



A Coming Crisis in Teaching? *Teacher Supply, Demand, and Shortages in the U.S.*

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Abstract

Recent media reports of teacher shortages across the country are confirmed by the analysis of several national datasets reported in this brief. Shortages are particularly severe in special education, mathematics, science, and bilingual/English learner education, and in locations with lower wages and poorer working conditions. Shortages are projected to grow based on declines in teacher education enrollments, coupled with student enrollment growth, efforts to reduce pupil-teacher ratios, and ongoing high attrition rates.

If attrition were reduced by half to rates comparable to those in high-achieving nations, shortages would largely disappear. We describe evidence-based policies that could:

- create competitive, equitable compensation packages for teachers;
- enhance the supply of qualified teachers for high-need fields and locations;
- improve retention, especially in hard-to-staff schools; and
- develop a national teacher supply market.

The full paper can be found at <https://learningpolicyinstitute.org/product/coming-crisis-teaching>.

Follow the conversation on Twitter at #SolvingTeacherShortages.

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Introduction

As the 2015–16 school year got underway, headlines across the country broadcast severe teacher shortages:

“Nevada needs teachers, and it’s shelling out \$5 million to get them.”¹

“First marking period in Philly ends with many teacher shortages.”²

“[San Francisco] Principals say state teacher shortage now a crisis.”³

“Why Oklahoma is racing to put nearly 1,000 uncertified teachers in its classrooms.”⁴

These headlines were among the more than 330 articles covering teacher shortages between June 22 and November 22, 2015. There were only 24 such articles during the same time period two years earlier.⁵

Many of the advertised shortfalls have been in mathematics and science. In the majority of states, there are also shortages of bilingual education teachers and others who teach new English learners. Special education is seeing the greatest shortages of all. Forty-eight states plus the District of Columbia have identified shortages of teachers in special education and related services: Half of all schools and 90% of high-poverty schools are struggling to find qualified special education teachers.⁶ As these statistics suggest, teacher shortages often have a disproportionate effect on the most disadvantaged students. One *Washington Post* headline warned: “High-poverty schools often staffed by rotating cast of substitutes.”⁷

These shortfalls mark a dramatic change from the years of teacher layoffs that occurred during the economic recession of 2008 and the several years that followed. In those years, tens of thousands of pink slips were handed out each spring informing teachers they would not be needed the following school year.⁸ State austerity measures resulted in eliminating support staff, reducing the number of new teacher hires, and increasing class sizes.⁹ The recession left the public accustomed to a surplus of teachers, with policies aligned to this reality.

However, as the economy improved and money began to come back into the system, districts have begun to hire again. Teacher demand has rapidly increased as schools have begun to lower pupil-teacher ratios, and reinstate classes and programs that were reduced or eliminated in the Great Recession. This hiring increase comes at a time when teacher

attrition is high, and as teacher preparation program enrollments have fallen 35% nationwide in the last five years, a decrease of close to 240,000 teachers in total.¹⁰

Tens of thousands of teachers were hired in the fall of 2015 on emergency or temporary credentials to meet these needs, and the same pattern has emerged as schools opened in 2016. In addition to hiring individuals who are not prepared to teach, districts and schools facing shortages have a small number of undesirable options: They can increase class sizes, cancel classes, use short-term substitutes, or assign teachers from other fields to fill vacancies. All of these stopgap solutions undermine the quality of education, especially for the students who most need effective schools.

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Has the United States moved into an era of teacher shortages? If so, how large is the gap between supply and demand? Where and in what fields are they most severe? Will they persist? Most important, what can be done to prevent and mitigate the negative effects of such a teacher shortage?

This brief describes the findings of a report that examined the current indicators of a national teacher shortage and used several national data sources to model supply and demand in the coming years.¹¹ The report also reviews research and makes recommendations about policies that could help create a sustainable supply of well-prepared teachers in the subjects and states where they are needed.

The Nature of Current Shortages

A shortage is typically defined as the inability to fill vacancies at current wages with individuals qualified to teach in the fields needed. Using this definition, some states are clearly experiencing high rates of shortages. For example:

- In California, the number of emergency and temporary permits has tripled in the last three years. In 2014–15, fully 7,700, or just over one-third of the credentials and permits issued that year, went to teachers who were not fully prepared for their teaching assignments.¹²
- In Arizona, 62% of school districts had unfilled teaching positions three months into the school year in 2013–14.¹³ In the same school year, close to 1,000 teachers were on substitute credentials—a 29% increase from the previous year.¹⁴ With one of the highest turnover rates of any state and 24% of the teacher workforce eligible to retire by the end of 2018, the outlook for Arizona’s future points to continued shortages.¹⁵
- In Oklahoma, imbalances in supply and demand in the southern half of the state have led to a tenfold increase in the number of emergency credentials issued to underprepared teachers, from 98 in 2010–11 to more than 900 by 2015–16.¹⁶

Certain fields are also experiencing significant shortages. In 2015–16, 48 states identified special education as a shortage area in their reports to the U.S. Department of Education. In addition, 42 states reported shortages in mathematics, and 40 states reported shortages in science. More than 30 states identified high levels of shortage for teachers of English learners.¹⁷ The District of Columbia reported shortages in these areas as well.

These shortages have been emerging as teacher education enrollments have taken a deep dive, while demand for teachers has begun to climb, largely due to district efforts to return to pre-recession staffing levels.

Why Is There a Growing Teacher Shortage?

Teacher demand is growing. If current trends continue, we will see about a 20% increase in annual teacher demand from 2015 levels, reaching 316,000 teachers per year by 2025.

- **Student enrollments** are projected to grow by 3 million (to 53 million total) in the next decade, driven by higher birth rates and immigration.
- **Pupil-teacher ratios** are projected to shrink from about 16 to 1 to pre-recession levels (about 15.3 to 1), requiring an additional 145,000 teachers by 2025.
- **Teacher attrition** remains high, at 8% annually. Two-thirds of leavers depart before retirement age, most because of dissatisfaction with aspects of their teaching conditions.

Teacher supply is shrinking. If current trends continue, we would see as few as 200,000 available teacher hires each year by 2025, resulting in a gap of more than 100,000 teachers annually.

- There are **fewer new entrants**, with teacher preparation enrollments having dropped by 35% and teacher preparation graduates having dropped by 23% between 2009 and 2014.
- Although **re-entrants** who are former teachers typically comprise one-third to one-half of hires in a given year, the number willing to return is currently not enough to make up the difference.

In addition, student enrollments are beginning to climb again, and teacher attrition remains at a high level: At 8% annually, it is about twice as high as teacher attrition rates in countries like Finland and Singapore, as well as in neighbors like Ontario, Canada. Under the current conditions, shortages are likely to grow worse before they improve.

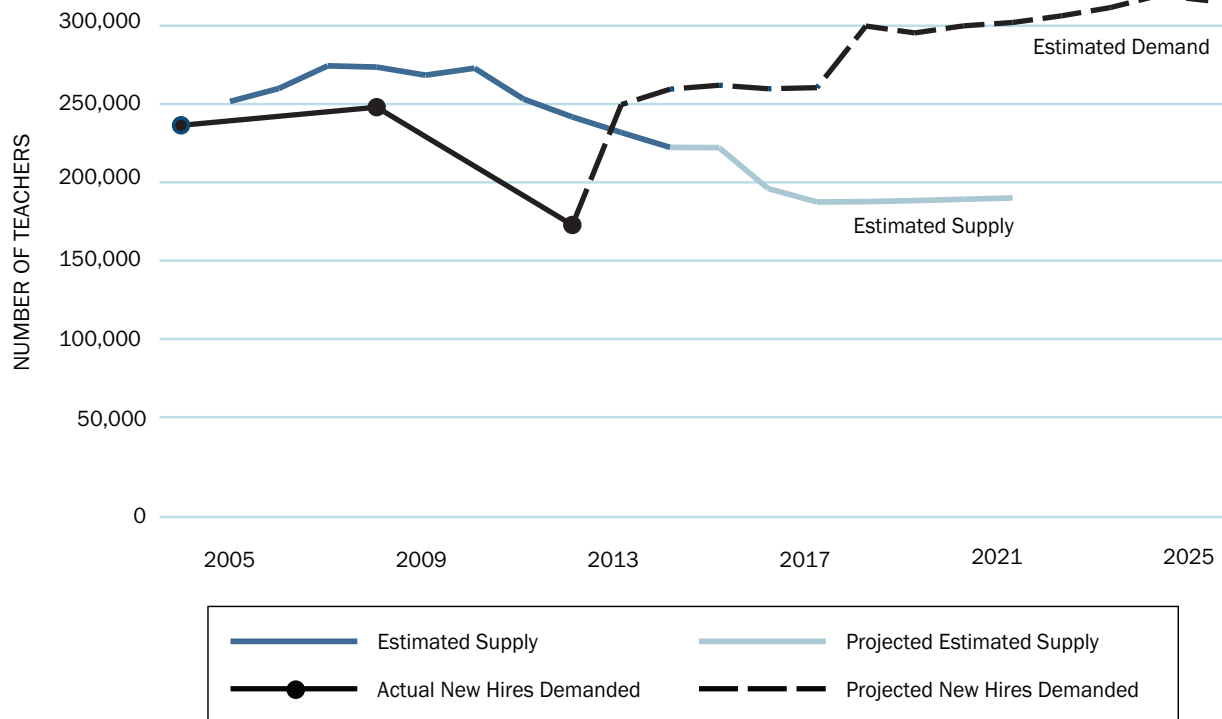
As Figure 1 shows, the relative balance in supply and demand that occurred in the early 2000s turned into a surplus in 2010 through 2012, when school budgets declined and teachers were being laid off. By 2014, however, as the economy recovered, demand began to rise and then took a steep upward turn in 2015, while supply continued to remain low and declined further. During this period, the teacher labor market moved into a shortage condition.

Currently, there are not enough qualified teachers applying for teaching jobs to meet the demand in all locations and fields. We estimate that the shortage during the 2015–16 school year was approximately 60,000 teachers. This is the rough number of positions that were not filled at all or were filled by people not qualified for that teaching assignment. This estimate is in the same ballpark as state reports of the numbers of substitutes and underprepared teachers hired when qualified applicants could not be found.

If supply trends were to persist at these current lows, by 2018, the annual shortfall could grow to 112,000 teachers. Although some increase in the number of individuals entering teaching is expected in response to greater demand, even if the supply reaches pre-recession levels of 260,000 teachers a year, demand would still outstrip supply by about 40,000 teachers. Furthermore, the perennial areas of acute shortages (mathematics, science, special education, and bilingual education) thus far show little sign of response to labor market demand.¹⁸

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Figure 1. Projected Teacher Supply and Demand



Note: The supply line represents the midpoints of our upper and lower bound teacher supply estimates (see Figure 10 in the report for full analysis).
 Source: U.S. Department of Education, multiple databases (see Appendix A in full report).

The Importance of Teacher Attrition

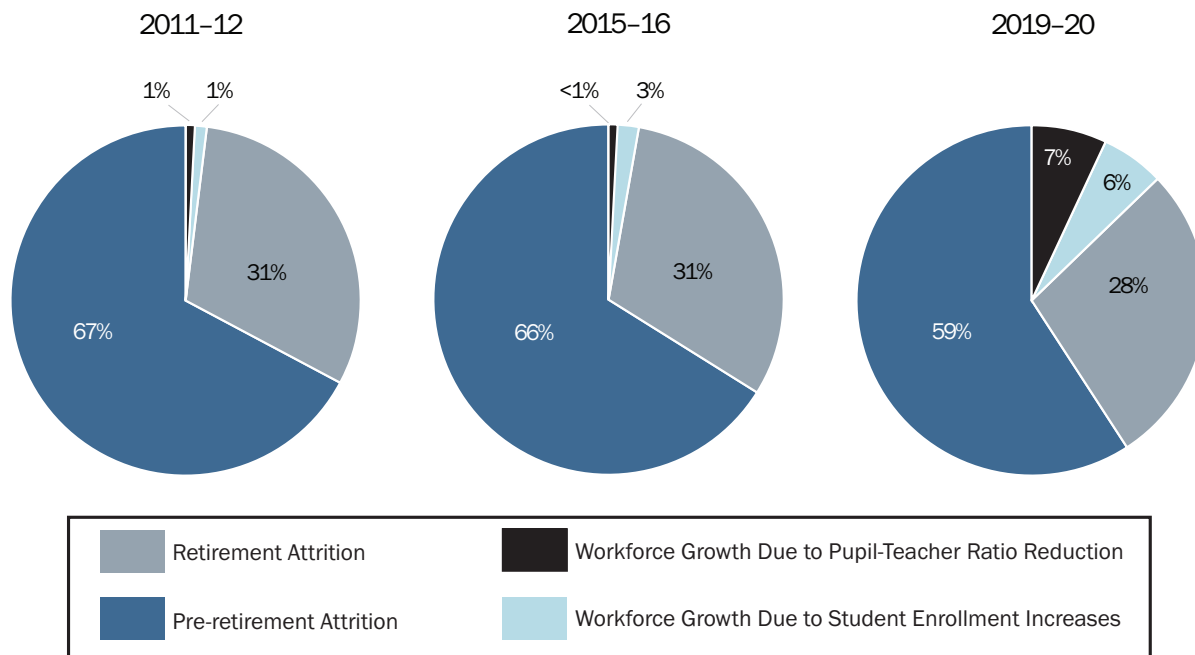
Although policymakers often focus on how to recruit more teachers when there are shortages, keeping existing teachers is at least as important. As Figure 2 shows, the lion’s share of the demand for teachers is caused by attrition. In recent years, it has accounted for more than 95% of demand, and in the years to come, attrition will continue to account for at least 85% of annual demand, if it remains at the current levels.

Only about one-third of teacher attrition is due to retirement. Pre-retirement attrition accounts for the largest share of turnover—and most of the teachers who leave before retirement list dissatisfactions with teaching conditions as their major reasons. The good news is that the problems they identify may be amenable to policy solutions.

National data indicate that the public school teacher attrition rate of 7.68% in 2012 represented a loss of 238,000 teachers in that year,¹⁹ virtually the entire demand for the following school year. If the attrition rate could be reduced from the current rate of 8% to 4%, closer to where it is in some other countries,²⁰ U.S. hiring needs would decrease by around 130,000 teachers annually, cutting annual demand by nearly half. This large reduction would virtually eliminate teacher shortages and allow for increased selectivity in hiring, which could, in turn, boost the quality of teachers in the nation’s classrooms.

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Figure 2. Components of Teacher Demand



Source: U.S. Department of Education, multiple databases (see Appendix A in full report).

Reducing attrition would also significantly reduce the substantial costs for replacing teachers who leave. A decade ago, these costs—estimated to reach up to \$18,000 per teacher in an urban district—produced an estimated national price tag of over \$7 billion a year.²¹ With inflation, these costs would be more than \$8 billion today. A comprehensive approach to reducing attrition would both lessen the demand for teacher hiring and save money that could be better spent on mentoring and other strategies to improve instruction.

In addition, attrition can impose very large educational costs on some schools. High teacher turnover negatively affects student achievement,²² and the detrimental effects extend to all of the students in a school, not just those students in a new teacher’s classroom. A vicious cycle is often created in hard-to-staff schools, as these schools typically end up with a disproportionate number of relatively inexperienced teachers, who typically leave at much higher rates than other teachers. In times of shortage, many of these teachers are typically also underprepared, which puts them at greater risk of leaving in comparison to teachers who are fully prepared.²³

The resulting churn undermines student achievement as a function of teacher inexperience, underpreparation, and overall instability. Schools suffer from diminished collegial relationships, a lack of institutional knowledge, and the expense of training new teachers who, oftentimes, will not stay. Research shows that stability, coupled with shared planning and collaboration, helps teachers to improve their effectiveness,²⁴ and that teachers improve more rapidly in supportive and collegial working environments.²⁵ High teacher turnover undermines these benefits, which are the product of shared knowledge and collaboration among colleagues.

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Why Teachers Enter and Leave

Researchers find four major factors that influence teacher recruitment and retention:

- 1. Compensation**—Research finds that individuals are more likely to choose to become teachers when teacher salaries are competitive with those of other occupations.²⁶ Salaries also influence teacher attrition: Both beginning and veteran teachers are more likely to quit when they work in districts with lower wages and when their salaries are low relative to alternative wage opportunities, especially in high-demand fields like mathematics and science.²⁷ Teachers' salaries, however, have been declining since the 1990s and now amount to only about 70% of the salaries of other college-educated workers. A recent study found that in a number of states teachers with 10 years of experience made less than unskilled workers.²⁸ In 30 states, mid-career teachers who head families of four or more qualify for three or more public benefit programs, such as subsidized children's health insurance or free or reduced-price school meals.
- 2. Preparation**—A growing body of evidence indicates that attrition is unusually high for those who lack preparation for teaching.²⁹ Several studies have found that teachers who receive little pedagogical training are two to three times more likely to leave teaching after their first year than teachers who had received a comprehensive preparation.³⁰ A key issue, however, is how candidates can afford adequate preparation—especially when they may have had to go into debt to prepare to enter a profession that earns less than others. Research shows that the more debt college students incur, the less likely they are to choose to work in a lower wage profession like teaching. The influence of debt on job choice is “most notable on the propensity to work in the education industry.”³¹
- 3. Mentoring and Induction**—Well-designed mentoring programs improve retention rates for new teachers, as well as their attitudes, feelings of efficacy, and instructional skills.³² The keys to success include having a mentor teacher in the same subject area, common planning time with teachers in the same subject, and regularly scheduled collaboration with other teachers. Beginning teachers' practice is enhanced further when their mentors also receive formal training and are released from some of their own classroom duties to provide one-to-one observation and coaching in the classroom, so they can demonstrate effective methods and help new teachers solve problems of practice.³³
- 4. Teaching Conditions**—Surveys of teachers have long shown that teaching conditions play a major role in teachers' decisions to change schools or leave the profession. The relatively poor teaching conditions in many high-poverty schools are a major reason why teachers in these schools are more than twice as likely to leave due to dissatisfaction as those in low-poverty schools.³⁴ Beyond resources, teachers' plans to stay in teaching and their reasons for actually having left are strongly associated with how they feel about administrative support, collegial opportunities, and teacher input into decision-making. When these elements are present, retaining teachers is much easier.

Of teachers who left in the year after 2012, only 13% said the most important factor for their departure was retirement. Fifty-five percent reported areas of dissatisfaction as important reasons for leaving. These range from teaching conditions, such as class sizes and salaries, to unhappiness with administrative practices (such as lack of support, classroom autonomy, or input on decisions) to policy issues, such as the effects of testing and accountability. Accountability pressures focused on test preparation and leading to sanctions comprised the most frequently cited area of dissatisfaction, listed by 25% of teachers who left.³⁵

Rates of leaving are higher for certain categories of teachers:

- New teachers leave at rates of somewhere between 19% and 30% over their first five years of teaching.³⁶ These rates are higher when novices do not get high-quality mentoring in their early years.³⁷
- Teachers with little or no preparation are more than twice as likely to leave teaching as those who are fully prepared.³⁸
- Mathematics and science teachers change schools and leave teaching at higher rates than humanities teachers and general elementary teachers. Special education teachers and teachers of English language learners leave and move at even higher rates.³⁹
- Teachers in Title I schools leave at rates nearly 50% greater than those of teachers in non-Title I schools.⁴⁰
- Teachers of color have higher turnover rates, as do teachers working in high-poverty, high-minority schools. More than three-quarters of teachers of color work in these schools, which are often under-resourced and plagued by poor working conditions.
- Teachers in the South are more likely to leave than those in other regions. Southern and Midwestern cities have the highest rates of teacher turnover, followed by Southern suburbs, towns, and rural areas. The higher spending Northeast averages the lowest turnover rates across all district types.

Researchers have identified a number of workplace conditions associated with teachers' decisions to stay or leave, including the quality of instructional leadership, school culture, collegial relationships, time for collaboration and planning, teachers' decision-making power, experiences with professional development, facilities, parental support, and resources.⁴¹

Policy Recommendations

Many policy decisions can be considered to relieve teacher shortages. These are generally aimed either at increasing the attractions to teaching or lowering the standards to become a teacher. Short-term solutions may temporarily curb the fear of empty classrooms, but they can often exacerbate the problem over the long haul. For example, if teachers are hired without having been fully prepared, the much higher turnover rates that result are costly in terms of both dollars spent on the replacement process and decreases in student achievement in high-turnover schools. Long-term solutions focusing on recruitment and retention can ease shortages, while also prioritizing student learning and a strong teacher workforce. To accomplish this, research suggests that policies should:

1. **Create competitive, equitable compensation packages** that allow teachers to make a reasonable living across all kinds of communities.
 - **Leverage more competitive and equitable salaries** by **providing district incentives** to raise teacher salaries, **increasing statewide salary schedules**, and/or **using weighted student funding formulas** that direct resources to districts in relation to the students they serve (e.g., those in poverty, English language learners, youth in foster care).
 - **Create incentives that make living as a teacher more affordable** by offering other financial incentives, including: mortgage guarantees, down payment assistance, or other housing support, in exchange for service commitments; child care supports; and opportunities to continue teaching and mentoring after retirement, while maintaining retirement benefits.

2. **Enhance the supply of qualified teachers into high-need fields and locations** through targeted training subsidies and high-retention pathways. In critical shortage fields—mathematics, science, special education, and bilingual/ESL education, and in urban and rural areas with perennial shortages—schools don't just need more teachers, they need more teachers who will spend lasting teaching careers in those fields and locations. **Increasing access to strong teacher preparation can increase the pipeline of qualified, committed teachers to high-need positions.** However, becoming well prepared should be affordable.
 - **Offer forgivable loans and service scholarships.** The federal government should maintain a substantial, sustained program of service scholarships that cover training costs in high-quality undergraduate or graduate preparation programs for those who will teach in a high-need field or location for at least four years.
 - **Create career pathways and “Grow Your Own” programs.** The federal government and states can increase the supply of teachers willing to teach in urban and rural areas by recruiting and supporting high school students and other community members from those areas.
 - **Establish teacher residency models in hard-to-staff districts.** Urban and rural residency programs place candidates who will eventually teach in shortage fields in high-need urban and rural schools into paid, yearlong apprenticeships with expert mentor teachers, while the candidates complete tightly linked credential and master's degree coursework with partnering universities. In exchange, candidates pledge to teach in the district for 3–5 years.
3. **Improve teacher retention, especially in hard-to-staff schools**, through improved mentoring, induction, working conditions, and career development. If a teacher receives mentoring, collaboration, and extra resources, and is part of a strong teacher network, first-year turnover is cut by more than half (from 41% to 18%).⁴² But just 3% of beginning teachers had such a comprehensive set of supports in 2012.⁴³ In addition, school working conditions—including access to resources, administrative support, collegial opportunities, teacher input in decision-making, and pressure related to accountability measures—strongly influence teachers' choices to continue teaching in their schools.
 - **Develop strong, universally available mentoring and induction programs.** With federal or state matching grants, districts can support every new teacher using induction strategies that work: mentoring by a trained mentor in the same teaching field, learning opportunities for beginners in key areas of need, classroom visits, a reduced teaching load, and joint planning time.
 - **Create productive school environments.** States and districts can allocate funds specifically to improve teaching conditions in hard-to-staff schools. These funds can reduce class sizes, purchase much-needed materials and supplies, and provide time for professional development and joint teacher planning.
 - **Strengthen principal training programs.** Federal and state agencies can offer grant funding and technical assistance for creating and expanding high-quality principal training programs that emphasize effective leadership skills.
4. **Develop a national teacher supply market** that can facilitate getting and keeping teachers in the places they are needed over the course of their careers. The federal government can provide labor market data and analyses for federal, state, and local planning.
 - **Support for teacher mobility.** States can support common licensing exams and interstate agreements about credential coursework to facilitate more complete license reciprocity.
 - **Support pension portability.** A public/private partnership between states and pension providers can help create a system of pension portability across states, as was done for college faculty by TIAA.

Conclusion

The teacher shortage provides an opportunity for the United States to take a long-term approach to a comprehensive and systematic set of solutions to build a strong teaching profession. Although these proposals have a price tag, they could ultimately save far more than they would cost. The savings would include more than \$8 billion now wasted annually on replacement costs because of high teacher turnover, plus much of the expense of grade retention, summer schools, and remedial programs required because too many children are poorly taught.

In the competition for educational investment, the evidence points strongly to the importance of a strong, stable teaching force. Preventing and eliminating teacher shortages so that all children receive competent, continuous instruction in every community every year is, in a 21st century economy, essential for the success of individuals as well as for our society as a whole.

Endnotes

1. Whitaker, I. (2015, November 27). Nevada needs teachers, and it's shelling out \$5 million to get them. *The Las Vegas Sun*. Retrieved from <http://lasvegassun.com/news/2015/nov/27/nevada-needs-teachers-and-its-shelling-out-5-million/>.
2. Graham, K. A. (2015). First marking period in Philly ends with many teacher shortages. *The Inquirer, Philly.com*. Philadelphia. http://articles.philly.com/2015-11-20/news/68416094_1_vacancies-arlene-kempin-school-year.
3. Markovich, M. (2015, November 30). Principals say state teachers shortage now a crisis. *SF Gate*. <http://www.sfgate.com/local/komo/article/Principals-say-state-teacher-shortage-now-a-crisis-6666518.php>.
4. Nix, N. (2015, December 1). Why Oklahoma is racing to put nearly 1,000 uncertified teachers in its classrooms. *The Seventy Four*. <https://www.the74million.org/article/why-oklahoma-is-racing-to-put-nearly-1000-uncertified-teachers-in-its-classrooms>.
5. Based on a search of LexisNexis Academic, a newspaper archive database, for all articles containing "teacher shortage" in the United States between June 22 and November 22, 2015; 332 articles were retrieved. The same search between June 22 and November 22, 2012 produced 24 articles. (Searches were conducted May 12, 2016.)
6. U.S. Department of Education, Office of Postsecondary Education. (2015). *Teacher shortage areas nationwide listings 1990–1991 through 2015–16*. Washington, DC: U.S. Department of Education; Hale, L. (2015). Behind the shortage of special ed teachers: Long hours, crushing paperwork. *National Public Radio*. <http://www.npr.org/sections/ed/2015/11/09/436588372/behind-the-shortage-of-special-ed-teachers-long-hours-crushing-paperwork>.
7. Brown, E. (2015, December 4). High-poverty schools often staffed by rotating cast of substitutes. *The Washington Post*. https://www.washingtonpost.com/local/education/how-can-students-learn-without-teachers-high-poverty-schools-often-staffed-by-rotating-cast-of-substitutes/2015/12/04/be41579a-92c6-11e5-b5e4-279b4501e8a6_story.html.
8. In California alone at least 10,000 pink slips were issued, according to press releases issued by the California Teachers Association from April 7, 2008, through March 15, 2012, <http://www.cta.org/About-CTA/News-Room/Press-Releases/2008/04/20080407-1.aspx>; <http://www.cta.org/About-CTA/News-Room/Press-Releases/2009/03/20090313-1.aspx>; http://www.cta.org/en/About-CTA/News-Room/Press-Releases/2010/03/20100311_1.aspx; http://www.cta.org/About-CTA/News-Room/Press-Releases/2011/03/20110315_1.aspx; http://www.cta.org/About-CTA/News-Room/Press-Releases/2012/03/20120315_1.aspx (all accessed 10/6/15).
9. Hussar, W. J., & Bailey, T. M. (2014). *Projections of education statistics to 2022*. Washington, DC: National Center for Education Statistics. <https://nces.ed.gov/pubsub/2014/2014051.pdf>.
10. LPI analysis of the Title II Data Collection, 2009-2014, U.S. Department of Education. <https://title2.ed.gov/Public/Home.aspx> (accessed 9/3/15).
11. These include the federal *Schools and Staffing Surveys and Teacher Follow-up Survey databases from 2012 and 2013, the Baccalaureate and Beyond 2008:2012 databases*, the Higher Education Act Title II data from 2005 through 2014, and more recent data from the state of California.
12. Darling-Hammond, L., Furger, R., Shields, P. M., & Sutchter, L. (2016). *Addressing California's emerging teacher shortage: An analysis of sources and solutions*. Palo Alto, CA: Learning Policy Institute.
13. Educator Recruitment & Retention Task Force. (2015). *Educator retention and recruitment report*. Phoenix, AZ: Arizona Department of Education.
14. Educator Recruitment & Retention Task Force. (2015). *Educator retention and recruitment report*. Phoenix, AZ: Arizona Department of Education.
15. Educator Recruitment & Retention Task Force. (2015). *Educator retention and recruitment report*. Phoenix, AZ: Arizona Department of Education.
16. Nix, N. (2015, December 1). Why Oklahoma is racing to put nearly 1,000 uncertified teachers in its classrooms. *The Seventy Four*. <https://www.the74million.org/article/why-oklahoma-is-racing-to-put-nearly-1000-uncertified-teachers-in-its-classrooms>.
17. U.S. Department of Education Office of Postsecondary Education. (2015). *Teacher Shortage Areas Nationwide Listings 1990-1991 through 2015-16*. Washington, DC: U.S. Department of Education.
18. Darling-Hammond, L., Furger, R., Shields, P. M., & Sutchter, L. (2016). *Addressing California's Emerging Teacher Shortage: An Analysis of Sources and Solutions*. Palo Alto, CA: Learning Policy Institute. See also, U.S. Department of Education Office of Postsecondary Education. (2015). *Teacher Shortage Areas Nationwide Listings 1990-1991 through 2015-16*. Washington, D.C.: U.S. Department of Education.
19. Calculated by taking the total number of FTE teachers in 2011–12 and multiplying it by the 2011–12 attrition rate. LPI analysis of the Teacher Follow-Up Survey (TFS), 2013, from the Schools and Staffing Survey, National Center for Education Statistics.
20. Darling-Hammond, L., & Rothman, R. (2011). *Teacher and Leader effectiveness in high-performing education systems*. Washington, DC: Alliance for Excellent Education; Stanford, CA: SCOPE. <http://eric.ed.gov/ERICWebPortal/recordDetail?accno=ED517673>.
21. Carroll, T. G. (2007). *Policy brief: The high cost of teacher turnover*. Washington, D.C.: National Commission on Teaching and America's Future. <http://nctaf.org/wp-content/uploads/NCTAFCostofTeacherTurnoverpolicybrief.pdf>.
22. Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal*, 50(1), 4–36.
23. Kini, T., & Podolsky, A. (2016). *Does teaching experience increase teacher effectiveness?* Palo Alto, CA: Learning Policy Institute.

24. Jackson, C. K., & Bruegmann, E. (2009). Teaching students and teaching each other: The importance of peer learning for teachers. *American Economic Journal: Applied Economics*, 1(4), 85–108.
25. Kraft, M. A., & Papay, J. P. (2014). Can professional environments in schools promote teacher development? Explaining heterogeneity in returns to teaching experience. *Educational Evaluation and Policy Analysis*, 36(4), 476–500.
26. Beteille, T., & Loeb, S. (2009). Teacher quality and teacher labor market. In B. S. & D. N. P. (Eds. . In G. Sykes (Ed.), *Teacher Quality and Teacher Labor Markets* (pp. 596–612). Handbook of Education Policy Research.
27. Grissom, J. A., Viano, S. L., & Selin, J. L. (2015). Understanding employee turnover in the public sector: Insights from research on teacher mobility. *Public Administration Review*, 76; Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How teaching conditions predict teacher turnover. *Peabody Journal of Education*, 80(3), 44–70; Stockard, J. & Lehman, M. B. (2004). Influences on the satisfaction and retention of 1st-year teachers: The importance of effective school management. *Educational Administration Quarterly*, 40(5), 742-771; Adamson, F., & Darling-Hammond, L. (2011). *Speaking of salaries: What it will take to get qualified, effective teachers in all communities*. Washington, DC: Center for American Progress.
28. Boser, U., & Straus, C. (2014). *Mid- and late-career teachers struggle with paltry incomes*. Washington, DC: Center for American Progress.
29. Marinell, W. H., Coca, V. M., Arum, R., Goldstein, J., Kemple, J., Pallas, A., Bristol, T., Buckley, C., Scallon, A., & Tanner, B. (2013). *Who stays and who leaves? Findings from a three-part study of teacher turnover in NYC middle schools*. New York, NY: Research Alliance for New York Schools; Ingersoll, R., Merrill, L., & May, H. (2014). What are the effects of teacher education preparation on beginning teacher attrition? *Consortium for Policy Research in Education* (Vol. RR-82). Philadelphia, PA: Consortium for Policy Research in Education, University of Pennsylvania.
30. Ingersoll, R., Merrill, L., & May, H. (2014). *What Are the Effects of Teacher Education Preparation on Beginning Teacher Attrition? Consortium for Policy Research in Education* (Vol. RR-82). Philadelphia, PA: Consortium for Policy Research in Education, University of Pennsylvania. Gray, L., Taie, S., & O'Rear, I. (2015). *Public school teacher attrition and mobility in the first five years*. Washington, DC: National Center for Education Statistics. <http://nces.ed.gov/pubs2015/2015337.pdf>.
31. Rothstein, J., & Rouse, C. E. (2011). Constrained after college: Student loans and early-career occupational choices. *Journal of Public Economics*, 95(1-2), 149–163.
32. Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of Educational Research*, 81(2), 201–233; Headden, S. (2014). *Beginners in the classroom*. Stanford, CA: Carnegie Foundation for the Advancement of Teaching; Henke, R. R., Chen, X., Geis, S., & Knepper, P. (2000). Progress through the teacher pipeline: 1992–93 college graduates and elementary/ secondary school teaching as of 1997. *Postsecondary education descriptive analysis report*. U.S. Department of Education, Office of Educational Research and Improvement; California Commission on Teacher Credentialing. (2015). *Report on new teacher induction*. Sacramento, CA: California Commission on Teacher Credentialing.
33. Bartell, C. A. (1995). Shaping teacher induction policy in California. *Teacher Education Quarterly*, (Fall), 27–43; Olebe, M. (2001). A decade of policy support for California's new teachers: The beginning teacher support and assessment program. *Teacher Education Quarterly*, 28(1), 71–84; Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Research Journal*, 41(3), 681–714; Wang, J., Odell, S. J., & Schwille, S. A. (2008). Effects of teacher induction on beginning teachers' teaching: A critical review of the literature. *Journal of Teacher Education*, 59(2), 132–152.
34. Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, 38(3), 499–534.; Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How Teaching Conditions Predict Teacher Turnover. *Peabody Journal of Education*, 80(3), 44–70 .
35. LPI analysis of the *Teacher Follow-Up Survey* (TFS), 2013, from the *Schools and Staffing Survey*, National Center for Education Statistics.
36. Studies have produced a range of estimates for beginning teacher attrition, but all the studies have shortcomings. For example, one recent estimate using national longitudinal data put the attrition rate around 17%, finding 83% of beginning teachers still teaching at the end of their fifth year, including some who had left and re-entered. [See Gray, L., Taie, S., & O'Rear, I. (2015). *Public school teacher attrition and mobility in the first five years: Results from the first through fifth waves of the 2007–2008 beginning teacher longitudinal study*. Washington, DC: U.S. Department of Education.] <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED556348&site=ehost-live>.) However, the analysis omitted the large number of individuals who did not respond to the survey at various points during these years because it did not adjust for nonresponse bias. In general, survey evidence finds that those who do not respond to such surveys are more likely to have left their positions than to have continued teaching. Our own imputations to adjust these data based on the characteristics of non-respondents suggest that the attrition rate is likely at least 19%. Older estimates of attrition using national cross-sectional data suggested about a 30% attrition rate at the end of five years. [See Darling-Hammond, L., & Sykes, G. (2003). Wanted: A national teacher supply policy for education: The right way to meet the "highly qualified teacher" challenge. *Education Policy Analysis Archives*, 11(33), 1–55.]
37. Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of Educational Research*, 81(2), 201–233.
38. Ingersoll, R. M., Merrill, L., & May, H. (2014). *What are the effects of teacher education and preparation on beginning teacher retention?* Philadelphia, PA: Consortium for Policy Research in Education.
39. LPI analysis of the *Teacher Follow-up Survey* (TFS), 2013, from the *Schools and Staffing Survey*, National Center for Education Statistics.
40. Carver-Thomas, D. (2016). *National trends in teacher attrition: An analysis of 2011–12–2012–13 stayers, movers, and leavers*. Palo Alto, CA: Learning Policy Institute. (forthcoming).
41. For a comprehensive review, see Simon, N. S., & Johnson, S. M. (2015). Teacher turnover in high-poverty schools: What we know and can do. *Teachers College Record*, 117(March), 1–36. [http://isites.harvard.edu/fs/docs/icb.topic1231814.files/Teacher Turnover in High-Poverty Schools.pdf](http://isites.harvard.edu/fs/docs/icb.topic1231814.files/Teacher%20Turnover%20in%20High-Poverty%20Schools.pdf).
42. Ingersoll, R. M., & Smith, T. M. (2004). Do teacher induction and mentoring matter? *NASSP Bulletin*, 88(638), 28–40.
43. LPI analysis of the Public School Teacher File, 2012, from the *Schools and Staffing Survey*, National Center for Education Statistics.

Appendix: State Data

A-1: State Indicators Influencing Supply and Demand

This table highlights a number of key factors that reflect and influence teacher supply and attrition, and signal whether states are likely to have an adequate supply of qualified teachers to fill their classrooms. Based on these data—which treat compensation, teacher turnover, working conditions, and qualifications—each state is assigned a “teaching attractiveness rating,” indicating how supportive it appears to be of teacher recruitment and retention. The data are drawn from national data sources (listed in the footnotes), representing the most recent data available for analysis. Interpretations of the data should keep in mind that, depending on the specific statistic, these sources are from 2012, 2013, or 2014. Some states may have recently experienced changes in policies or conditions that would change the statistic reported if it were collected today. In addition, in some cases, sample sizes are relatively small. We do not report data for states where the samples are too small to meet NCES guidelines for reporting.

Quintile



State	Compensation			Teacher Turnover				Working Conditions					Teacher Qualifications			Teaching Attractiveness Rating ¹³
	Average Starting Salary ¹ (2013)	Wage Competitiveness Ratio ² (Teachers to Non-teachers) (2012)	% of Teachers Planning to Leave as Soon as Possible ³ (2012)	Teacher Attrition (Leavers) ⁴ (2013)	Teacher Turnover (Movers and Leavers) ⁵ (2013)	% of Teachers Who Feel Supported by Their Administrator ⁶ (2012)	% of Teachers Worried about Job Security Because of Testing ⁷ (2012)	% of Teachers Who Report Staff Cooperation ⁸ (2012)	% of Teachers Who Feel They Have Control in Their Classroom ⁹ (2012)	Pupil-Teacher Ratio ¹⁰ (2014)	% of Teachers Not Certified ¹¹ (2014)	% of Teachers Inexperienced ¹² (2014)				
Alabama	\$36,198	71	6.0%	6.8%	13.8%	57%	9%	39.2%	71%	15.8	0.87%	10.7%	3.33			
Alaska	\$44,166	85	4.7%	†	16.8%	50%	3%	39.6%	77%	16.6	0.88%	10.5%	3.73			
Arizona	\$31,874	62	11.9%	18.8%	23.6%	46%	15%	39.2%	71%	22.8	5.04%	15.1%	1.50			
Arkansas	\$32,691	74	5.3%	4.6%	13.7%	58%	8%	43.2%	78%	14	1.45%	11.5%	3.67			
California	\$41,259*	75	4.4%	4.6%	10.6%	48%	8%	39.3%	72%	24.3	1.49%	8.9%	3.67			
Colorado	\$32,126	68	8.4%	6.3%	14.6%	46%	15%	38.1%	76%	17.5	11.33%	17.6%	2.00			
Connecticut	\$42,924	71	4.1%	6.1%	10.9%	37%	9%	35.9%	73%	12.6	1.18%	9.3%	3.42			
Delaware	\$39,338	75	7.0%	†	17.3%	45%	15%	37.9%	54%	14	1.10%	11.0%	2.73			
District of Columbia	\$51,539*	68	14.8%	†	23.1%	24%	20%	27.9%	77%	13	17.84%	17.9%	1.91			
Florida	\$35,166	73	9.3%	6.6%	14.1%	52%	25%	38.0%	58%	15.3	4.20%	28.6%	2.25			
Georgia	\$33,664	68	5.4%	5.5%	12.7%	55%	11%	43.4%	66%	15.8	2.08%	5.9%	3.25			
Hawaii	\$41,027	77	†	†	20.5%	51%	†	†	81%	15.9	3.58%	15.3%	2.75			
Idaho	\$31,159	72	8.9%	†	13.2%	57%	15%	43.3%	79%	19.8	0.66%	14.1%	2.82			
Illinois	\$37,166	73	2.9%	5.3%	9.6%	44%	9%	36.1%	81%	15.2	0.60%	12.4%	3.42			
Indiana	\$34,696	70	7.9%	9.3%	15.4%	45%	26%	38.1%	76%	17.5	0.55%	14.8%	2.17			
Iowa	\$33,226	85	4.2%	7.0%	13.4%	39%	7%	37.2%	83%	14.2	0.01%	9.8%	3.58			
Kansas	\$33,386	70	7.7%	8.2%	15.1%	55%	7%	40.8%	83%	13	1.29%	12.8%	3.17			
Kentucky	\$35,166	71	4.2%	14.8%	15.8%	49%	11%	39.7%	71%	16.2	0.65%	9.8%	2.92			
Louisiana	\$38,655	75	7.0%	9.9%	21.4%	54%	21%	36.8%	61%	15.3	4.33%	12.7%	2.42			
Maine	\$31,835	81	7.6%	†	10.3%	47%	6%	38.5%	81%	11.9	2.10%	9.1%	3.64			

Maryland	\$43,235	75	10.9%	†	11.9%	41%	15%	26.9%	59%	14.8	3.16%	14.3%	2.18
Massachusetts	\$40,600	69	3.5%	3.0%	13.4%	45%	7%	36.8%	78%	13.6	2.39%	13.8%	3.17
Michigan	\$35,901	78	6.5%	10.0%	12.7%	44%	18%	39.5%	76%	18.1	0.49%	9.4%	3.08
Minnesota	\$34,505	71	5.6%	10.2%	16.0%	42%	6%	36.5%	83%	15.6	1.72%	11.4%	2.75
Mississippi	\$31,184	72	7.1%	†	17.4%	51%	14%	34.5%	75%	15.3	1.70%	12.7%	2.18
Missouri	\$30,064	68	5.3%	5.9%	14.0%	53%	11%	44.2%	80%	13.8	0.86%	11.5%	3.33
Montana	\$27,274	74	6.8%	†	18.7%	48%	†	31.6%	89%	14	7.68%	11.3%	2.50
Nebraska	\$30,844	77	4.2%	†	10.4%	47%	7%	38.2%	76%	13.7	0.20%	12.6%	3.55
Nevada	\$35,358	82	11.5%	†	19.8%	48%	14%	30.9%	68%	20.6	0.26%	14.1%	2.27
New Hampshire	\$34,280	73	5.7%	†	9.7%	40%	6%	34.1%	82%	12.6	1.14%	7.0%	3.55
New Jersey	\$48,631	76	4.4%	8.8%	9.2%	49%	15%	38.0%	73%	12	1.48%	11.2%	3.42
New Mexico	\$31,960	78	7.2%	†	23.2%	48%	20%	30.4%	73%	15.3	2.09%	13.8%	2.18
New York	\$43,839	81	†	8.2%	11.1%	44%	16%	34.7%	80%	13.2	0.59%	7.9%	3.45
North Carolina	\$30,778	67	9.2%	5.5%	17.4%	53%	9%	42.6%	69%	15.4	0.39%	11.5%	2.67
North Dakota	\$32,019	70	4.0%	†	14.6%	46%	2%	38.0%	88%	11.8	1.42%	12.9%	3.27
Ohio	\$33,096	75	4.0%	4.1%	12.9%	47%	15%	37.6%	78%	16.3	0.69%	10.4%	3.33
Oklahoma	\$31,606	67	7.8%	5.6%	17.9%	53%	13%	40.8%	86%	16.2	1.55%	13.2%	2.50
Oregon	\$33,549	75	5.6%	†	11.9%	56%	6%	46.2%	82%	22.2	0.40%	9.8%	4.09
Pennsylvania	\$41,901	80	4.4%	4.5%	9.3%	45%	13%	40.9%	76%	14.5	0.54%	7.5%	3.92
Rhode Island	\$39,196	78	†	†	7.4%	44%	23%	37.9%	63%	14.5	0.94%	6.9%	3.00
South Carolina	\$32,306	73	8.9%	13.9%	17.3%	55%	8%	43.9%	71%	15.5	3.10%	11.6%	2.75
South Dakota	\$29,851	68	2.8%	†	12.5%	51%	5%	43.3%	86%	13.8	0.26%	12.1%	3.82
Tennessee	\$34,098	66	7.8%	†	13.2%	56%	22%	44.0%	69%	15.1	0.48%	10.0%	3.09
Texas	\$38,091	69	10.7%	14.9%	20.7%	46%	12%	38.0%	67%	15.4	1.53%	14.4%	2.00
Utah	\$33,081	71	5.8%	†	8.5%	56%	11%	44.2%	78%	23	2.27%	15.7%	3.00
Vermont	\$35,541	75	5.2%	†	9.9%	45%	2%	34.1%	88%	10.6	0.90%	8.8%	3.82
Virginia	\$37,848	63	10.2%	8.0%	14.6%	48%	8%	36.0%	65%	14.1	3.52%	10.4%	2.58
Washington	\$36,335	69	7.7%	7.2%	9.7%	51%	9%	40.7%	80%	19.3	0.19%	6.8%	3.50
West Virginia	\$32,533	77	†	†	8.7%	53%	6%	38.3%	69%	14.1	3.45%	10.5%	3.40
Wisconsin	\$33,546	76	6.2%	10.5%	16.2%	41%	15%	38.2%	82%	15.1	1.07%	15.1%	2.42
Wyoming	\$43,269	94	3.7%	†	10.5%	51%	9%	37.7%	79%	12.3	0.19%	13.2%	4.00
United States	\$36,141	74†	6.6%	7.7%	14.2%	48%	12%	38%	77%	16.1	1.9%	13%	—

* NEA salary data are from 2011-12.

‡ Average of the 51 states (including Washington, DC) calculations, rather than a separate average for the United States as a whole.

† Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is greater than 50%.

¹ NEA Collective Bargaining/Member Advocacy's Teacher Salary Database, based on affiliate reporting as of December 2013; see www.nea.org/home/2012-2013-average-starting-teacher-salary.html.

² The competitiveness wage index is calculated by dividing the predicted annual wage of elementary and secondary teachers by the predicted wage of non-teachers working in the same state with master's degrees at both age 25 and 45. Baker, B., Farris, D., & Sciarrà, D.G. (2016). *Mind the gap: 20 years of progress and retrenchment in school funding and achievement gaps*. Table 5. Princeton, NJ: Educational Testing Service, pp. 15.

³ Percent of teachers who plan to leave as soon as possible or until a more desirable job opportunity. Data are from the 2011-12 school year. LPI analysis of Public School Teacher File, 2012, from the Schools and Staffing Survey, National Center for Education Statistics.; Interpret estimates from District of Columbia, New Hampshire, and New Mexico with caution—each estimate's coefficient of variation (CV) is between 30 and 35%.

⁴ LPI analysis of Teacher Follow-Up Survey (TFS), 2013, from the Schools and Staffing Survey, National Center for Education Statistics. Interpret with caution—all estimates other than Texas and Ohio have a coefficient of variation (CV) between 30 and 50%.

⁵ LPI analysis of Teacher Follow-Up Survey (TFS), 2013, from the Schools and Staffing Survey, National Center for Education Statistics.; Schools and Staffing Survey. (2013). Teacher status file 2012-13. Washington, DC: National Center for Education Statistics.

⁶ Percent of teachers who strongly agree that their school administration's behavior toward the staff is supportive and encouraging. Data are from the 2011-12 school year. LPI analysis of Public School Teacher File, 2012, from the Schools and Staffing Survey, National Center for Education Statistics.

⁷ Percent of teachers who strongly agree that they worry about the security of their job because of the performance of their students or school on state and/or local tests. Data are from the 2011-12 school year. LPI analysis of Public School Teacher File, 2012, from the Schools and Staffing Survey, National Center for Education Statistics. Interpret estimates from Alaska, Connecticut, North Dakota, and Vermont with caution—each estimate's coefficient of variation (CV) is between 30 and 45%.

⁸ Percent of teachers who strongly agree that there is a great deal of cooperative effort among the staff members. Data are from the 2011-12 school year. LPI analysis of Public School Teacher File, 2012, from the Schools and Staffing Survey, National Center for Education Statistics.

⁹ Teacher autonomy in the classroom is measured using a Cronbach Alpha-generated construct of classroom control derived from six components: Control over textbooks and materials, content and skills to be taught, teaching techniques, evaluating students, discipline, and homework. The Cronbach Alpha value was equal to 0.76. LPI analysis of Public School Teacher File, 2012, from the Schools and Staffing Survey, National Center for Education Statistics.

¹⁰ National Center for Education Statistics. (2015). *Digest of education statistics*. Public elementary and secondary teachers, enrollment, and pupil-teacher ratios, by state or jurisdiction: Selected years, fall 2000 through fall 2013. Washington DC: U.S. Department of Education. <https://nces.ed.gov/ipeds/data/ipedsdatatools/datafiles/2013-14/2013-14-digest-table-301.pdf> (accessed 5/18/16).

¹¹ The Office of Civil Rights defines certified teachers as those who have "met all applicable state teacher certification requirements for a standard certificate" for a beginning teacher or one who has completed the state-required probationary period. "A teacher who is working toward certification by way of alternative routes, or a teacher with an emergency, temporary, or provisional credential is not considered to have met state requirements." LPI Analysis of Civil Rights Data Collection, Public-Use Data File 2013-14, National Center for Education Statistics.

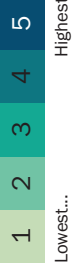
¹² An inexperienced teacher is defined as a teacher in his or her first or second year of teaching. LPI Analysis of Civil Rights Data Collection, Public-Use Data File 2013-14, National Center for Education Statistics.

¹³ Teaching attractiveness ratings are calculated by assigning point values for each indicator according to the quintile: 5 points for quintile 5, 4 points for quintile 4, and so on. Teacher turnover indicators, teacher qualification indicators, and pupil-teacher ratio are reverse coded such that the 1st quintile is always the least desirable response. Each state's point total was then divided by the number of available indicators to generate an average teaching attractiveness score for each state. This rating represents the average quintile rank for each state.

KEY	
Color	Quintile
	1st Quintile
	2nd Quintile
	3rd Quintile
	4th Quintile
	5th Quintile
†	Does not meet reporting standards
<p>Note: % of Teachers Planning to Leave as Soon as Possible, Teacher Attrition, Teacher Turnover, Pupil-Teacher Ratio, % of Teachers Not Certified, and % of Teachers Inexperienced are reverse coded such that the 1st quintile is always the least desirable response.</p>	

A-2: Distribution of Uncertified and Inexperienced Teachers by State

Quintile



Drawing on data from the Office of Civil Rights, this table identifies the extent to which uncertified or inexperienced teachers are hired within states and the extent to which they are disproportionately assigned to students of color. Each state is assigned a “teacher equity rating,” indicating the extent to which students, in particular students of color, are assigned uncertified or inexperienced teachers.

State	Percent of Teachers Not Certified in High-Minority Schools* (2014)	Percent of Teachers Not Certified in Low-Minority Schools* (2014)	Ratio of the % Uncertified Teachers in High-Minority to Low-Minority Schools (2014)	Percent of Inexperienced Teachers in High-Minority Schools* (2014)	Percent of Inexperienced Teachers in Low-Minority Schools* (2014)	Ratio of the % Inexperienced Teachers in High-Minority to Low-Minority Schools (2014)	Teacher Equity Rating ⁴
Alabama	1.569%	0.246%	6.38	12.76%	8.77%	1.45	3.7
Alaska	4.938%	0.806%	6.12	19.70%	7.26%	2.71	2.2
Arizona	7.225%	8.408%	0.86	22.48%	12.59%	1.79	1.8
Arkansas	3.671%	3.026%	1.21	16.61%	9.56%	1.74	2.5
California	2.067%	0.452%	4.57	10.80%	8.49%	1.27	3.7
Colorado	20.964%	4.544%	4.61	25.54%	13.72%	1.86	1.3
Connecticut	5.281%	0.378%	13.97	15.18%	6.53%	2.32	2.5
Delaware	2.070%	0.785%	2.64	15.02%	8.36%	1.8	3
District of Columbia	22.884%	20.686%	1.11	19.47%	18.09%	1.08	2.3
Florida	5.422%	3.964%	1.37	36.67%	29.20%	1.26	2
Georgia	3.336%	1.383%	2.41	8.46%	3.11%	2.72	3
Hawaii	5.030%	4.086%	1.23	14.22%	15.58%	0.91	2.7
Idaho	0.713%	0.522%	1.36	15.82%	12.42%	1.27	3.7
Illinois	1.116%	0.082%	13.54	17.00%	9.91%	1.72	3
Indiana	1.222%	0.472%	2.59	25.61%	10.74%	2.38	2.5
Iowa	0.040%	0.000%	N/A	12.37%	9.69%	1.28	4.2
Kansas	1.538%	1.346%	1.14	16.82%	10.90%	1.54	3
Kentucky	0.538%	0.335%	1.6	9.35%	8.76%	1.07	4.5
Louisiana	11.749%	1.492%	7.87	17.27%	8.71%	1.98	2
Maine	2.175%	3.964%	0.55	12.04%	9.35%	1.29	3.5
Maryland	5.995%	0.501%	11.97	25.39%	6.78%	3.75	2.2
Massachusetts	4.423%	1.343%	3.29	22.89%	10.29%	2.22	2
Michigan	1.179%	0.649%	1.82	13.88%	8.64%	1.61	3.7
Minnesota	2.383%	1.867%	1.28	14.60%	12.39%	1.18	3.2
Mississippi	4.045%	0.685%	5.91	18.88%	9.06%	2.09	2.3
Missouri	2.051%	1.384%	1.48	14.64%	12.91%	1.13	3
Montana	1.820%	0.711%	2.56	17.47%	20.33%	0.86	3
Nebraska	0.884%	0.446%	1.98	15.45%	9.41%	1.64	3.5
Nevada	0.184%	0.620%	0.3	21.67%	9.10%	2.38	3
New Hampshire	2.355%	0.859%	2.74	9.66%	8.82%	1.1	3.8

New Jersey	2.748%	0.638%	4.31	13.90%	9.48%	1.47	3
New Mexico	2.088%	1.440%	1.45	15.04%	12.02%	1.25	3
New York	2.285%	0.099%	23.08	16.72%	5.43%	3.08	3
North Carolina	0.811%	0.297%	2.73	15.46%	8.80%	1.76	3.7
North Dakota	1.898%	0.294%	6.44	12.44%	13.31%	0.93	3.3
Ohio	1.789%	0.172%	10.4	16.62%	9.94%	1.67	3.2
Oklahoma	4.138%	0.319%	12.98	16.31%	10.45%	1.56	2.7
Oregon	0.855%	1.079%	0.79	11.71%	10.72%	1.09	4
Pennsylvania	1.823%	0.170%	10.72	9.47%	7.02%	1.35	4
Rhode Island	3.207%	0.036%	88.99	12.40%	4.62%	2.68	3
South Carolina	7.043%	2.845%	2.48	16.86%	9.27%	1.82	2
South Dakota	0.497%	0.676%	0.74	16.78%	11.29%	1.49	3.3
Tennessee	1.971%	0.308%	6.41	12.55%	8.99%	1.4	3.5
Texas	3.661%	0.776%	4.72	18.80%	11.51%	1.63	2.3
Utah	4.009%	2.355%	1.7	16.82%	13.17%	1.28	2.3
Vermont	0.722%	0.784%	0.92	7.43%	8.19%	0.91	4.7
Virginia	4.180%	0.960%	4.36	14.39%	7.59%	1.9	2.8
Washington	1.003%	0.245%	4.1	9.63%	4.85%	1.99	4
West Virginia	3.664%	4.642%	0.79	11.78%	11.13%	1.06	3.3
Wisconsin	2.897%	0.527%	5.49	21.30%	13.26%	1.61	2.3
Wyoming	0.169%	1.277%	0.13	18.53%	10.75%	1.72	3
United States	3.6%	0.9%	4.0	16.6%	9.9%	1.7	—

* "High-minority schools" are schools in the top quartile of minority enrollment in each state. "Low-minority schools" are those in the bottom quartile of minority enrollment in each state.

Source: LPI Analysis of the Civil Rights Data Collection, Public-Use Data File 2013-14, National Center for Education Statistics.

Note: The Office of Civil Rights defines certified teachers as those who have "met all applicable state teacher certification requirements for a standard certificate" for a beginning teacher or one who has completed the state-required probationary period. "A teacher who is working toward certification by way of alternative routes, or a teacher with an emergency, temporary, or provisional credential is not considered to have met state requirements."

¹ Teacher Equity ratings are calculated by assigning point values for each indicator according to the quintile: 5 points for quintile 4, and so on. (Note: Percent of Teachers Not Certified in High-Minority Schools, Percent of Teachers Not Certified in Low-Minority Schools, Percent of Inexperienced Teachers in High-Minority Schools, and Percent of Inexperienced Teachers in Low-Minority Schools are reverse coded such that the 1st quintile is always the least desirable response.) Each state's point total was then divided by the number of indicators to generate an average Teacher Equity score for each state. This rating represents the average quintile rank for each state.

KEY	
Color	Quintile
	1st Quintile
	2nd Quintile
	3rd Quintile
	4th Quintile
	5th Quintile
N/A	Undefined (not able to divide by zero)

Note: Percent of Teachers Not Certified in High-Minority Schools, Percent of Teachers Not Certified in Low-Minority Schools, Percent of Inexperienced Teachers in High-Minority Schools, and Percent of Inexperienced Teachers in Low-Minority Schools are reverse coded such that the 1st quintile is always the least desirable response.

External Reviewers

This report benefited from the insights and expertise of two external reviewers: Richard Ingersoll, Board of Overseers Professor of Education and Sociology at the University of Pennsylvania; and Jason Grissom, Associate Professor of Public Policy and Education, and Director of the Master of Public Policy Program at Peabody College of Education and Human Development, Vanderbilt University. We thank them for the care and attention they gave the report. Any remaining shortcomings are our own.

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The Learning Policy Institute conducts and communicates independent, high-quality research to shape evidence-based policies that support equitable and empowering learning for every child. Nonprofit and nonpartisan, the Institute connects policymakers at the local, state, and federal levels with the evidence, ideas, and actions needed to strengthen the pre-k to grade-12 education system, and address the complex realities facing public schools and their communities.

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