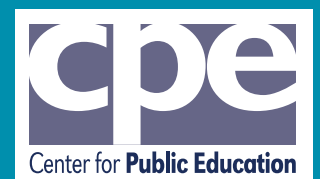


FIXING THE HOLES IN THE TEACHER PIPELINE: AN OVERVIEW OF TEACHER SHORTAGES



By Patte Barth, Naomi Dillon, Jim Hull, Breanna Holland Higgins
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This white paper was written by the Center for Public Education: Patte Barth, director; Naomi Dillon, managing editor; Jim Hull, senior policy analyst; and Breanna Holland Higgins, George Washington University, Ed.D. candidate.

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Founded in 1940, the National School Boards Association (NSBA) is a not-for-profit organization representing state associations of school boards and their more than 90,000 local school board members throughout the U.S. Working with and through our state associations, NSBA advocates for equity and excellence in public education through school board leadership. www.nsba.org

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INTRODUCTION

Teacher shortage has schools in ‘crisis mode’ ...

— *Seattle Times, December 21, 2015*

California teacher shortage could get worse ...

— *San Jose Mercury News, January 21, 2016*

School districts of all sizes experiencing teacher shortages ...

— *Peoria Journal Star, January 13, 2016*

The headlines don’t lie. School districts across the country are struggling to attract and keep good teachers, a situation that seems to be particularly acute in states such as California and Oklahoma. This is not a good time for schools to be facing a teacher shortage. States have raised K-12 standards to new heights with the expectation that all students will graduate ready for college and careers. At the same time, enrollments in public schools are growing more diverse and include higher proportions of English language learners and students with special needs. As local school leaders are painfully aware, the new standards will not be met if they cannot make sure all their students have the benefit of well-prepared teachers.

School leaders are clearly feeling the urgency. At the National School Boards Association, which houses the Center for Public Education, the issue rose to the top of school boards’ concerns just in the last year. We developed this paper in order to address those concerns and, hopefully, provide some useful information for moving forward.

We begin by examining the scope of the problem. The first finding is hard to explain. While we know that many districts and even whole states have teaching vacancies they can’t fill, many in the research community have concluded that, nationally, there is no shortage (Cowan et al., 2015). Substantially fewer college students are enrolling in teacher preparation programs, but those who do appear to be completing at higher rates. More veteran teachers are leaving, but more new teachers are staying (NCES, 2014; Title II HEA, 2015). The net effect seems to be that the supply of teachers nationwide is not significantly different than it was five years ago.

However, the overall numbers mask imbalances that are creating shortages on various fronts:

- **By state:** the nation is awarding more teacher licenses, but 20 states have seen decreases. Oklahoma, Washington, Minnesota, Virginia and New York have all seen certificates drop by one third to almost one half in the last four years (Title II HEA, 2015). Other states, such as South Dakota, struggle to find enough teachers to keep up with increases in student enrollments (South Dakota Department of Education, 2015).
- **By subject area:** schools report vacancies in STEM fields more than others. They also have more difficulty hiring special education and bilingual teachers (Cowan, 2015).
- **By school level:** there is actually a surfeit of new elementary teachers, but schools report having trouble filling positions in their middle and high schools (AACTE, 2013).
- **By student minority/poverty enrollments:** by some accounts, it is easier for traditionally hard-to-staff schools to fill positions than it used to be. However, high-poverty and high-minority schools still have more trouble than others (NCES, Title II, 2015).
- **By staff race/ethnicity:** the student population is increasingly diverse. In many states, public schools have a majority-minority student body. Yet four out of five teachers are white (AACTE, 2013).

Researchers point to several reasons for these imbalances:

- the impact of the recession on school budgets in different locations;
- the inability of some districts to compete on teacher salaries;
- the spillover from policies such as class size reduction and higher graduation requirements that increase demand;
- better opportunities for math and science majors outside of teaching;
- a perceived lack of respect for teachers; and
- the reluctance of millennials to consider teaching careers.

The question for states and districts that are experiencing shortages is how to tip the balance in their favor.

In these pages, we will look at the national data on teacher supply and discuss the issues affecting it with a focus on the three main leverage points in the teacher pipeline: initial preparation, recruitment and retention. We will examine best practices regarding each, including how districts have forged collaborations with universities to strengthen the local pipeline. And we highlight four states that have been impacted by shortages.

We conclude this paper with questions school leaders should consider in order to fulfill their commitment to provide every child with a good teacher. ■

NSBA'S COMMITMENT TO TEACHER QUALITY

School boards and Association Members should continue to take a leadership role in improving the quality of teaching and administration in our schools. School boards and their associations should continue to support excellence in teacher education, development of standards, hiring practices, in-service education for personnel consistent with district goals and priorities, and constructive evaluation of administrative and teaching personnel.

— NSBA Beliefs and Policies, 2015

BY THE NUMBERS

TEACHER SUPPLY AND DEMAND

Is there a national teacher shortage or not? This section will look at the data and shows why it's hard to say for certain. Economics 101 tells us a teacher shortage is a function of supply and demand so we'll examine both aspects to determine if the demand for teachers outpaces the supply.

SUPPLY

FEWER INDIVIDUALS ARE ENTERING TEACHER PROGRAMS

One thing is pretty clear, fewer students are entering teacher education programs. Enrollments in traditional and alternative programs declined by 30 percent between 2010 and 2014. Over that same period time, however, the number of completers fell by about half that amount, 17 percent, so that the total supply has not been hit as badly, at least not yet (NCES, Title II, 2015). We may see the number of completions fall more as the full impact of lower enrollments plays out in the next couple of years (NCES, Title II, 2015).

Keep in mind, not everyone who completes a teacher prep program goes on to teach. One analyst estimates that between one quarter and one half of completers don't teach the year after graduating (DeMonte, 2016). While some of them will eventually enter the classroom, an unknown proportion never will.

Teacher preparation enrollment and completion numbers, 2010-2014

YEAR	TOTAL NUMBER OF ENROLLEES*	TOTAL NUMBER OF COMPLETERS
2014 (AY 2012-2013)	499,800	192,459
2013 (AY 2011-2012)	623,190	204,180
2012 (AY 2010-2011)	684,801	217,492
2011 (AY 2009-2010)	725,518	241,401
2010 (AY 2008-2009)	719,081	232,707

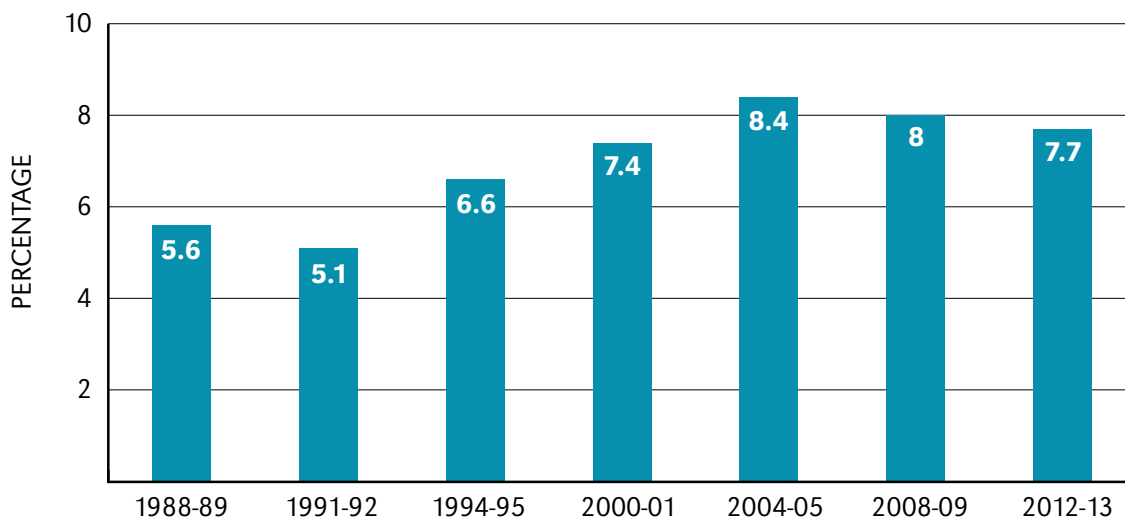
Source: Title II Report, includes state and territories. Enrollees include all state-approved teacher preparation programs, traditional, and university-based and non-university-based alternative programs.

FEWER NEW TEACHERS ARE LEAVING THE PROFESSION

The impact of fewer beginning teachers could be somewhat mitigated by improving retention rates. Here there is some cause for optimism. Earlier studies estimated that up to half of new teachers left the profession within their first five years (Ingersoll, 2003). However, the availability of longitudinal data now offers a better measure of teacher attrition. These new studies are finding that the proportion is closer to 17 percent within four years, which is not far from attrition rates for new employees in other professions (Gray & Taie, 2015; Goldhaber, 2015). A lead researcher believes that the figure may be slightly higher – perhaps more than 20 percent – which is still much lower than previous estimates suggested (Brown, 2015).

However, there’s also been an uptick in the loss of veteran teachers. About 8 percent of teachers overall are leaving the profession each year compared to 5 to 6 percent twenty years ago (NCES, 2014). The growth in departures began in the mid-1990s due to the glut of retiring Baby Boom teachers, and peaked at 8.4 percent in 2005 (NCES, 2015). In recent years, the average age of the teaching force has begun to fall so retirement may be less of a factor moving forward (Ingersoll, Merrill & Stuckey, 2014).

Public school teachers leaving the profession



SOURCE: NCES, 2014

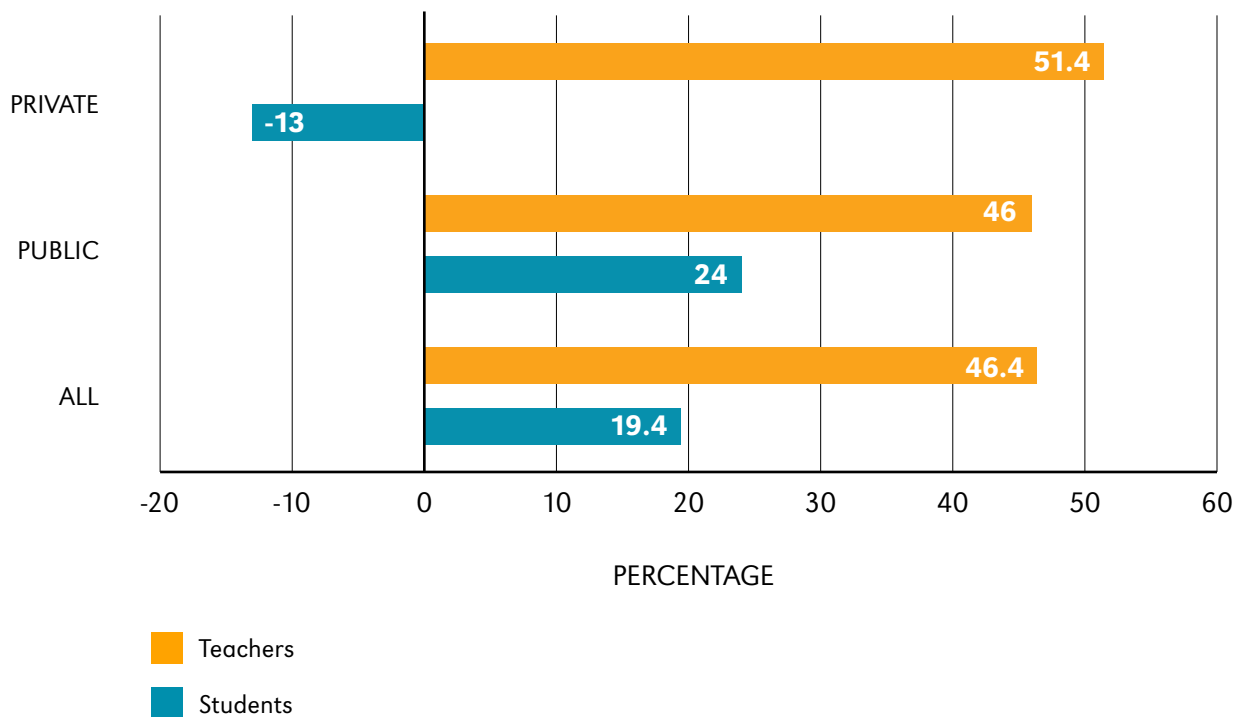
When the production of new teachers and the retention of existing teachers are considered together, there appears to be little evidence that the supply of teachers is dramatically shrinking, at least not for the present. However, we must also look at demand.

DEMAND

AFTER DECADES OF GROWTH, THE NUMBER OF POSITIONS HAS PLATEAUED

The number of teaching positions exploded over the past couple of decades. Between 1988 and 2008, the number of teachers rose by 1.3 million far outpacing the increase in student enrollment during that same time period (Ingersoll, Merrill & Stuckey, 2014). The recession reversed that trajectory somewhat. The teaching force declined by 45,000 following 2008. But the losses seem to have tapered off (Ingersoll, Merrill & Stuckey, 2014).

Percent change in student vs. teacher population, 1987-88 to 2011-12



SOURCE: Ingersoll, Merrill & Stuckey, 2014

PUPIL/TEACHER RATIOS CREEPING UPWARD

Policies to lower pupil/teacher ratios increase demand for more teachers, and indeed, the growth in the teaching force between 1988 and 2008 coincided with the reduction of the public school pupil/teacher ratio from 17.3 to its low point at 15.3 in 2008. Within two years of the recession, however, the ratio increased to 16 where it remains and should therefore lessen demand (NCES, 2014).

Note that pupil/teacher ratios differ from class size. The ratio is a straight division calculation between the number of pupils and the number of teachers available. As such, it will be a lower number than class size which represents the number of students teachers serve in a classroom. In 2011-12, average class size was 21.6 for elementary schools and 24.2 in high schools (NCES, 2012).

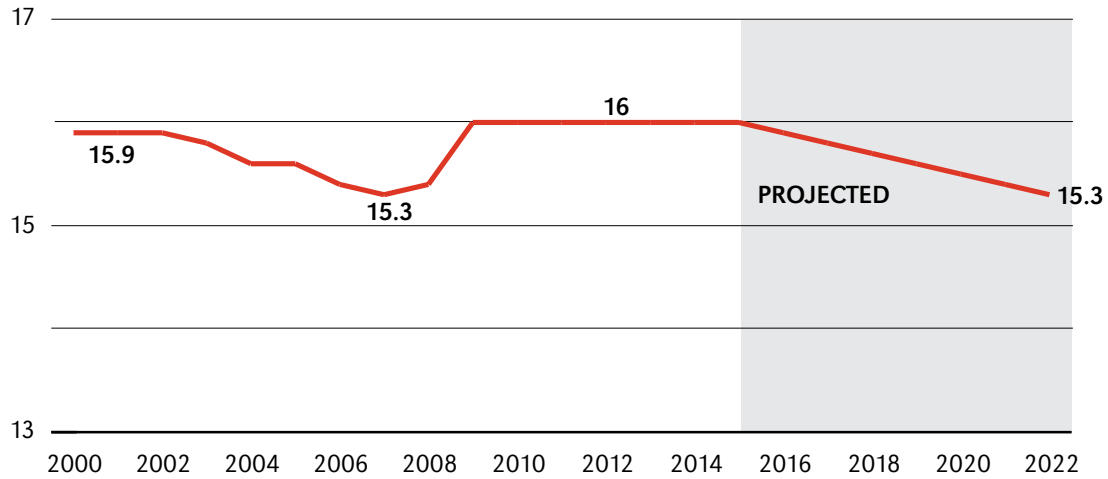
DRAMATIC DECLINE IN TEACHER VACANCIES

An increase in teacher vacancies would be another indicator of a shortage of teachers. However, the opposite appears to be happening. Based on data from the federal Schools and Staffing Survey, the proportion of schools having at least one teaching vacancy has been declining since 2000, from 83 percent in 2000 to 68 percent in 2012. In addition, schools reporting difficulty staffing at least one subject area were half what they were twelve years earlier, from 36 to the present 15 percent. (Malkus, Mulvaney Hoyer & Sparks, 2015).

The decline in teacher vacancies was evident across the board and in virtually every category, including traditionally hard-to-fill positions in math and special education. However, some schools have more vacancies than others. High schools, for example, had many more openings than elementary schools. As stated earlier,

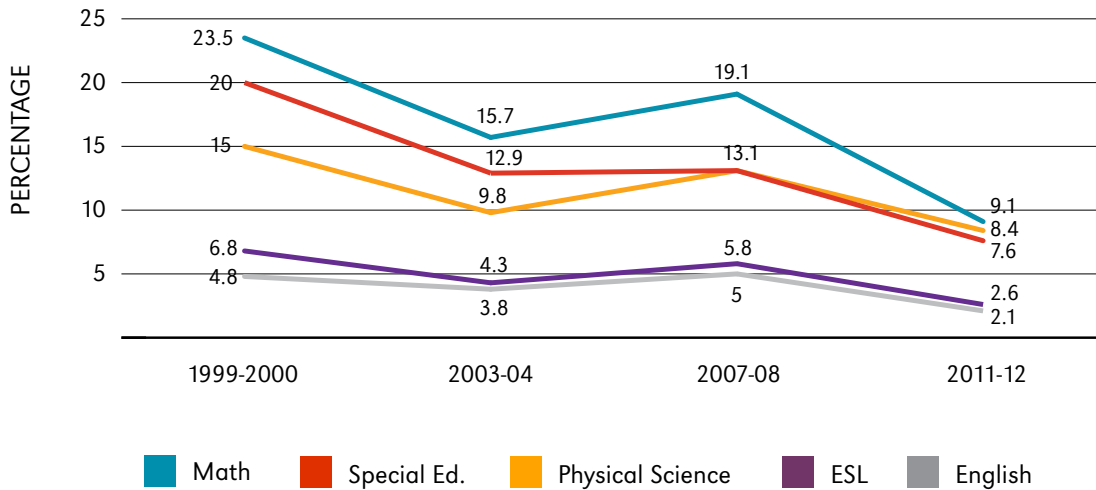
universities produce more elementary teachers than secondary. At the same time, more high-school students are staying in school and are taking more courses to graduate, especially in high-level math and science, both of which increase demand (Ingersoll et al, 2014).

Pupil/teacher ratios Public schools, 2000-2023



SOURCE: NCES, 2014

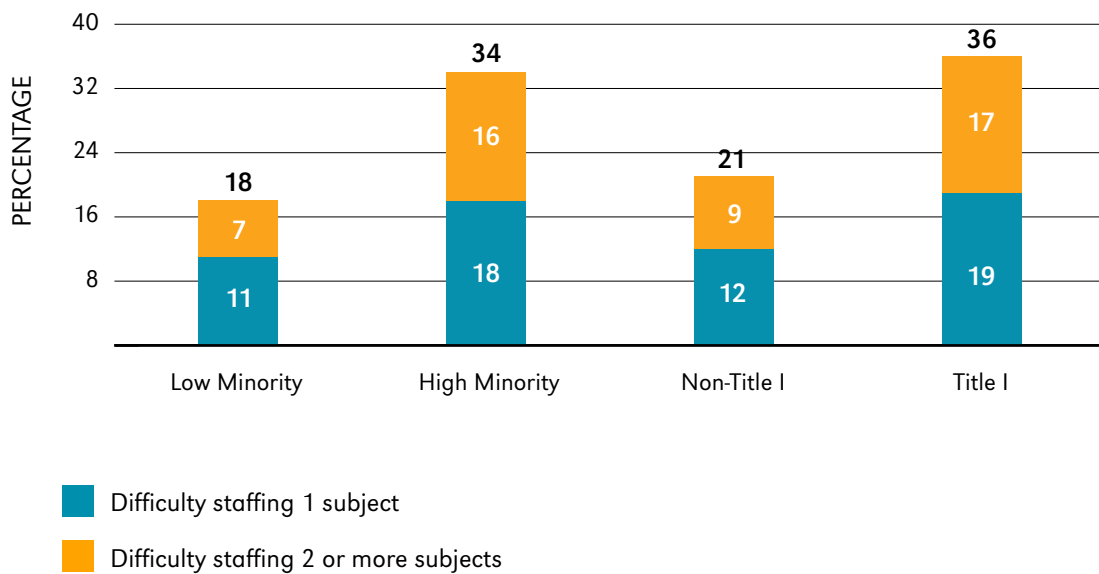
Fewer public high schools report hard-to-fill positions but there are still differences by subject



SOURCE: Malkus et al, 2015

Not all schools share equally in the ability to fill positions. Staffing gaps persist between high- and low-minority schools as well as high- and low-poverty schools.

Schools with more minority and low-income students have more difficulty staffing 1 or more subject areas, 2011-12



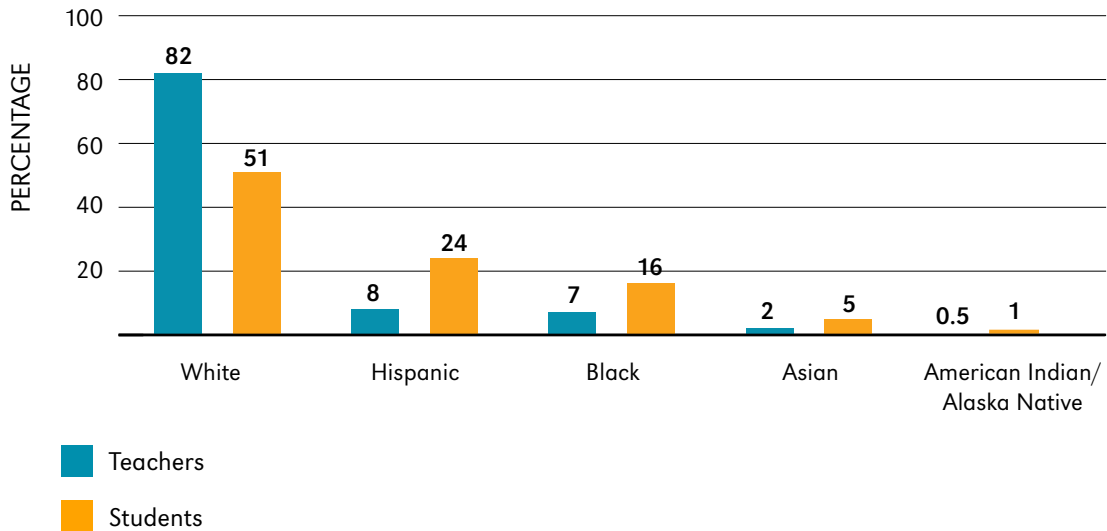
SOURCE: Malkus et al, 2015

LACK OF MINORITY TEACHERS

Public school enrollments are increasingly diverse. Students of color comprise nearly half of the student population now and are projected to be the majority within the next few years. Yet the demographic composition of the teaching force has changed little. Unlike many of the children they teach, about four in five public school teachers are white. Many advocates argue that it’s important for students of every race and ethnicity to have role models among their teachers. Research seems to bear this out. Anna Egalite and her team, for example, have documented achievement gains for students with same-race teachers (Egalite et al, 2015).

The nation is beginning to make some progress, however. Minorities are joining the teaching profession at an increasing rate, and the gap is narrowing. Between 1988 and 2008, the number of white teachers increased by 41 percent while the number of minority teachers increased by 96 percent. As a result, the overall number of minority teachers in the workforce increased from 12.4 percent to the current 16.5 percent (Ingersoll, 2014). Even so, the number of minority students enrolled in public schools is growing faster. Further, minority teachers are more likely to leave the profession than white teachers, which keeps a consistent, significant diversity gap in nearly every state. (Boser, 2014)

A demographic mismatch between public school teachers and their students, 2011-12



SOURCE: SASS 2011-12; NCES, Condition of Education, 2015

ENOUGH TEACHERS, BUT NOT EVERY SCHOOL GETS ITS SHARE

At the national level it appears the current supply of teachers is enough to meet demand. The enrollment drop off in teacher preparation programs is being offset by higher rates of completion and lower attrition rates among new teachers. In addition, the number of schools reporting vacancies has dropped significantly. Yet this is likely small consolation to the many states and districts struggling to staff their schools.

The challenge may not be finding more teachers. Rather we may need to be more strategic in getting the right teachers with the right qualifications to where they are most needed. In the next sections, we address best practices at three points in the teacher pipeline — preparation, recruitment, and retention — as well policies that serve as barriers at the state and local levels to hiring and keeping good teachers. ■

TEACHER PREPARATION

WHO IS PREPARING FOR TEACHING

As we've shown, enrollments in teacher preparation programs have dropped off dramatically in the last five years (Title II, 2015). Of those who do enroll, most enter traditional college or university-based programs, but alternate paths into teaching are a growing part of the pipeline, too NCEES, 2011-2012. Nationally, approximately 85 percent of aspiring teachers come through traditional education programs. The remaining participate in state-approved alternate routes, such as Teach for America or TNTP Teaching Fellows.

The drop in enrollment is the result of many factors. ACT surveys show that over the past four years, high school students' interest in a teaching career has fallen by 16 percent (Darling-Hammond, et al, 2016). Many experts believe the bad economy may be to blame resulting in budget cuts and staff reductions that make teaching less secure than before. Students may also feel more pressure to choose careers where they can earn higher salaries and pay off high student loans (Sawchuk, 2014). Still others point to test-based accountability and high-stakes teacher evaluations that have made the profession less attractive (Goldhaber & Walch, 2014).

A DECREASE IN QUANTITY, AN INCREASE IN QUALITY

While enrollments are down, students who do enter teacher preparation programs have higher credentials than their peers in the past. The GPA of students admitted in the fall of 2011 to teacher preparation programs was significantly higher than the entrance requirements at both the bachelors and masters levels (AACTE, 2013). Further, graduates entering the teaching profession in 2008-09 had slightly higher average SAT scores than their peers entering other professions (Goldhaber & Walch, 2014). This was most apparent with new teachers in high-stakes classrooms, that is, grade 4-8 reading and math where the pressure for students to achieve high standardized test scores is significant (Goldhaber & Walch, 2014).

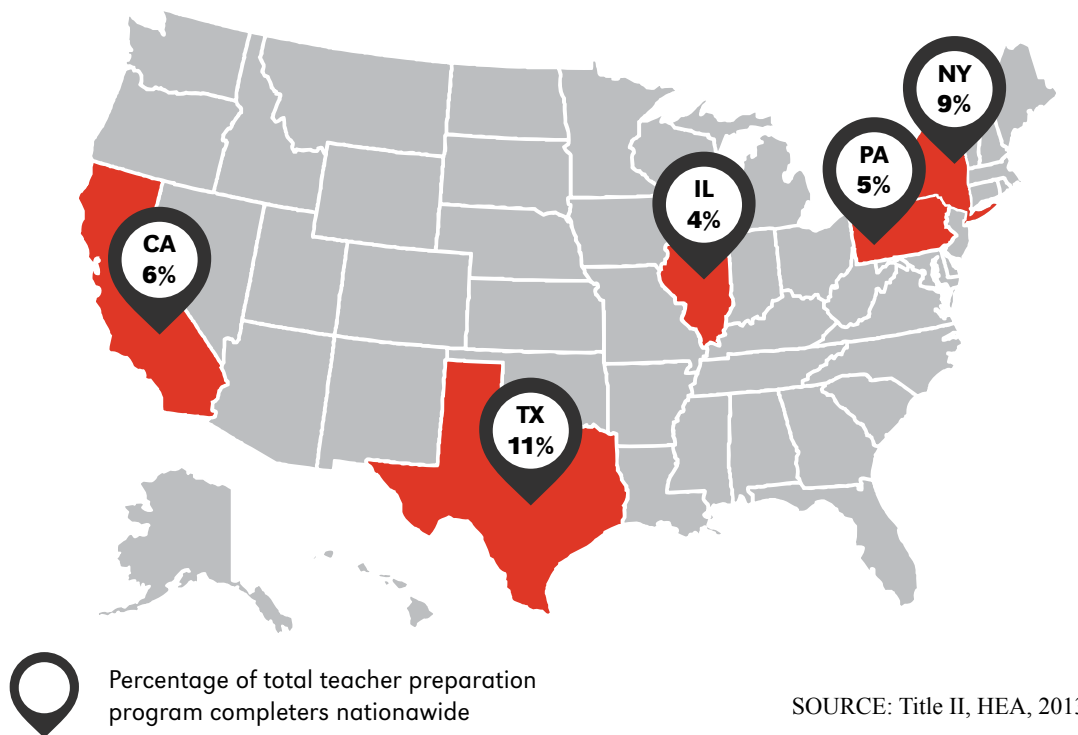
Another hopeful note is that more qualified STEM majors are preparing to teach. According to a federal longitudinal study, high-scoring STEM majors in the 2008 cohort were more likely to become teachers than cohorts from 1993 or 2000. Also, the overall number of STEM teachers coming from the bottom fifth in their class sharply declined from 13 percent in 1993 to 2 percent in 2008 (NCES, 2015).

BEST PRACTICES

Even though enrollments in teacher preparation are falling, it is encouraging that teacher candidates are entering programs with higher academic credentials, which may be one factor in higher completion rates. Experts recommend that universities address shortages in the following ways:

- **Better alignment between teacher production and workforce needs.** Teacher preparation programs continue to produce an abundance of elementary teachers. But teaching degrees in common shortage fields such as mathematics, science, special education and bilingual education are lagging. The American Association of College of Teacher Education calls for expanding recruitment efforts in high-needs areas. These efforts should include attracting more minority candidates into teaching programs in order to produce a more diverse teaching force (AACTE, 2013).
- **A high academic bar for admissions.** Teacher programs can promote stronger candidates by raising admissions standards. Research has shown that enrollees who come into programs with higher test scores and GPAs tend to become more effective teachers (CPE, 2005). In addition, being more selective can add more prestige to teacher programs and thus become more attractive to more students. According to National Council on Teacher Quality standards, only 24 states at present set a high bar for teacher preparation programs, either through GPA or testing requirements (NCTQ, 2015).
- **Supervised clinical experience.** According to AACTE, pre-service programs that provide aspiring teachers opportunities to “engage in the actual practices involved in teaching” produce first-year teachers who are better prepared to take charge of a classroom and tend to stay in the profession longer (AACTE, 2013). Student teaching is especially valuable when the aspiring teacher has a skilled mentor. Yet these experiences aren’t universal. As recently as 2009, beginning teachers in public schools with bachelor’s degrees, only 54 percent had earned credits in student teaching (NCES, 2012). However, the proportion should be improving as more states make student teaching a requirement for certification. ■

Top 5 Teacher-Producing States



TEACHER RECRUITMENT

"THE LEAKIEST SECTION"

Training to be a teacher doesn't guarantee the new graduate will enter the profession. The gap between the university and the classroom is what Jenny DeMonte of the American Institutes for Research calls the "teacher pipeline's leakiest section." Data is hard to come by, but she estimates that between a quarter and a half of graduates of teacher preparation programs don't teach (DeMonte, 2016). Some of these graduates are merely taking some time off before heading into the teaching workforce. Even so, an unknown number have had second thoughts about their career choice and abandoned their plans altogether.

Little is known about why they do. Some researchers suggest that the reality of paying off student loans on a teacher's salary persuades some of them to seek higher-paying jobs (Sawchuk, 2014). DeMonte further points to the typical practice of delaying student teaching until the very end of the program, only to have students find out too late that they're not ready or just don't want to be in the classroom.

A SKEWED COMPETITION

The current reality is that districts need to compete for new teachers. Those that pay higher salaries and can support new employees with strong induction programs have a clear advantage. Those that can't tend to serve high proportions of low-income and minority students. Too often these schools resort to filling positions any way they can. According to the Office of Civil Rights, black and Latino students are two to four times as likely to attend schools where more than 20 percent of the teachers have not met state licensure requirements (OCR, 2014). The teachers who have the least qualifications are left in charge of students who arguably need the best.

The Reform Support Network offers ways to improve the supply of highly qualified teachers to high-need schools. Among these are:

- **Create paid teacher residency programs.** Many teacher educators are promoting year-long residencies in high-need schools. Such programs offer candidates the opportunity for intensive practical experience as well as a chance to earn certification, advanced degree or a guaranteed position upon successful completion.
- **Recruit talented pre-service students with the promise of loan forgiveness.** Federal programs already exist to forgive a portion of teachers' student loans if they work in a high-need school for five consecutive years. Such programs can be supplemented with state and philanthropic dollars.

BEST PRACTICES TO RECRUIT NEW TEACHERS

- Work closely with local colleges to recruit new teachers
- Offer a competitive salary, especially for STEM teachers
- Develop programs within districts for aspiring teachers in high schools to learn about education, join clubs, and offer them incentives to come back to their hometowns to teach

BEST PRACTICES TO RECRUIT NEW TEACHERS TO HARD-TO-STAFF SCHOOLS

- Offer tuition reimbursement and loan forgiveness programs
- Provide a signing bonus or housing assistance, especially in high-cost urban districts
- Differentiate salaries for hard-to-fill positions
- Support new teachers with a strong mentoring program or, if possible, a paid residency
- Hire highly trained and effective principals

- **Establish effective peer cohort teams.** Charlotte-Mecklenburg in North Carolina improved low-performing schools in its district by staffing them with well-selected teams of effective principals and teachers. The combination of prestige and the chance to work collaboratively proved to be incentives to attract talented individuals into previously hard-to-staff schools (Berry et al, 2007).

Other ways districts attract new teachers are to offer signing bonuses, salary adjustments for shortage areas such as STEM, or housing assistance (particularly in urban communities or other locations with high costs of living).

Note that some of these practices are more proven than others. Studies show mixed results on the effectiveness of offering financial incentives to teachers, for example. On average, teachers choose to teach in a school with a more preferable location and good working conditions rather than a district that offers financial incentives. Further, even when the incentives attracted teachers into the district, it had no effect on their retention if they received little support once there. Improved working conditions and administrative quality and support is more important than salaries to teachers choosing where to work (CPE, 2008).

Districts can start to recruit new teachers to the profession on their own by developing teachers from within their own communities. High schools can offer clubs and volunteer opportunities for students who are aspiring teachers to learn about the field of education and begin to work with students. If possible, the district can also offer incentives for those students to come back to their hometowns to teach after earning their degrees and teaching credentials (Bland et al, 2014). ■

TEACHER RETENTION

THE COST OF TURNOVER

Addressing shortages depends as much on keeping existing teachers inside our schools as it does producing new teachers. Retaining existing teachers has other benefits, too. These experienced veterans contribute to a stable school environment and higher student achievement. Retention can also save considerable costs related to replacement.

The good news is that beginning teachers are staying in the profession at higher rates than previously thought (NCES, 2015). The bad news -- more veteran teachers are leaving the nation's public schools. Altogether, we lose about a half million teachers every year at a cost estimated at \$1 to \$2.2 billion (Haynes, 2014).

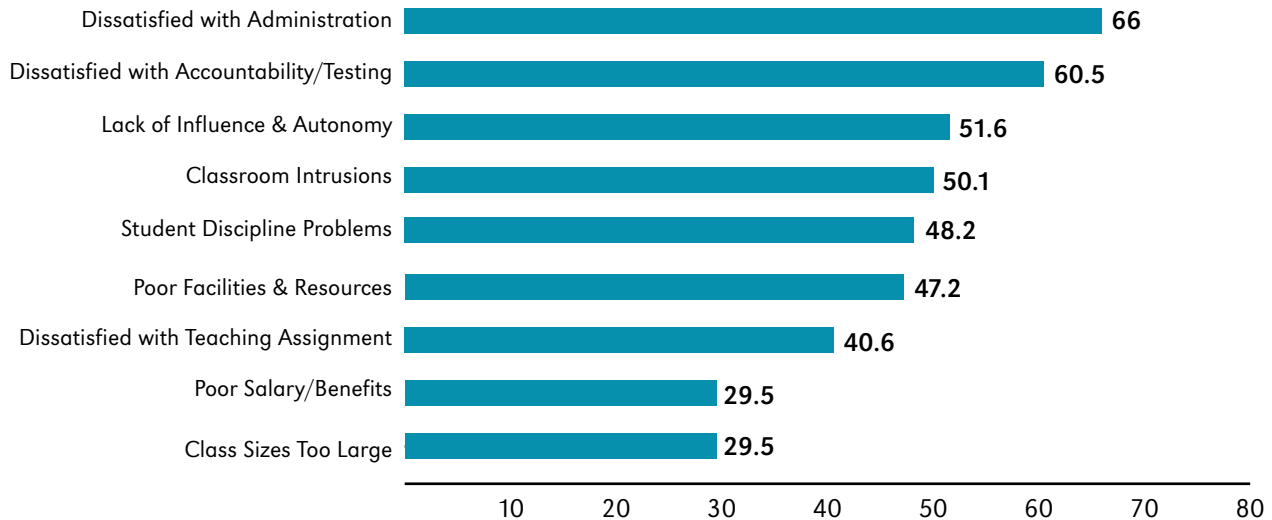
Many of these leavers are teachers of color, who already represent a shortage area. Despite being a growing share of beginning teachers over the last two decades, the turnover rates of minority teachers are regularly higher than those of their white colleagues: 18 percent higher than that of white teachers in 2004-05, and 24 percent higher in 2008-09 (Ingersoll, 2011).

WHY TEACHERS LEAVE

According to Richard Ingersoll, most teachers leave the profession because of "inadequate administrative support, isolated working conditions, poor student discipline, low salaries, and a lack of collective teacher influence over schoolwide decisions" (Haynes, 2014). The departure of minority teachers is probably due to the fact that they are more likely to teach in urban and hard-to-staff schools, which are regularly the schools with the highest turnover rate (Ingersoll, 2011). And indeed, minority teachers cite job dissatisfaction more often than white teachers as their reason for leaving.

A 2012 survey by Metlife shows that overall teacher job satisfaction has decreased 23 percentage points since 2008 and half of teachers report feeling very stressed multiple times a week, compared to only 36 percent of teachers in 1985. These numbers coincide with budget decreases among schools and the rise of the standardized testing movement. Teachers further report higher stress levels due to the numbers of low-income and below-grade level students (Metlife, 2012). First year salaries also have a significant impact on teacher retention. Nearly all new teachers (97 percent) earning a salary of \$40,000 or more came back to teach a second year compared with 87 percent whose first-year salaries were \$40,000 or less (Gray & Taie, 2015).

Sources of dissatisfaction for outgoing teachers (in percentages)



SOURCE: Ingersoll, R. , original analyses of 2012-13 Teacher Followup Survey

Interestingly, minority teachers are more likely to move to a different urban school or leave the profession than white teachers who generally move away from urban schools. However, teachers overall tend to move to schools where students have higher achievement, a smaller fraction of students are African American, and less students are from low-income families (NCES, 2014).

Keep in mind that attrition is not always a bad thing. Researchers at the National Center for Analysis of Longitudinal Data in Education Research found that effective teachers are more likely to stay in their jobs than their less effective colleagues (Cowan, 2015). Indeed among beginning teachers who left the profession, one in five left involuntarily either because they were counseled out or their contracts were not renewed (Gray & Taie, 2015).

LEADERSHIP IS KEY

Leadership at the school level is an essential ingredient in teacher retention. Effective principals set a tone in the building that encourages professional collaboration and continuous improvement. They are able to recruit and develop effective teachers, and when all else fails, remove ineffective individuals from the classroom.

However, a 2012 report from the New Teacher Project (TNTP) finds that, on average, school leaders simply do not have the authority or strategies to create such an environment. Three-quarters of highly effective teachers who left a school reported that they would have stayed if their main reason for leaving had been addressed. Two-thirds of the top-performing teachers reported that no one encouraged them to stay at the school for another year.

BEST PRACTICES IN TEACHER RETENTION

The TNTP report lists eight low cost retention strategies that schools can begin to implement immediately. They find that highly effective teachers who experience two or more of these strategies plan to remain in their schools twice as long as those who did not:

- Provide regular, positive feedback to teachers
- Help teachers identify areas of development
- Give informal critical feedback about performance
- Recognize accomplishments publically
- Inform teachers when they are highly effective
- Provide opportunities for teacher leadership roles
- Give important responsibilities or opportunities to lead projects
- Provide access to additional classroom resources (TNTP, 2012)

None of these strategies is particularly challenging or costly but it can help retain teachers and improve the working culture of the school. In order for this to happen, however, principals must be trained and held accountable for the morale and attrition rates within their schools.

NEW TEACHER INDUCTION

Beginning teachers require even more support in their early years. Providing novices the benefit of strong mentors increases the likelihood they will be better teachers and stay in the profession (Gray & Taie, 2015). The New Teacher Center has identified the necessary characteristics of an effective induction program:

- Develop a rigorous process for selecting mentors and provide them with ongoing support in that role
- Dedicate at least 1.25 – 2.5 hours each week for mentor-teacher interactions
- Maintain mentoring for at least two years
- Observe professional standards guided by content-area standards and data-driven conversation
- Clear roles for administrators and collaboration with all stakeholders (New Teacher Center, 2016). ■

MOVEMENT ACROSS STATE LINES

The supply of teachers is not uniform across the country. While some states are experiencing serious shortages, others are producing an abundance.

Economic principles would suggest that employees looking for work would move from an area with a surplus to an area of scarcity. Yet many more teachers move to another district within the same state than move to another state, even when they live on a state border (Goldhaber, Grout, Holden, & Brown, 2015). Part of the problem is that states don't make it easy for teachers to move across state lines. The three main barriers are:

1. Teaching Licensures often are not transferrable across states (initial licenses more commonly than professional). Getting re-licensed in another state can be complicated and places a burden on the teacher. The result is that teachers are less likely to move or for teachers to stay in the profession if they have relocated to another state.
2. Pension plans are also not easily transferrable across states. Teachers also can lose time vested when they transfer to another system which costs them money in the long-term.
3. Collective Bargaining Agreements among teacher unions generally hold many privileges for seniority, which generally does not transfer across state lines. Teachers may be discouraged from taking out-of-state positions due to potential job insecurity.

A VIEW FROM THE STATES

After providing a national view of whether we are in the midst of a teacher shortage problem, we now examine the issue at the state level where different policies, teacher prep programs and demographic shifts, among other factors, create the unique challenges that each of these four states face in recruiting and retaining teachers.

CALIFORNIA

POST-RECESSION FALL OUT

From the diet and exercise industry to the high tech boom, California lives up to its reputation as a harbinger state.

Is it any wonder then that California, a state where trends frequently begin, should not only suffer one of the most acute cases of teacher shortages in the nation but embody everything that could go possibly wrong within the basic market principles of supply and demand?

To start, the demand is high. While California was not the first state to adopt policies limiting the size of classrooms--- a major driver of demand--- its version is arguably the largest class size reduction program ever undertaken. Enacted in 1996, the law provided every district extra per-pupil funding if they kept K-3 classrooms to 20 students or less. Funded by revenue from the dot-com boom, the program was modeled after the Tennessee STAR experiment, which in actuality differed in many ways. Most notably it examined and found positive evidence for classrooms of 15 students or less.

Regardless of the hasty and uneven implementation, teachers and parents alike held favorable views of the program in California. Still, strong public approval couldn't protect class sizes from the Great Recession. After one-time funding through the federal Recovery Act ran out, school districts had no choice but to trim staff and lose out on the state subsidy as class sizes inched up. At the height of the recession, many districts were reporting class sizes of 30 and more at the elementary level.

Then the economy began to pick up, and in 2013, Gov. Jerry Brown signed into law a new school finance formula, which among other things revived the class size reduction program. School districts will have until 2021, when full funding is available, to get their average K-3 class size down to 24 students or fewer, which would

make them eligible for an additional \$712 per pupil. Districts are almost universally eager to jump at the chance of bringing back a popular program, even if research has been inconclusive on its effectiveness.

Buoyed by additional state funding, districts are embarking on a hiring craze, and are coming up empty. A report released in January by the Learning Policy Institute, found nearly 4,000 open teaching positions still listed on EdJoin, the statewide educator job portal, two months into the 2015-2016 school year.

Analysts from a broad spectrum of backgrounds and think tanks are predicting a sizeable gap between the number of teachers California produces and the number it needs to bring class sizes back down to pre-Recession levels. According to California's Legislative Analyst's Office, the desire for smaller class sizes has created the need for an additional 11,300 teachers. The Learning Policy Institute's estimate is more dire: to return to pre-Recession ratios of 19.8 students per teacher, California teachers would need to hire some 60,000 teachers, a good 20 percent of its current teaching force.

Unfortunately, the latest annual report from the California Commission on Teacher Credentialing shows the number of initial teaching credentials issued declining for the 10th consecutive year and the overall number of candidates enrolled in teacher preparation programs declining for the 12th consecutive year.

During what seems like cyclical patterns of teacher supply and demand mismatch, California has relied on alternative paths to get individuals into the teaching profession. And it seems like districts are returning to those strategies.

The number of provisional and short-term permits issued in 2014-15 grew three-fold to 2,400 from about 850 just two years earlier. The California Teacher Corps, a non-profit launched in 2009 to address teacher shortages in the state, is perhaps one of the biggest drivers of the alternative certification route having committed itself to placing 100,000 highly qualified teachers in the classroom by 2020.

At the local level, districts are getting equally creative at recruiting teachers, with some offering signing bonuses, housing incentives and even carpooling. Most notably, school systems are looking elsewhere for faculty, with 24 percent of all preliminary credentials issued in 2014-15 for individuals who came from out-of-state credentialing programs.

For a state as large and complex as California, tackling the teacher shortage problem will require a multi-faceted approach that includes all parties, from prospective student to state lawmaker, and addresses each phase of the teacher pipeline, from teacher preparation to retention. Anything less, will only exacerbate the resource inequities that exist between the affluent and poor communities.

INDIANA

A MICROCOSM OF THE NATIONAL PICTURE

Perhaps no other state embodies the nuances of the teacher shortage debate better than Indiana. The data is inconclusive, hiring difficulties aren't experienced uniformly, and stakeholders have differing views of the underlying causes and how to address them.

Indiana is a seeming newcomer to the growing list of states reporting problems filling teacher vacancies. First there was a high volume of recent news accounts chronicling districts' challenges in finding enough applicants which was then followed by a flurry of task forces commissioned to study the issue.

Naturally, each came to their own conclusion.

In a report released last October, Ball State University's Center for Business and Economic Research declared that data did not support the finding that there was an undersupply of teachers in the state. Rather the authors

contend that falling completion rates at state teacher preparation programs -- a 37 percent drop from 2004 to 2014 -- was actually a market correction from the glut of teaching degrees conferred in previous eras.

Complicating matters, college enrollment data does not include alternative preparation programs like Teach for America or account for relatively new changes to the way data on teacher preparation programs are collected and reported by the state and federal departments of education.

Some reports, for instance, counted the number of licenses issued rather than the number of people certified which ignores the fact that teachers can and often do earn certifications in multiple subjects. Also noteworthy: state education departments issue licenses to other educators besides classroom teachers, yet this distinction hasn't always been made in reports.

Indeed, drawing conclusions from aggregate data can be dangerous, which is why Ball State researchers stopped short of declaring that the problem didn't exist for some districts.

But where does the problem exist and why?

Research has shown -- and the same holds true in Indiana -- that urban, rural and high poverty schools typically have a harder time attracting and keeping teachers. Vacancies are also high for specialized subjects like math, science and special education, where burn out and job market competition is higher.

Incidentally, state data does show that between 2012-2013 and 2013-2014, about 80 percent of Indiana teachers returned to the same school which, put another way, means 20 percent did not. It's a dramatic hike from the 2008-2009 school year, when a state-by-state analysis by the Alliance for Excellent Education found Indiana had a 7 percent attrition rate.

What accounts for the higher turnover, which is higher than in other professions like nursing, law and engineering? Answering this and other questions was the reason Indiana State Superintendent Glenda Ritz convened a Blue Ribbon commission last fall.

Comprised mainly of K-12 and higher education officials, the 49 member task force cited lack of apprentice, mentoring and induction opportunities as root causes of an apparent dwindling interest in the profession. In close second, however, were a perceived loss of professionalism and positive messaging around teaching.

"The biggest problem not mentioned is the climate for public education," East Porter Schools Superintendent Rod Gardin told the Chicago Tribune. "There's continued bashing from the legislature and from what we perceive as little support from the DOE (Department of Education)."

Like many states, Indiana lawmakers have instituted a series of reforms to its education system over the last decade or so, adopting changes to its school finance formula, placing limits on union bargaining power and rapidly expanding school choice. On this last part, state funding for charter schools and voucher programs grew by \$920 million but decreased by \$3 billion for traditional schools between fiscal year 2009 and 2015.

"I believe this [data] show a dramatic drop in education funding and a shift of emphasis and funds from the 94 percent of our students in traditional schools," remarked Rep. Ed Delaney, who co-chaired the General Assembly's interim study committee on education. "I believe that the public and especially aspiring teachers sense this shift. They have reacted."

How state policymakers and institutions react, however, is also of equal importance.

"I don't think any of us have all the answers -- I don't even think we have all the data we need to make logical suggestions about what the problem is and how we're going to fix it," Rep. Bob Behning, who co-chairs the

interim study committee with Delaney, told Indiana Public Media. “But I think there are some things that we probably can tweak with.” Indeed, the state recently took some initial steps by passing legislation that among other things will make it easier to license teachers from out of state, and offer differential pay in order to attract teachers for Advanced Placement courses.

NORTH CAROLINA

FUNDING CUTS HURTING SUPPLY

North Carolina teacher turnover is currently at a five-year high. “Since 2010, the number of teachers leaving because they are ‘dissatisfied with teaching’ or to make a career change has nearly doubled, and the number of those leaving to teach in other states has more than tripled,” according to the Public School Forum of North Carolina, a nonpartisan think tank in Raleigh.

The statewide turnover rate last year was 14.8 percent, a 33 percent increase in five years. The severity of the shortage is best seen in 18 central districts that began the 2015-16 school year with over 400 teaching vacancies, almost half of which were in the generally easy-to-staff areas of elementary school, in addition to math, and science.

Funding is at the root of much of the shortage crisis. North Carolina is 43rd in the nation in per-pupil spending and teacher salaries are among the lowest. A recent increase in a first-year teacher salary has brought it up to \$35,000 a year. A 20-year veteran teacher will only make \$46,500. New policies have also stagnated teacher salaries so that pay increases only occur every five years, and cost of living adjustments haven’t been made since 2008. Pay increases for master’s degrees have been eliminated and there are talks to end tenure as well. An increasing number of North Carolina teachers are moving across the border into South Carolina or Virginia where teacher salaries are significantly higher and there is more stability. The state’s legislature has approved tax cuts among the populace to the chagrin of many in the education field who see this as a sign that no additional funding is coming their way.

Currently, 25 percent of North Carolina’s teaching force has less than five years of experience. Despite the proven impact of new teacher induction programs on teacher retention, funding for North Carolina’s mentoring program has been cut which increases the likelihood for high turnover rates.

On top of high teacher attrition, North Carolina is churning out a low supply of new teachers. Enrollment for in-state teacher preparation programs is continually dropping. Making matters worse, state lawmakers recently eliminated funding for the North Carolina Teaching Fellows Program which had enticed high school students into the profession by offering competitive scholarships to college. The high demand is forcing districts to look out-of-state for teachers. But the state’s salary and funding policies aren’t making it easy.

OKLAHOMA

LOW SALARIES CAN’T COMPETE

Oklahoma is in the midst of a historic teacher shortage with no signs of relief. The state started the 2015-2016 school year about 1,000 teachers short, even after districts cut 600 teacher positions. The state has issued a record number of emergency teaching certificates, leaving more than 35,000 students in classrooms without a qualified teacher.

Like many states suffering from teacher shortages, the Great Recession didn’t leave Oklahoma schools unscathed. During the subsequent economic recovery, Oklahoma missed an opportunity to return to its previous level of financial support for schools.

Public school enrollment has been on the rise. Meanwhile, state funding for public education is less in 2016 than it was in 2008. As the state's per-student investment has slipped, districts are increasingly reliant on local funding.

The bottom line of the inadequate investment is a devastating impact on Oklahoma's teacher labor market. Oklahoma has long lagged in national rankings of average teacher salaries. A typical teacher with five years of experience and a bachelor's degree makes \$34,000. In fact, when adjusted for inflation, teachers in Oklahoma make less today than they did nine years ago.

Oklahoma has recruitment and retention challenges. Between 2005–06 and 2013–14, completion rates at educator preparation-programs in the state dropped 24 percent and that's expected to keep dropping. Most students who attend Oklahoma colleges and study education typically don't stick around the state or profession after graduation.

What the teacher shortage has made glaringly obvious is that Oklahoma needn't worry about competing with other states throughout the country; Oklahoma can't even compete with its own private sector or the teacher labor market in neighboring states.

Between 2010 and 2015, more Oklahoma educators left the profession than joined it, according to a study commissioned by Oklahoma lawmakers. Even districts in Oklahoma's most affluent and academically successful communities have been forced to seek emergency certifications to fill open teaching positions.

Texas is easily Oklahoma's biggest competitor in the teacher labor market. A 2015 study from the Oklahoma State School Boards Association and the Oklahoma Business and Education Coalition found that Oklahoma teacher salaries are about 16 percent lower than in Texas and that Texas is much more successful at retaining teachers. Oklahoma has significant turnover among novice teachers, and low-income schools have the most difficult time finding experienced teachers (Hendricks, 2015).

Despite much talk at the legislative level about the need for teacher pay raises, there's been little action. Efforts aimed at gaining voter support for a penny sales tax dedicated to public education are under way and the question is expected to appear on a November 2016 statewide ballot. The single largest share of the anticipated sales tax revenue would underwrite \$5,000 teacher pay raises.

Schools lost \$109 million in 2016 due to an economic downturn, making the need for a dedicated revenue stream even more critical.

From stipends to computers, school districts are doing everything they can on their own to lure teachers to their campuses. Increasingly, however, they are forced to do what Millwood Public Schools in central Oklahoma had to do.

"We've actually closed positions due to our inability to fill them," Millwood Superintendent Cecilia Robinson-Woods told the Oklahoman newspaper of her decision to eliminate hard-to-fill classes like drama and computer tech. "Rather than continuing to carry a teacher vacancy and expose children to teachers who weren't really equipped to work with them in those areas, we actually closed them."

CLOSING THE LOOP

SCHOOL-COLLEGE COLLABORATION

Teacher shortages are ultimately local. Some states have them while others don't. Even in those lucky states with plenty of teachers, individual districts can have trouble filling positions. State and federal policy can help support a better supply and distribution. But the exact staffing needs will vary as much as communities do from each other. One district may be scrambling to find bilingual teachers for its growing ELL population, for example, whereas the community next door has an older elementary school staff who are retiring in greater numbers each year.

Which all argues for local planning and action in order to fill immediate gaps as well as to guarantee a steady supply of teachers in the future who have the combination of skills the community needs. School districts cannot do this work alone. Fortunately, there is an excellent chance that school leaders have a natural partner in a nearby college of education.

It's not at all unusual for school districts to hire a large share of its teachers from one or two universities. According to Sharon Robinson, president of the American Association of Colleges of Teacher Education, most teachers, in fact, teach within 30 miles of where they grew up or went to college. Collaboration between the school district and its supplier college of education only makes sense.

Benefits of such a partnership include:

- **Strategic planning.** Districts can apprise universities of positions that are the most challenging for them to fill, for example, high school math teachers or teachers of color. Together the district and COE can develop strategies for recruiting talented candidates to prepare for teaching in these areas of need.
- **Data sharing for continuous improvement.** Districts can provide feedback to the COE about the effectiveness of its teacher graduates. In return, universities can give districts data on their high school graduates who attend their campuses. Remediation and completion rates, in particular, provide valuable information about how well the district is preparing students to undertake college-level work.
- **A setting for clinical practice.** Teacher educators and researchers agree on the importance of supervised classroom experiences in the development of effective teachers. Districts can provide the setting for student teaching, and at the same, acquaint potential future candidates with the culture of the school community.

- **Ongoing professional development.** Teacher surveys consistently find that teachers are more likely to stay in a school that provides a supportive workplace with time for collaboration and professional learning with peers. A school-college partnership provides opportunities for the ongoing exchange of ideas and research between teacher educators and practitioners in which everyone contributes to learning about what works.
- **Grow your own teachers.** Recruitment can begin as early as middle school with programs to encourage students to explore teaching as a career. Scholarship and loan forgiveness programs for these aspiring teachers can provide additional incentives for them to return to their community after graduation. Other “grow your own” programs target paraprofessionals with deep ties to the community. These individuals already have classroom experience but lack the specialized knowledge and licenses. University-based programs designed for fast-tracking participants can elevate an aide to a teacher in as little as 18 to 24 months.

Dr. Robinson says that developing your own people from the school community is also vital to maintaining a steady supply of well qualified teachers who are invested in the school. “If you don’t create your own supply, you are not likely to recruit enough teachers to meet your needs in the future.”

Federal support for school-college partnerships has been provided through Title II of the Higher Education Act. The matching “Teacher Quality Partnerships Grants” are awarded to colleges of education who work with high-need LEAs and/or early education programs to improve teacher preparation. The most recent round of grants in 2014 provided \$35 million in support of 24 new partnerships between universities and high-need school districts. The partnerships are committed to produce more than 11,000 teachers over the next five years. ■

QUESTIONS FOR SCHOOL BOARDS

As we have shown, teacher shortages occur for many reasons. How a district addresses a shortage depends on understanding why it exists, in what areas, and which groups of students are most affected by it. Be aware that actual shortages could be hidden in overall data. For example, your district may report having enough teachers certified in a particular subject area. But that doesn't necessarily mean all of the classes they teach are in their main field.

Consider that in 2012, only 57 percent of high school biology teachers reported teaching all of their classes in their main subject; 12 percent said that less than half of their classes were related to biology (NCES, 2015). We also know that high-poverty high schools are more likely to have classes taught by out-of-field teachers than low-poverty schools (Education Trust, 2010).

School boards have a responsibility to make sure students have access to effective teachers in every class who have the relevant skills for their assignment. This means paying attention to quality as well as quantity. We recommend school boards keep the following questions in mind as they consider the staffing needs in their district:

Do we have enough teachers? How many vacancies do we have? What is the applicant-to-vacancy ratio? Are there particular subjects or specialized areas, such as math or bilingual education, that are harder to staff than others? Are there schools in our district that are harder to staff than others? What are the characteristics of hard-to-staff schools? Does the demographic make up of our staff reflect that of our students?

Are our teachers qualified? Are all teachers licensed in the area of their assignment? Have they come from traditional university programs? Alternate routes? Do we have evidence of the quality of the programs that produce our teacher candidates? Do we have teachers with emergency credentials? How many? Where do they teach and to which groups of students? Do all students have access to qualified teachers?

Are we able to recruit qualified teachers? How do our salaries compare to neighboring districts? to other comparable districts? Can we provide incentives in shortage areas, for example, differential pay, signing bonuses, student loan forgiveness? Do we provide mentoring for new teachers? How effective are our induction programs?

Do we retain qualified teachers? What is our turnover rate? How does it compare to other districts? Do some schools in our district have higher turnover than others? Do teachers feel well supported in their school? Do we provide time and resources for teacher collaboration and learning? Do we provide opportunities for leadership development for principals?

Can we grow our own? Do a significant share of our teachers come from certain universities? Do we have a partnership with these universities? Can we collaborate on recruiting and training qualified candidates in order to maintain a steady supply of good teachers in our schools? ■

BIBLIOGRAPHY

- Adams, P. (2016, January 13). School districts of all sizes experiencing teacher shortages. Peoria Journal Star.
- Almy, S. & Theokas, C. (2010). Not prepared for class: High-poverty schools continue to have fewer in-field teachers. Education Trust. Retrieved from <https://edtrust.org/resource/not-prepared-for-class-high-poverty-schools-continue-to-have-fewer-in-field-teachers/>
- American Association of Colleges for Teacher Education. (2013). The changing teacher preparation profession. Retrieved from <https://aacte.org/news-room/13-press-releases-statements/145-aacte-releases-first-national-data-report-on-teacher-preparation-profession>
- Associated Press. (2015, December 21). Teacher shortage has schools in 'crisis mode.' Seattle Times.
- Berry, B. with Rasberry and Williams. (2007). Recruiting and retaining quality teachers for high-needs schools, Center for Teaching Quality and National Education Association.
- Bland, P., Church & Mingchu. (2014). Strategies for attracting and retaining teachers, Administration Issues Journal. Vol. 4, Issue 1.
- Boser, U. (2014). Teacher Diversity Revisited, Center for American Progress.
- Brown, E. (2015, April 20). Study: Far fewer new teachers are leaving the profession than previously thought. Washington Post.
- Center for Public Education. (2005). Teacher quality and student achievement. Retrieved from <http://www.centerforpubliceducation.org/Main-Menu/Staffingstudents/Teacher-quality-and-student-achievement-At-a-glance/Teacher-quality-and-student-achievement-Research-review.html>
- Center for Public Education (2008) Wanted: Good teachers.
- Cowan, J., Goldhaber, D., Hayes, K. & Theobald, R.. 2015. "Missing Elements in the Discussion of Teacher Shortages. Washington, DC: American Institutes for Research." CALDER Explainers. Accessed January 2016. <http://www.caldercenter.org/missing-elements-discussion-teacher-shortages>.
- Darling-Hammond, L., Furger, R., Shields, P. & Sutchter, L. (2016). Addressing California's Emerging Teacher Shortage: An Analysis of Sources and Solutions. Retrieved from Learning Policy Institute: www.learningpolicyinstitute.org/addressing-ca-teacher-shortage
- DeMonte, J. (2016). The Leaky Pipeline: Why Don't New Teachers Teach? Retrieved from <http://educationpolicy.air.org/blog/leaky-pipeline-why-dont-new-teachers-teach>.
- Egalite, A. J., Kisida, B. & Winters, M.A. (2015). Representation in the classroom: The effect of own-race teachers on student achievement. Economics of Education Review, (45), 44-52.
- Goldhaber, D. (2015). "Research vs. Conventional Wisdom I: Teacher Attrition." American Institutes of Research. August 10, 2015. Accessed January 2016. <http://www.air.org/resource/research-vs-conventional-wisdom-i-teacher-attrition>.
- Goldhaber, D., Grout, C., Holden, K., & Brown, N. (2015). Cross-State Mobility of the Teacher Workforce: A Descriptive Portrait. CEDR Working Paper 2015-5. University of Washington, Seattle, WA.
- Goldhaber, D. & Walch, J. (2014). Gains in Teacher Quality: Academic capabilities of the U.S. teaching force are on the rise. Education Next, 14(1), 39-45.
- Gray, Lucinda, and Soheyla Taie. 2015. "Public School Teacher Attrition and Mobility in the First Five Years (NCES 2015-337)." National Center for Education Statistics at the U.S. Department of Education. April 2015. Retrieved from <http://nces.ed.gov/pubs2015/2015337.pdf>.
- Haynes, M. (2014). On the Path to Equity: Improving the effectiveness of beginning teachers, Alliance for Excellent Education.
- Hendricks, M. (2015). An empirical analysis of teacher salaries and labor market outcomes in Oklahoma, Oklahoma Business and Education Coalition.

- Hicks, M. (2015). Indiana's demand and supply issues for K-12 educators, Center for Business and Economic Research, Ball State University.
- Hill, J., Stearns, C. & Owens, C. (2015). Education and certification: Qualifications of departmentalized public high school-level teachers of selected subjects, 2011-12. NCES, 2015
- Ingersoll, R. & May, H. (2011). Recruitment, retention and the minority teacher shortage. Consortium for Policy Research in Education. DOI: 10.12698/cpre.2011.rr69
- Ingersoll, R., Merrill, L. & Stuckey, D. (2014). Seven Trends: The Transformation of the Teaching Force. Consortium for Policy Research in Education.
- Ingersoll, R. (2003). "Is There Really a Teacher Shortage?" Center for the Study of Teaching and Policy and The Consortium for Policy Research in Education. Retrieved from <http://depts.washington.edu/ctpmail/PDFs/Shortage-RI-09-2003.pdf>.
- Malkus, N., Mulvaney Hoyer, K. & Sparks, D. (2015). Teaching Vacancies and Difficult-to-Staff Teaching Positions (NCES-065). National Center for Education Statistics at the U.S. Department of Education. Retrieved from <http://nces.ed.gov/pubs2015/2015065.pdf>.
- Melendez Salinas, C. (2016, January 21). California teacher shortage could get worse, report warns. San Jose Mercury News
- MetLife. (2012). The MetLife Survey of the American Teacher. Retrieved from <https://www.metlife.com/assets/cao/foundation/MetLife-Teacher-Survey-2012.pdf>
- National Comprehensive Center for Teacher Quality (2006). Recruiting quality teachers in mathematics, science and special education for urban and rural schools. Retrieved from <http://www.gtcenter.org/sites/default/files/docs/NCCTQRecruitQuality.pdf>
- New Teacher Center. (2016). High Quality Mentoring and Induction Practices.
- Philips, O. (2015, March 30). Revolving Door of Teachers Costs Schools Billions Every Year. Retrieved from <http://www.npr.org/sections/ed/2015/03/30/395322012/the-hidden-costs-of-teacher-turnover>.
- Public School Forum of North Carolina. (2016). Top 10 Education Issues of 2016.
- Reform Support Network (2015). Promoting more equitable access to effective teachers.
- Sawchuk, S. (2014, October 21). "Steep drops seen in teacher-prep enrollment numbers," Education Week.
- South Dakota Department of Education. (2015). Trends in Teacher Preparation and Employment in South Dakota. State of South Dakota Blue Ribbon Task Force.
- TNTP. (2012). The Irreplaceables: Understanding the real retention crisis in America's urban schools.
- U.S. Department of Education, National Center on Education Statistics, (2009-2012). NCES. Web Tables. Beginning K-12 Teacher Characteristics and Preparation by School Type, 2009. Table 4. October 2012.
- U.S. Department of Education, National Center on Education Statistics, (2012). Schools and Staffing Survey, Total number of public school teachers and percentage distribution of school teachers by race/ethnicity and state: 2011-12
- U.S. Department of Education, National Center on Education Statistics (2012). Schools and Staffing Survey, Average class size in public primary schools, middle schools, high schools and schools with combined grades, by classroom type and selected school characteristics: 2011-12
- U.S. Department of Education, National Center on Education Statistics (2014). Digest of Education Statistics Table 208.30. Accessed February 2016.
- U.S. Department of Education, National Center on Education Statistics (2014). Digest of Education Statistics Table 208.20. Accessed February 2016. https://nces.ed.gov/programs/digest/d14/tables/dt14_208.20.asp?current=yes.
- U.S. Department of Education, National Center on Education Statistics (2014). Digest of Education Statistics Table 208. National Center for Education Statistics. Accessed January 2016. https://nces.ed.gov/programs/digest/d14/tables/dt14_208.40.asp.
- . 2015. School and Staffing Survey Data TFS Tables 6 and 1. Accessed January 2016. https://nces.ed.gov/surveys/sass/tables_list.asp.
- U.S. Department of Education, Office for Civil Rights (2014). Civil Rights Data Collection, Data Snapshot: Teacher Equity, Issue Brief No. 4, March 2014.
- U.S. Department of Education, National Center on Education Statistics (2015). Title II Higher Education Act. 2015. Title II Data Tool. Accessed January 2015. <https://title2.ed.gov/Public/DataTools/Tables.aspx>.
- U.S. Department of Education, National Center on Education Statistics (2015). NCES. 2015. Condition of Education, Racial/ethnic enrollment in public schools, 2012.

APPENDICES

APPENDIX A: TEACHER PREP ENROLLMENTS

STATE	2010	2014	2010-14	2010-14
Alabama	9,836	5,922	-3,914	-40%
Alaska	1,331	741	-590	-44%
Arizona	24,056	42,251	18,195	76%
Arkansas	8,255	6,161	-2,094	-25%
California	44,692	19,858	-24,834	-56%
Colorado	9,984	8,460	-1,524	-15%
Connecticut	5,481	3,884	-1,597	-29%
Delaware	3,492	2,858	-634	-18%
District of Columbia	2,275	1,118	-1,157	-51%
Florida	21,111	14,343	-6,768	-32%
Georgia	18,241	11,878	-6,363	-35%
Hawaii	1,513	1,401	-112	-7%
Idaho	8,393	5,833	-2,560	-31%
Illinois	34,184	17,934	-16,250	-48%
Indiana	18,113	8,991	-9,122	-50%
Iowa	9,243	7,885	-1,358	-15%
Kansas	6,996	5,504	-1,492	-21%
Kentucky	8,460	11,208	2,748	32%
Louisiana	10,823	5,420	-5,403	-50%
Maine	2,713	2,002	-711	-26%
Maryland	9,036	8,093	-943	-10%
Massachusetts	15,760	15,578	-182	-1%
Michigan	23,372	14,372	-9,000	-39%
Minnesota	12,172	7,300	-4,872	-40%
Mississippi	4,277	4,166	-111	-3%
Missouri	13,402	10,120	-3,282	-24%
Montana	2,738	2,948	210	8%
Nebraska	6,302	3,474	-2,828	-45%
Nevada	4,638	2,574	-2,064	-45%
New Hampshire	2,276	2,857	581	26%
New Jersey	18,038	12,970	-5,068	-28%
New Mexico	5,464	3,766	-1,698	-31%
New York	74,344	47,872	-26,472	-36%
North Carolina	16,902	13,716	-3,186	-19%
North Dakota	1,843	1,669	-174	-9%
Ohio	28,548	21,607	-6,941	-24%
Oklahoma	23,631	7,887	-15,744	-67%
Oregon	4,203	1,891	-2,312	-55%
Pennsylvania	39,750	23,546	-16,204	-41%
Rhode Island	2,837	2,233	-604	-21%
South Carolina	9,858	5,844	-4,014	-41%
South Dakota	2,461	1,379	-1,082	-44%
Tennessee	12,890	8,993	-3,897	-30%
Texas	62,461	33,767	-28,694	-46%
Utah	5,346	9,616	4,270	80%
Vermont	2,103	1,564	-539	-26%
Virginia	13,548	13,028	-520	-4%
Washington	5,106	5,362	256	5%
West Virginia	4,642	3,551	-1,091	-24%
Wisconsin	12,323	9,563	-2,760	-22%
Wyoming	1,089	1,151	62	6%
U.S.	646,395	442,274	-204,121	-32%

Source: Title II Higher Education Act data, 2015

APPENDIX B: TEACHER PREPARATION COMPLETIONS, BY STATE

STATE	2010	2014	2010 to 2014	
Alaska	235	218	-17	-7%
Arizona	3,212	6,089	2,877	90%
Arkansas	1,959	2,350	391	20%
California	17,407	11,084	-6,323	-36%
Colorado	3,345	2,839	-506	-15%
Connecticut	2,193	1,904	-289	-13%
Delaware	0	746	746	NA
District of Columbia	451	618	167	37%
Florida	9,011	6,846	-2,165	-24%
Georgia	7,205	5,753	-1,452	-20%
Hawaii	628	590	-38	-6%
Idaho	1,332	1,351	19	1%
Illinois	18,121	8,534	-9,587	-53%
Indiana	5,701	4,382	-1,319	-23%
Iowa	2,138	2,649	511	24%
Kansas	1,947	2,065	118	6%
Kentucky	3,789	3,222	-567	-15%
Louisiana	2,604	2,586	-18	-1%
Maine	878	728	-150	-17%
Maryland	2,672	2,784	112	4%
Massachusetts	4,669	4,267	-402	-9%
Michigan	6,159	4,450	-1,709	-28%
Minnesota	4,572	2,927	-1,645	-36%
Mississippi	2,810	2,305	-505	-18%
Missouri	4,572	4,609	37	1%
Montana	697	808	111	16%
Nebraska	1,631	1,804	173	11%
Nevada	1,012	771	-241	-24%
New Hampshire	988	1,074	86	9%
New Jersey	6,608	6,236	-372	-6%
New Mexico	207	1,141	934	451%
New York	26,670	18,046	-8,624	-32%
North Carolina	4,675	5,516	841	18%
North Dakota	662	673	11	2%
Ohio	6,520	6,667	147	2%
Oklahoma	3,087	2,153	-934	-30%
Oregon	2,221	1,672	-549	-25%
Pennsylvania	12,800	10,372	-2,428	-19%
Rhode Island	832	836	4	0%
South Carolina	2,558	2,594	36	1%
South Dakota	733	696	-37	-5%
Tennessee	4,730	4,453	-277	-6%
Texas	28,115	20,828	-7,287	-26%
Utah	2,346	2,693	347	15%
Vermont	567	476	-91	-16%
Virginia	3,434	4,043	609	18%
Washington	2,728	2,428	-300	-11%
West Virginia	1,130	1,192	62	5%
Wisconsin	4,749	3,966	-783	-16%
Wyoming	248	274	26	10%
U.S.	232,543	190,274	-42,269	-18%

Source: Title II Higher Education Act data, 2015

APPENDIX C: AVERAGE SALARIES OF PUBLIC SCHOOL TEACHERS, 2012-13

STATE	SALARY
Alabama	47,949
Alaska	65,468
Arizona	45,264
Arkansas	46,631
California	69,435
Colorado	49,844
Connecticut	69,397
District of Columbia	70,906
Delaware	59,679
Florida	46,598
Georgia	52,880
Hawaii	54,300
Idaho	44,669
Illinois	59,113
Indiana	50,077
Iowa	50,946
Kansas	47,464
Kentucky	50,203
Louisiana	51,381
Maine	48,430
Maryland	64,248
Massachusetts	71,620
Michigan	61,560
Minnesota	56,268
Mississippi	41,814
Missouri	47,517
Montana	48,855
Nebraska	48,842
Nevada	55,957
New Hampshire	55,599
New Jersey	67,447
New Mexico	45,453
New York	75,279
North Carolina	45,737
North Dakota	47,344
Ohio	56,307
Oklahoma	44,373
Oregon	57,600
Pennsylvania	62,994
Rhode Island	63,474
South Carolina	48,375
South Dakota	39,018
Tennessee	47,563
Texas	48,819
Utah	45,543
Vermont	53,735
Virginia	48,988
Washington	52,234
West Virginia	45,453
Wisconsin	53,797
Wyoming	56,775
United States	56,065

Source: National Education Association, *Rankings of the States, 2014*

APPENDIX D: PUPIL/TEACHER RATIOS AND CLASS SIZE BY STATE

STATE	PUPIL/TEACHER RATIO	AVERAGE CLASS SIZE
Alabama	14.4	19.4
Alaska	17.1	21.1
Arizona	22.3	24.5
Arkansas	14.2	20.4
California	23.7	25.4
Colorado	17.7	23.3
Connecticut	12.5	20.1
District of Columbia	12.9	n.d.
Delaware	13.9	21.1
Florida	15.2	n.d.
Georgia	15.6	21.2
Hawaii	15.9	n.d.
Idaho	19.6	25.1
Illinois	15.3	23.5
Indiana	17.4	21.7
Iowa	14.2	20.9
Kansas	11.9	20.7
Kentucky	16	23.7
Louisiana	15.3	19.4
Maine	12.2	17.8
Maryland	14.9	n.d.
Massachusetts	13.5	20.1
Michigan	18.1	25.7
Minnesota	15.8	23.7
Mississippi	15.1	22.1
Missouri	13.9	20.7
Montana	14	20.5
Nebraska	13.7	19
Nevada	21.5	26.1
New Hampshire	12.7	21.2
New Jersey	12.4	19
New Mexico	15.2	20.5
New York	13.1	21.5
North Carolina	15.4	19.8
North Dakota	11.7	19.3
Ohio	16.3	21.8
Oklahoma	16.1	21.1
Oregon	22.2	26.7
Pennsylvania	14.3	22.6
Rhode Island	14.4	n.d.
South Carolina	15.3	19.4
South Dakota	14	21.7
Tennessee	15	17.8
Texas	15.5	18.6
Utah	23	27.6
Vermont	10.7	16.7
Virginia	14.2	20.4
Washington	19.6	23.9
West Virginia	14.1	19.2
Wisconsin	15.2	20.8
Wyoming	12.5	17.4
United States	16	21.6

Sources: NCES: Digest of Education Statistics, Table 208-40, 2014; Schools and Staffing Survey, Table 7, 2011-12

APPENDIX E: STUDENT TEACHING REQUIREMENTS BY STATE, 2015

STATE	AT LEAST 10 WEEKS	LESS THAN 10 WEEKS	REQUIRED, NO LENGTH SPECIFIED	OPTIONAL/NO REQUIREMENT
Alabama	x			
Alaska	x			
Arizona	x			
Arkansas	x			
California				x
Colorado				x
Connecticut	x			
District of Columbia				x
Delaware	x			
Florida			x	
Georgia	x			
Hawaii	x			
Idaho		x		
Illinois			x	
Indiana	x			
Iowa	x			
Kansas	x			
Kentucky	x			
Louisiana		x		
Maine	x			
Maryland				x
Massachusetts	x			
Michigan	x			
Minnesota	x			
Mississippi	x			
Missouri	x			
Montana				x
Nebraska	x			
Nevada		x		
New Hampshire			x	
New Jersey	x			
New Mexico		x		
New York		x		
North Carolina	x			
North Dakota	x			
Ohio	x			
Oklahoma	x			
Oregon		x		
Pennsylvania	x			
Rhode Island	x			
South Carolina	x			
South Dakota	x			
Tennessee	x			
Texas	x			
Utah	x			
Vermont	x			
Virginia		x		
Washington	x			
West Virginia		x		
Wisconsin	x			
Wyoming		x		

Sources: National Council on Teacher Quality, State Policy, Teacher prep/certification, 2015

