachers were certified through alternative routes.

While the preceding information suggests that a relatively small proportion of special education teachers have been certified through alternative routes, the rapid growth in the number of alternative programs suggests that more teachers will be generated through these routes in the future. This is an area of teacher supply and demand that deserves further study, because little is known about this emerging approach to addressing the teacher shortage.

Uncertified Persons Entering Teaching

Boe and his colleagues (1996) distinguish between two types of special education teacher shortages: (1) a quantity shortage and (2) a quality shortage. A *quantity shortage* is simply the number of persons needed to fill open teaching positions. Approximately 99% of all special education teaching positions are filled each year, indicating a very small *quantity shortage*. In contrast, a *quality shortage* exists when school districts cannot fill all positions with professionals possessing the qualifications they are seeking. The primary indicator of quality for entering teachers is full certification in the area of the primary teaching assignment. Thus, a quality shortage of teachers is “a shortage in the number of teachers who are fully certified for their positions and available to fill vacant teaching positions” (USDOE, 1998, p. III-2).

Data reported in the 20th *Annual Report to Congress* (USDOE, 1998) indicate that there was a severe and chronic quality shortage of special education teachers from the late 1980s until the mid-1990s. During that time, 9%-10% of all special education teachers were not fully certified. This problem continued in the 2000-2001 school year when 47,532 individuals teaching in special education classrooms lacked teacher certification in their primary teaching assignment (USDOE, 2003).

Entering teachers significantly impact the quality shortage (Boe, Cook, et al., 1998). For example, in 1990-1991, 31.8% of all individuals newly assigned to special education teaching positions, but only 7.8% of continuing special education teachers, were not fully certified. The quality shortage was almost twice as large in special education as in general education. More recent data (Carlson et al., 2002) reveal that this trend has continued: 29% of beginning special education teachers in their first three years of teaching were not certified for their main teaching assignment. Baker and Smith (1997) believe that “imbalances in supply and demand are often resolved through adjustments in teacher qualifications” (p. 33). It is clear that these adjustments have occurred across the U. S. in special education, because large numbers of uncertified teachers have been hired to teach students with disabilities each year by using temporary or emergency certificates.

Although much research evidence documents a quality shortage of special education teachers, little is known about these teachers' job skills (Smith-Davis & Billingsley, 1993). For example, in some states, teachers who may be certified in an area of special education but not in the area of their teaching assignment are included among teachers who are uncertified. In other settings, persons who lack a college degree may be hired as permanent substitutes and listed as uncertified. Obviously, the teachers in these two examples bring vastly different qualifications to their teaching positions. More research is needed regarding just what the quality shortage of special education teachers means and how this shortage may influence outcomes for students with disabilities.

Factors Affecting the Supply of Special Education Teachers

Two primary factors influence the supply of new teachers from preparation programs: (1) the limited yield of teachers from the total number of graduates and (2) the large number of teachers already employed when they graduate from a preparation program. In addition, some evidence

suggests that conditions of teaching in special education influence the number of teachers who choose to enter the profession.

In 1998, 20,274 newly certified teachers graduated from teacher preparation programs in special education. Not all of these prospective teachers were available to fill the approximately 30,000 special education teaching positions that were vacant in 1998. A significant proportion of teacher education program graduates do not enter teaching (Boe, Cook, et al., 1999; Henke, Geis, Giambattista, & Knepper, 1996; Hirsch, Koppich, & Knapp, 2001). For example, Boe, Cook, et al. (1999) found that approximately 46% of all teacher education program graduates in 1993 entered teaching upon graduation. An additional 27% of previous graduates of teacher education programs entered teaching for the first time (i.e., delayed entrance into teaching) in 1993, resulting in a total yield of 73% from all teacher education programs. Henke et al. (1996) found that 55% of all education majors had entered teaching two years after graduation, and Hirsch et al. (2001) reported the proportion of teacher education graduates who enter teaching at 60%.

When special education teacher programs were the sole focus of study, 59% of their graduates entered the teaching profession in the year after graduation (Boe, Cook, et al., 1999). This figure was somewhat higher than the yield of all education programs (46%) or elementary education programs (45%), but comparable to the yield of secondary education programs (58%).

A second factor that effectively reduces the yield of new teachers entering the profession is the relatively large number of graduates of degree programs in special education who continue in a teaching position upon graduation. (Boe, Cook, et al., 1999). Boe and colleagues found that in 1993 approximately 35% of all graduates of special education programs were already teaching when they completed their teacher preparation programs compared to elementary education, 20%; secondary education, 26%; and all teachers, 21%. Thus, a much larger proportion of special educators than teachers in other fields were hired before they were prepared. Most likely, these teachers were students in masters-level teacher preparation programs, received their degrees as they became fully certified, and continued in their teaching positions after graduation.

The shortage of special education teachers being prepared by colleges and universities influences the overall teacher shortage in two important ways. First, there are simply not enough certified teachers available (or willing) to fill teaching positions in special education. Boe, Cook, Bobbitt, and Terhanian (1998) examined the SASS data from the early 1990s and found that about one third of all entering teachers in special education were not fully certified, adding to the quality shortage. Second, uncertified teachers leave the profession at a much higher rate than fully certified teachers leave (Boe, Bobbitt, et al., 1999; Miller et al., 1999). Boe, Bobbitt and colleagues found that uncertified teachers were three times more likely to leave their teaching positions than were fully certified teachers. Thus, hiring large numbers of uncertified teachers each year further adds to "revolving door" problems—many teachers moving in and out of special education teaching positions.

A final consideration regarding the supply of special education teachers relates to factors that influence the limited number of prospective teachers who make the decision to enter special education teacher preparation programs.

As previously noted, one national study suggested that twice as many prospective teachers enter elementary programs per available position than special education teachers (Boe, Cook, et al., 1999). These data strongly suggest that the existence of factors that make elementary education positions more appealing than special education positions. Further evidence for this assertion is that special education teachers are ten times more likely to transfer to general education than general educators to special education (Boe, Bobbitt, et al., 1998).

Related to these findings, it is important to note that insufficient numbers of prospective teachers are attracted to special education, despite many incentives available from USDOE and from SEAs across the nation. For example, many states have grants or forgivable loan programs for preservice students who prepare for careers in special education and teach for a given number of years (Hirsch et al., 2001). In addition, USDOE provides grants to colleges and universities to attract people into the profession. Obviously, these incentives have not attracted enough people into special education preparation programs to make up for the losses due to attrition and to fill new positions that are regularly created to teach the growing number of students with disabilities.

STATE AND LOCAL POLICIES AND PRACTICES ADDRESSING THE TEACHER SHORTAGE

Administrators from state departments of education, school districts, and other education agencies have implemented various strategies for resolving shortages, but no research has been conducted on the effectiveness of these approaches. Publications are beginning to describe these strategies (Hirsch, Koppich, & Knapp, 2001; Wilson, Darling-Hammond, & Berry, 2001), which are predominantly used to attract all teachers rather than special education teachers in particular.

Hirsch and colleagues (2001) detail approaches that SEAs and local education agencies (LEAs) use to attract teachers to the profession or retain them. These approaches include:

- offering college scholarships, forgivable loans, alternative certification programs, "future teacher" programs in high schools and community colleges
- providing salaries and benefits (e.g., bonuses, lowered state tax rates, assistance with housing costs) to attract teachers into SEAs and LEAs
- reducing hiring barriers (e.g., uniform hiring approaches and web sites where districts post openings and applicants post resumes and applications)
- luring retired teachers back to the classroom by allowing them to draw full pensions and full salaries
- providing financial bonuses and moving expenses to redistribute teachers to critical shortage areas
- maximizing teachers' mobility (e.g., portable pensions, reciprocal licensing, and credit for years of experience)
- helping districts to prepare their own strategies (e.g., LEAs' preparation programs developed in cooperation with SEAs or institutions of higher education [IHEs]).

Some states have made systematic efforts to attract and retain certified teachers (Hirsch, Koppich, & Knapp, 2001; Wilson, Darling-Hammond, & Berry, 2001). For example, Connecticut (Wilson, et al., 2001) developed and implemented reform measures that effectively eliminated their teacher shortage. These measures include:

- school funding equity across the state's poor and wealthy districts
- high standards for teacher preparation programs tied to districts' practices
- a teacher induction program
- scholarship programs for in-state high school graduates to attend state teacher education programs
- on-going professional development for teachers.

Although a teacher shortage remains, California (Hirsch, et al., 2001) also has a comprehensive approach that includes:

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- disseminating information about teaching as a career, requirements for teaching credentials, traditional and alternative preparation programs, and school districts in need of teachers
 - conducting outreach activities in high schools to develop interest in teaching at an early age
 - providing block grants to low-performing schools to be used to recruit and retain teachers
 - providing reductions in state taxes for teachers who serve at least four years
 - increasing beginning teacher salaries
 - providing bonuses for National Board Certified teachers
 - providing financial incentives to teacher interns
 - funding fellowships for prospective teachers who are willing to teach in low-performing schools
 - funding loan forgiveness programs for teachers
 - increasing funds for teachers' retirement accounts.

Some LEAs have developed their own programs or added to state programs by providing signing bonuses, moving expenses, salary supplements, higher beginning salaries, and other incentives to fill positions with certified teachers. Anecdotal evidence suggests these programs may be effective; as for statewide programs, empirical data are lacking about the effectiveness of these strategies.

There seems little doubt that state and local recruitment and retention programs are expensive, requiring education funds in short supply. It is possible that these strategies result in the redistribution of teachers to locales with more incentives, creating shortages in less aggressive school districts and states. In a more positive light, some of these strategies may entice teachers to enter the profession who might not otherwise be teaching (i.e., teachers from the reserve pool), and may expand the pipeline of teachers entering the profession from preparation programs. Hirsch and colleagues (2001) warned that recruitment and retention strategies used by SEAs and LEAs may result in lower teacher quality by allowing less rigorous preparation through 'back door' programs or by hiring retired teachers for areas or grade levels they are not prepared to teach.

In summary, although state and local recruitment and retention programs may be effective, empirical data are lacking about which strategies are effective, cost effective, and attract teachers into special education. Research is needed to examine these issues, to ensure that funds are expended on effective and efficient methods for attracting individuals into the teaching profession, and to ensure that highly qualified teachers staff classrooms.

WHAT WE KNOW ABOUT TEACHER SUPPLY AND DEMAND IN SPECIAL EDUCATION

We do know a great deal about the supply and demand of special education teachers in the U. S. Available data inform us in the following ways:

The shortage of special education teachers is chronic and long term and will get worse. The most recent data available indicate that during the 2000-2001 school year, 47,532 individuals filling special education positions were not fully certified (approximately 11% of all teachers in special education) (USDOE, 2003). This shortage has existed for at least 15 years (USDOE, 1998). Furthermore uncertified teachers increased from 1999-2000 to 2000-2001 by 23%, the largest increase since USDOE has been reporting these data. Trends suggest that the need for new teachers will continue to grow rapidly over the next 10 years, requiring an additional 135,000 to 200,000 teachers over the next decade (Bureau of Labor Statistics, 1999; Kozleski et al., 2000) and likely increasing the teacher shortage.

There is a severe shortage of culturally and linguistically diverse (CLD) teachers in the work force, and this shortage is likely to get worse. Currently 38% of students identified with disabilities are from CLD backgrounds, although only 14% of their teachers are from similar backgrounds (USDOE, 2000). Olson (2000) predicts that if current trends continue, by 2009, 40% of students and 12% of teachers will come from diverse backgrounds. This situation exists in part because of poor educational opportunities for CLD students during their elementary and secondary education years that create barriers for college attendance. Another contributing factor is the lure of professions outside of education that have better working conditions and better pay than education.

The shortage of special education teachers is pervasive across geographic regions and localities in the U. S. Most states and localities face shortages (AAEE, 2000; Carlson et al., 2002). For example, 98% of the nation's school districts report special education teacher shortages (ERIC, 2001); special education is the area of greatest teacher shortages in the largest 200 cities (AFT, 1999); shortages are greatest in high-poverty schools (Carlson et al., 2002); and considerable teacher shortages exist in 10 of the 11 geographic regions in the U. S. (AAEE, 2000).

The shortage of special education teachers is greater than teacher shortages in any other area, including mathematics and science. The area with the greatest shortage of teachers nationally is emotional or behavioral disorders, followed by multicategorical, severe/profound disabilities, learning disability, and mild/moderate disabilities, in that order. Moreover, all 10 areas of teacher certification in special education rank in the top 15 shortage areas nationally (AAEE, 2000). Other teaching areas ranking in the top 15 are mathematics education (rank:6), physics (rank:8), bilingual education (rank:9), chemistry (rank:12), and computer science education (rank:13).

Reducing teacher attrition is necessary to address the teacher shortage successfully. The most recent available data reveal that over 13% of special education

teachers leave the profession or transfer to general education classrooms each year. This means that every four years, more than half of all special education teachers depart. “It is as if we were pouring teachers into a bucket with a fist-sized hole in the bottom” (NCTAF, 2003, p. 8). The level of attrition from the profession must be addressed if the shortage of fully certified special education teachers is to be remedied.

The conditions of teaching in special education are a major factor affecting the teacher shortage. These conditions (Kozleski et al., 2000) contribute to the attrition rate in special education—averaging over 13% per year—twice as great as attrition in general education (Boe, Bobbitt, et al., 1998). Furthermore, the attrition rate of special educators transferring to general education is more than 10 times larger than general educators transferring to special education. Determinants of this high attrition rate include: job design, role overload, and characteristics of students (Billingsley, 2003; Gersten et al., 2001; Kozleski, Mainzer, & Deshler, 1999).

Insufficient numbers of new teachers are being prepared to meet the ongoing demand. Although the production of teachers in special education increased during the 1990s, recent data indicate that 86 teachers are prepared for each available position in special education, while almost twice as many teachers are produced for each available position in elementary education (Boe, Cook, et al., 1999). Thus, the limited production of teachers by preparation programs remains a significant contributing factor to the shortage of fully certified teachers in special education in the U. S.

In summary, it is obvious that we face pervasive, chronic shortages of special education teachers in many parts of the U. S. If we are to address these shortages successfully, research needs to provide a deeper understanding about the reasons for the shortages and what may be done to address them. Specific questions that begin to address research needs follow.

WHAT WE NEED TO LEARN MORE ABOUT

Although we know much about the supply, demand, and shortage of special education teachers in the U. S., there is also much we do not know. For example, existing data provide a general picture of supply and demand in the U. S. and related teacher shortages, but little rich, detailed information is available about the shortages. Furthermore, most data come from the early to mid-1990s in the SASS and TFS surveys and may not accurately portray the current teacher shortage and related issues, e.g., attrition. There is a need for more current data. Below are additional recommendations for future research to update our data base and to provide rich information about teacher supply, demand, and shortage issues in special education.

How do we attract more teachers into special education? Far more teachers are attracted into elementary education than available positions. Incentives are available to attract teachers into special education, yet the limited production of teacher education programs remains. Research is needed to understand more fully why prospective teachers do not enroll in special education and what can be done to attract more teachers into the profession.

Why do so many teachers transfer from special to general education? Special education teachers leave the profession of teaching in roughly the same numbers as general educators. However, far more special educators transfer to general education than vice versa. If similar proportions of teachers transferred in both directions, the teacher shortage in special education would be largely solved. We must find out why so many teachers transfer out of special education, what can be done to keep them, and how to encourage general educators to transfer into special education. More specifically, we need to know which conditions of teaching in special education and general education differentially influence teacher attraction to and retention in the profession and which state and local policies influence these conditions.

How do we attract more CLD individuals into special education? The current shortage of CLD teachers in special education is critical and likely will get even worse in the near future unless we determine effective methods to attract these individuals into the profession and keep them employed once they are in the profession. A rich source of potential data to address this issue are the grants funded by USDOE's OSEP to address the shortage of CLD special education teachers.

What strategies are effective in retaining well-qualified teachers? Many issues merit investigation, e.g., whether systematic induction procedures are effective, whether professional development activities help retain teachers, and whether different kinds of teacher preparation influence retention. In addition, it is important to examine issues related to the conditions of teaching and how these conditions may be changed to increase the retention of special education teachers.

What large-scale, systematic strategies used by SEAs and LEAs are effective in attracting teachers into the profession and retaining them? At present, very expensive strategies are being used to attract and retain teachers in the profession. These include incentive programs for teachers, induction programs, school reform, teacher professional

development, and a range of other strategies (Hirsch, Koppich, & Knapp, 2001; Wilson, Darling-Hammond, & Berry, 2001). Many states are also attempting to expand the pipeline for teachers entering the profession through alternative certification programs. It is important to examine the success of these strategies in producing high-quality teachers, reducing the teacher shortage, and attracting teachers to less desirable schools and/or teaching roles, especially in special education.

How qualified are the teachers who are uncertified in a given state? The answer to this question needs to include information regarding whether these *uncertified* teachers are partially certified in special education, certified in another area of education, certified in special education but not in the area of their primary teaching assignment, or lack any preparation to teach. This information should show the level of preparation uncertified teachers have to address the needs of students with disabilities and options for addressing the shortage of uncertified teachers.

What state policy initiatives have addressed teacher supply and demand and which initiatives have been most effective? States have changed a range of policies, e.g., teacher certification, teacher education program approval, and the composition of teacher case loads. In addition, many states have approved alternative paths to teacher certification. It is important to understand the effectiveness of state policy changes aimed at improving the quality and quantity of teachers for students with disabilities. This will provide insight into how the teacher shortage may be influencing student performance and identify strategies that may be used to reduce the shortage.

In addition to answering these questions, we need to update teacher shortage data in special education using the recently released SASS data base (updated in 1999-2000) and the TFS (updated in 2000-2001). Data currently available from USDOE Title II reports (<http://www.title2.org>) should be analyzed. Results from these analyses will include whether the teacher shortage in special education has changed significantly in the last several years, if disproportionate numbers of special education teachers continue to transfer to general education, and the number of certified teachers provided by the reserve pool.

In summary, the available data starkly reveal that we face shortages of qualified people willing to work at the salaries we offer under classroom working conditions that exist in most of the U. S. Unless these issues are addressed, there seems to be little hope that the shortage of fully certified teachers in the profession will be significantly reduced in the near future. It is highly unlikely that there will be easy or cheap answers. However, until we have the necessary research, we can only guess at reasonable alternatives for addressing the teacher shortage. The research questions described here are a beginning to ensure that eventually a well-qualified teacher will be provided for every student with a disability in the U. S.

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