

The pandemic has exacerbated a long-standing national shortage of teachers

Report • By John Schmitt and Katherine deCourcy • December 6, 2022

What this report finds: The pandemic exacerbated a preexisting and long-standing shortage of teachers. The shortage is particularly acute for certain subject areas and in some geographic locations. It is especially severe in schools with high shares of students of color or students from low-income families. The shortage is *not* a function of an inadequate number of qualified teachers in the U.S. economy. Simply, there are too few qualified teachers willing to work at current compensation levels given the increasingly stressful environment facing teachers.

Why it matters: A shortage of teachers harms students, teachers, and the public education system as a whole. Lack of sufficient, qualified teachers and other staff threatens students' ability to learn and reduces teachers' effectiveness, undermining the education system's goal of providing a sound education equitably to all children.

What we can do about it: To end the teacher shortage, we must address the two most pressing reasons for the shortage: the long-standing decline in the pay of teachers relative to other workers with a college degree and the high and increasing levels of stress public school teachers face.

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Introduction

For more than a decade, academics and education policy experts have raised concerns about a widespread shortage of teachers in the United States.¹ The first wave of warnings came in response to the drastic cuts in state and local spending on education following the Great Recession. But teacher shortages remained a significant challenge for the nation's public education system long after the immediate effects of the Great Recession wore off. Most recently, the COVID-19 pandemic ignited a new round of concerns.

In this report, we use data from a wide range of sources to document the size and scope of the teacher shortage. The data show that the teacher shortage is both widespread and acute across several dimensions, from subject matter specialties to school poverty status. We also review data that point to the two most important drivers of the shortage:

- the declining compensation in the teaching profession relative to other occupations that employ college graduates
- and the increasingly stressful work environment teachers face, a long-standing reality that has been greatly exacerbated by COVID-19.

Our key finding is that the current shortage is generally *not* the result of an insufficient number of potentially qualified teachers.² The shortage is, instead, a shortfall in the number of qualified teachers *willing to work at current wages and under current working conditions*. The combination of substandard teacher compensation and highly stressful working conditions has, in recent decades, made teaching a much less attractive profession than alternatives available to workers with college degrees.³

Low pay and high stress are, and have been for many years, the major barriers to meeting the national demand for teachers. A shortage of this nature—driven by poor pay and stressful working conditions—will not be ameliorated simply by increasing the potential number of qualified teachers.

Teacher shortages are widespread and long-standing

Researchers using data from a variety of sources have documented a long-standing and widespread shortage of teachers—overall, by subject area, by racial and ethnic composition of schools' students, by poverty status, by geography, and by other dimensions.⁴ In this report, we focus on: the large and growing share of unfilled teaching vacancies; the rising share of teachers leaving their jobs each year; and the declining interest in the teaching profession, which is reflected in falling enrollment in and completion of teacher preparation programs. We show that all these trends long predate the COVID-19 pandemic but have grown more acute since 2020.⁵

A central challenge for research on teacher shortages is how to define and measure the demand for teachers, the supply of teachers, and any gap between the two. To measure demand, researchers have generally taken school administrators' determination of the number and kinds of teachers they would like to hire each year. To measure supply, many researchers use the total number of people of working age who are, or who easily could become, qualified to teach. This group includes adults who have postsecondary degrees in education or who have completed less traditional teacher preparation programs.

To estimate the demand for teachers, we follow most existing research and use school administrators' assessment of the number of teaching positions needed to fulfill their educational goals as a reasonable and practical estimate of the "demand" for teachers. However, we emphasize that school administrators make staffing decisions based on current budgets and their best estimates of likely future budgets. The demand for teachers, therefore, depends on both educational considerations and the financial constraints facing public school administrators.

With respect to teacher supply, we argue that the supply of teachers is not well captured by simply summing the number of adults who already are, or who could quickly become, qualified to teach in public K–12 schools. As some researchers have emphasized, at any given point in time "supply" defined in this way is likely to be large relative to the number of unfilled vacancies.⁶ We argue that this approach ignores crucial features of the current teacher shortage, including long-standing problems with pay and stress that discourage qualified teachers from filling existing vacancies.

Vacancies

We begin with the data on vacancies for teaching positions. Each of the data sources we draw on below has strengths and weaknesses, but together they paint a consistent picture of schools working harder and harder—and increasingly failing—to fill openings for their available teaching positions.

Teacher Shortage Areas data

Each year since the 1990–1991 school year, the Department of Education has asked state governments to report on teacher shortages by subject area in their states. The Department of Education compiles the responses and issues an annual report on "Teacher Shortage Areas" (TSA), which allows us to identify the shortages in a wide range of subject areas, over more than two decades, separately for each state.⁷

In the year before the COVID-19 pandemic began, education researchers Pennington McVey and Trinidad (2019) produced a comprehensive analysis of the TSA data covering school years 1998–1999 through 2017–2018. Their analysis illustrates two important features of the national teacher shortage.

First, state reports of shortages were substantially higher at the end of the period they studied than they were at the beginning, with most of the increase taking place between

the school years 2003–2004 and 2008–2009, and holding roughly steady at elevated levels thereafter. In nine of the 10 subject areas that Pennington McVey and Trinidad identified as most likely to be experiencing a shortage, fewer than 30% of states reported shortages in those areas at the beginning of the period studied (1998–1999). But by the 2017–2018 school year, between 25% and 90% of states were reporting shortages in these particularly shortage-prone subject areas (Pennington McVey and Trinidad 2019, Figure 5). The increase in reported shortages was evident even for the 14 subject areas identified as least likely to experience shortages. In the first three school years studied (1998–1999 to 2000–2001), fewer than 10% of states reported shortages in any of these 14 relatively low-shortage subject areas. By 2017–2018, between 10% and 35% of states reported teacher shortages in nine of these same 14 subject areas (Pennington McVey and Trinidad 2019, Figure 8).⁸

The second important feature captured in the TSA data is that while shortages are widespread, they are particularly acute in some subject areas. The top 10 subject areas experiencing teacher shortages in the Pennington McVey and Trinidad analysis were: special education, mathematics, science, foreign language, English language arts, English as a second language, “career tech,” arts, social science, and librarian.

State teacher workforce reports

One limitation of the TSA data is that the survey reports whether a state is experiencing a shortage in a particular subject area, but does not provide information on the *size* of the shortage. As Pennington McVey and Trinidad note, in the TSA data a report of a shortage could indicate “one or 1,000” vacancies.⁹ An analysis by the Learning Policy Institute (LPI) (n.d.), however, provides one estimate of the scale of teacher shortages using data covering the 2015–2016 and the 2016–2017 school years, close to the end of the period studied in the Pennington McVey and Trinidad analysis.

LPI reviewed teacher workforce reports prepared by 40 states. These states reported either the number of unfilled teaching vacancies or the total number of teachers “not fully certified for the teaching assignments,” or both. Summing those numbers and extrapolating them to include the states that did not report data, LPI estimates that public schools nationally were operating 108,000 teachers below what was needed to fully staff vacancies with teachers certified for their assignments.¹⁰ LPI also warns “that these data also most likely underrepresent the extent and impact of shortages because districts often address shortages by canceling courses, increasing class sizes, or starting the school year with substitute teachers.”

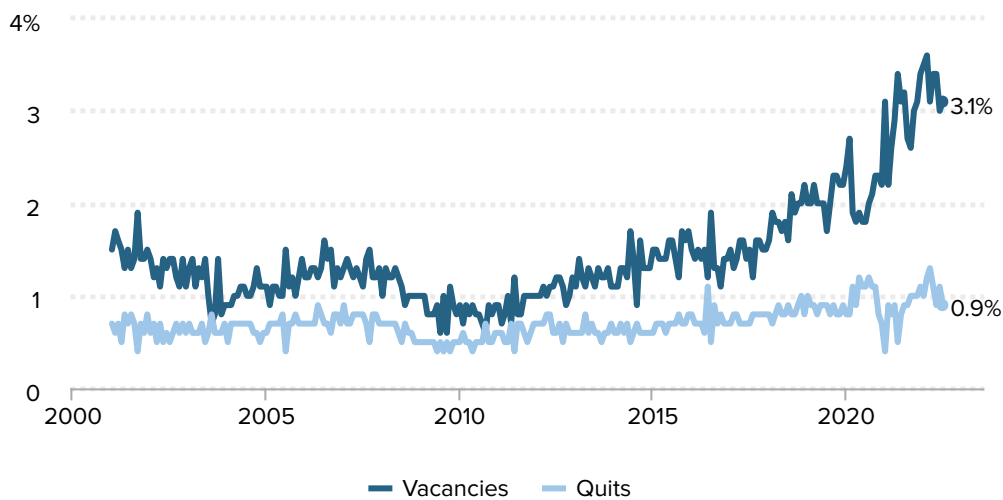
Job Openings and Labor Turnover Survey data

The LPI analysis provides a careful estimate of the number of teacher vacancies at a specific point in time prior to the 2020 pandemic. With some limitations, the Bureau of Labor Statistics’ Job Openings and Labor Turnover Survey (JOLTS) allows us to look at the size of vacancies over the entire period from 2000 through the present. The JOLTS tracks

Figure A

High and rising vacancies and quits in public education predate the pandemic

State and local government education vacancy and quit rates, January 2001–July 2022



Note: Data include community colleges, state colleges, and universities, and nonteaching jobs at all levels of education.

Source: EPI analysis of JOLTS data (Bureau of Labor Statistics (BLS), Job Openings and Labor Turnover Survey (JOLTS), Public data series accessed through the [JOLTS databases](#), 2022).

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monthly job openings (vacancies), new hires, quits, layoffs, and firings on a consistent basis across the entire economy and by specific industries, including the state and local government education sector. JOLTS does not publish separate estimates for public school teachers. Teachers, however, are about 44% of the workforce in state and local public education,¹¹ so the trends visible in the JOLTS data give some insight into the experience of public K–12 teachers.¹²

Consistent with the idea that schools have found it increasingly difficult to attract enough teachers, the JOLTS data show a long, steady increase in vacancies between roughly the end of the Great Recession and 2019 (**Figure A**). Between 2001 and 2012, for example, monthly vacancies in the sector averaged 1.1% of total employment. By 2015–2019, the average vacancy rate had increased by 60% to a monthly average of 1.7%.

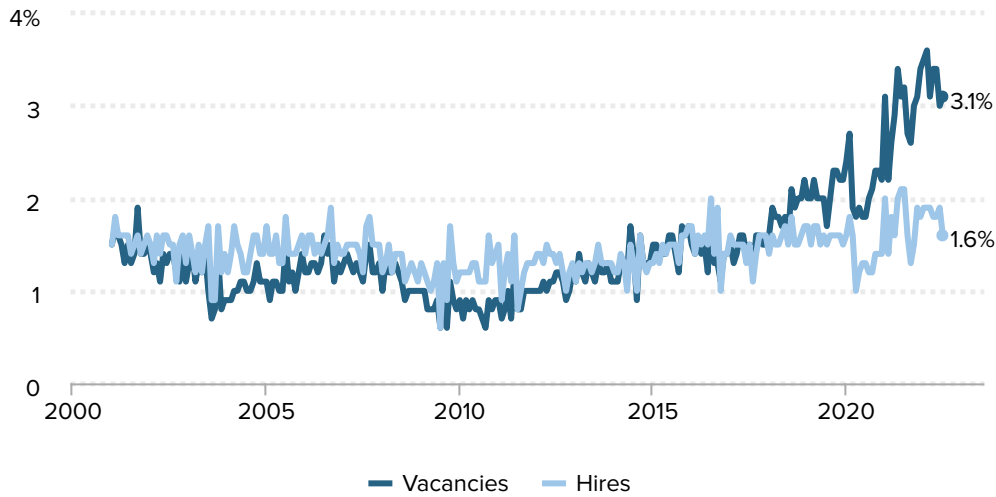
The JOLTS vacancy data also report a further, sharp increase in monthly vacancy rates during the pandemic—despite an initial collapse at the onset of the pandemic. From 2020 to the present, the vacancy rate has averaged 2.7%, well above the 1.7% rate for 2015–2019 and more than two-and-a-half times the 1.1% rate for 2001–2012.

Meanwhile, monthly quit rates in the JOLTS data for state and local public education also rose steadily after the end of the Great Recession, suggesting that a growing share of workers in the sector were leaving their jobs each month even before the pandemic.

Figure B

New hire rates have been flat, except during the pandemic

State and local government education vacancy and hire rates, January 2001–July 2022



Note: Data include community colleges, state colleges, and universities, and nonteaching jobs at all levels of education.

Source: EPI analysis of JOLTS data (Bureau of Labor Statistics (BLS), Job Openings and Labor Turnover Survey (JOLTS), Public data series accessed through the [JOLTS databases](#), 2022).

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Between 2001 and 2012, the quit rate averaged 0.6% per month. From 2015 through 2019 that rate rose to 0.8%, and after an initial dip in quits at the beginning of the pandemic the monthly quit rate rose to an average of 0.9% in 2021 and 2022.

Despite rising vacancy and quit rates after the Great Recession, new hires in the sector remained flat, holding close to the 1.4% average level for the entire pre-pandemic period 2001–2019 (**Figure B**). This lack of responsiveness of hires to rising vacancies suggests that the shortages reported in other survey data reflect an unwillingness of potential teachers to accept jobs given the compensation and working conditions on offer. The simultaneous rise in the quit rate (Figure A) also reinforces the idea that teaching jobs are becoming less desirable.¹³

The pandemic caused major disruptions to the long-term hiring patterns in state and local government education. Shortly after March 2020, layoffs spiked (not shown) and new hires dropped sharply (Figure B). Substantial federal aid early in the pandemic allowed local and state public education to reverse course and rehire a large share—but not all—of those initially laid off.¹⁴ Even though new hires have been above historical averages since the start of 2021, hiring has remained consistently below vacancies since January 2018.

School Pulse Panel data

While the TSA and JOLTS data document that education vacancies have been rising for at least a decade, the National Center for Education Statistics (NCES) School Pulse Panel (SPP) provides independent evidence that COVID-19 has aggravated the shortage. The SPP, a new survey implemented in response to the pandemic, has been sampling school and district staff monthly at about 2,400 public elementary, middle, and high schools during the 2021–2022 school year.¹⁵ Recently released results covering January 2022 found that 10% of all public schools reported that 10% or more of teaching positions were vacant; an additional 13% of schools reported that 5%–10% of teaching positions were vacant; and only 56% of schools reported they were operating without teaching vacancies (**Figure C**). Half of schools (51%) said that vacancies were caused by resignations; 21% said vacancies were the result of retirement. Almost one-third (30%) stated that vacancies were the result of creating new staff positions (IES 2022a).

The SPP data also show that vacancy rates were higher on average in schools with higher shares of students of color. One in every eight schools (13%) with 75% or more students of color had teacher vacancies in excess of 10% of total teaching staff, versus 7% in schools where students of color made up less than 25% of students. Teacher vacancy rates have also been consistently higher in schools in high-poverty areas. Fifteen percent of schools in high-poverty neighborhoods, for example, had teacher vacancies of 10% or higher, compared with 8% in low-poverty neighborhoods.

The most recent data from the SPP, covering August 2022, found that the educator shortage has continued into the current school year, with “53% of public schools...reporting feeling understaffed entering the 2022–2023 school year” (IES 2022b).

The SPP data also reinforce the earlier findings of the TSA survey that shortages are most acute in some specialties, particularly special education (45% of schools reporting vacant teaching positions), mathematics (16%), English or language arts (13%), English learner education (13%), and physical sciences (10%) (**Figure D**). But the SPP data also show almost one-third (31%) of schools reporting vacancies for “general elementary” teachers and one-fifth (20%) of schools reporting vacancies for substitute teachers, a problem that became particularly acute during the pandemic.

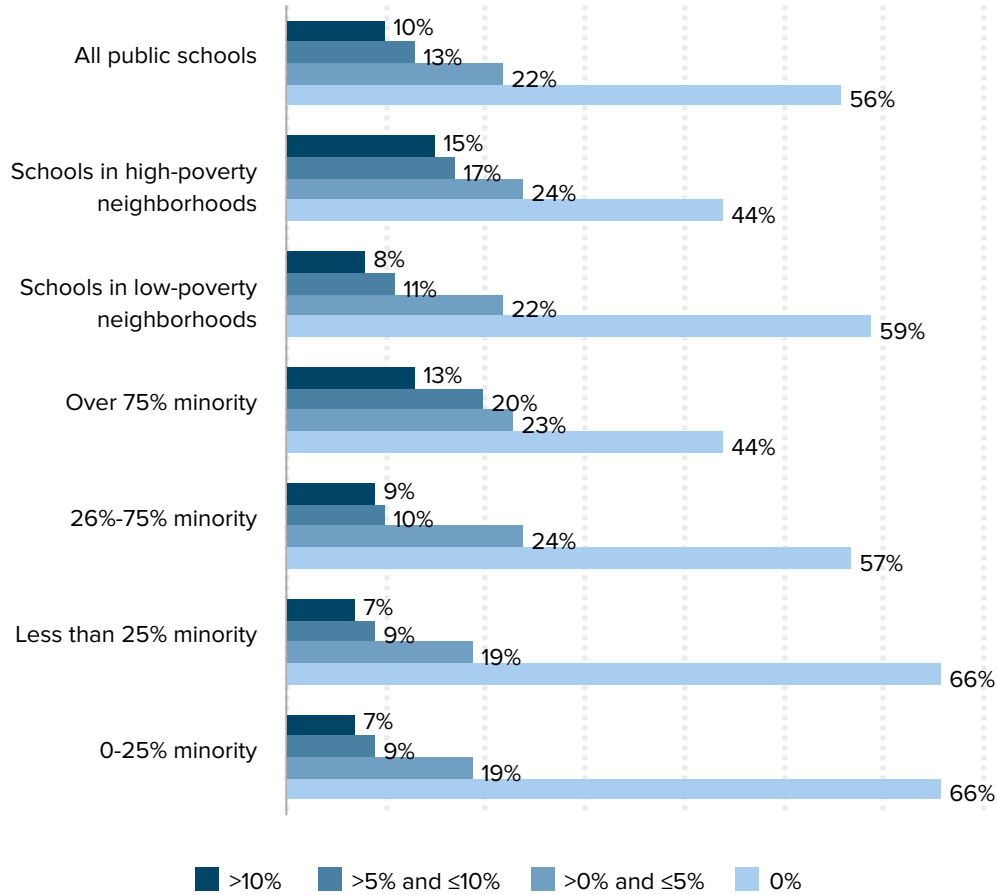
American School District Panel data

A separate survey of over 350 school district leaders conducted between October and December of 2021 by RAND and partner organizations also found widespread evidence of teacher shortages after the pandemic (**Figure E**). Two-thirds (67%) of district leaders in traditional public school districts agreed that the pandemic has caused shortages of teachers and 95% agreed that the pandemic has caused shortages of substitutes (Schwartz and Diliberti 2022, Figure 1). In the case of substitute teachers, 93% of district leaders reported shortages were “moderate” (16%) or “considerable” (77%); for special education, 60% of district leaders reported shortages, with 19% moderate and 41% considerable; and for mathematics, 48% of district leaders reported shortages, with 16%

Figure C

Teaching vacancy rates have been particularly high since the pandemic

Percentage of public schools reporting teaching vacancies, January 2022



Notes: Data are from IES (see Source line). Minority students are reported as "mutually exclusive categories by the percentage of students who are not Black, Hispanic, Asian, American Indian/Alaska Native, or Two or more races." The Income-to-Poverty ratio (IPR) for the neighborhood surrounding the school location is used to distinguish schools in high- and low-poverty neighborhoods. The IPR estimates come from the National Center for Education Statistics' [EDGE School Neighborhood Poverty Estimates](#). The IPR is the percentage of family income that is above or below the federal poverty threshold set for the family's size and structure and is calculated for the neighborhood surrounding the school building. It ranges from 0 to 999, where lower IPR values indicate a greater degree of poverty. A family with income at the poverty threshold has an IPR value of 100. In this analysis, IPR values of 200 or lower represent schools in high-poverty neighborhoods; IPR values greater than 200 represent schools in low-poverty neighborhoods.

Source: Institute of Education Sciences (IES), [School Staffing Shortages: Results from the January School Pulse Panel \(SPP\)](#), 2022a.

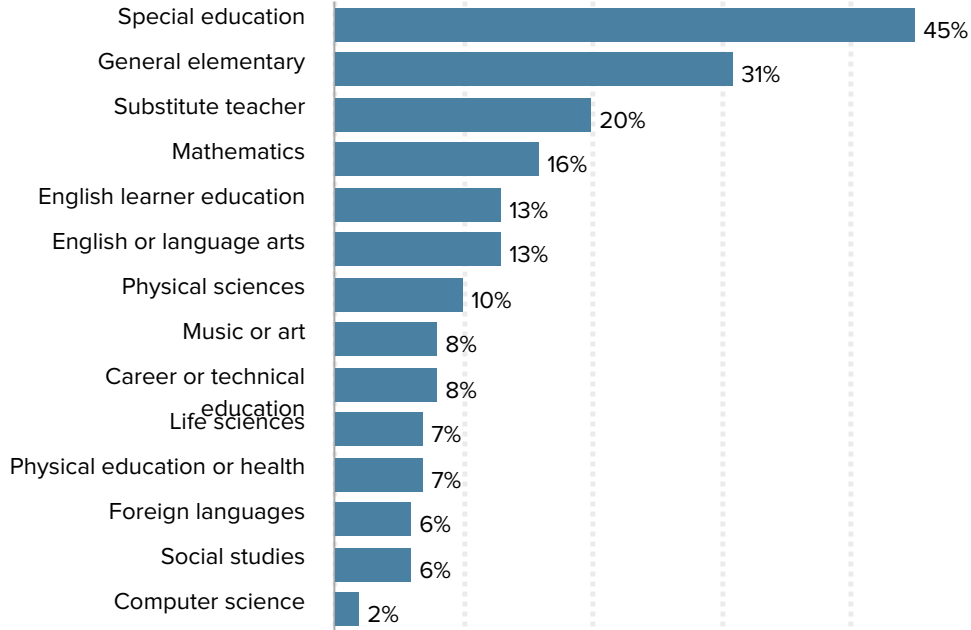
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moderate and 32% considerable. These shortages, however, were not confined to area specialties, with 54% responding that they had moderate or considerable shortages for "high school" teachers, 43% for "middle school" teachers, and 38% for "elementary school" teachers¹⁶ (Schwartz and Diliberti 2022, Figure 2).

Figure D

Teaching vacancies cut across subject areas (1)

Share of public schools reporting vacancies in listed subject areas, January 2022



Source: Institute of Education Sciences (IES), *School Staffing Shortages: Results from the January School Pulse Panel (SPP)*, 2022a.

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A summer 2022 nationally representative survey conducted by the EdWeek Research Center of 255 principals and 280 district leaders had similar findings. Seventy-two percent of the school administrators said that there were not enough applicants to fill the teaching positions they had open for the 2022–2023 school year (Lieberman 2022).

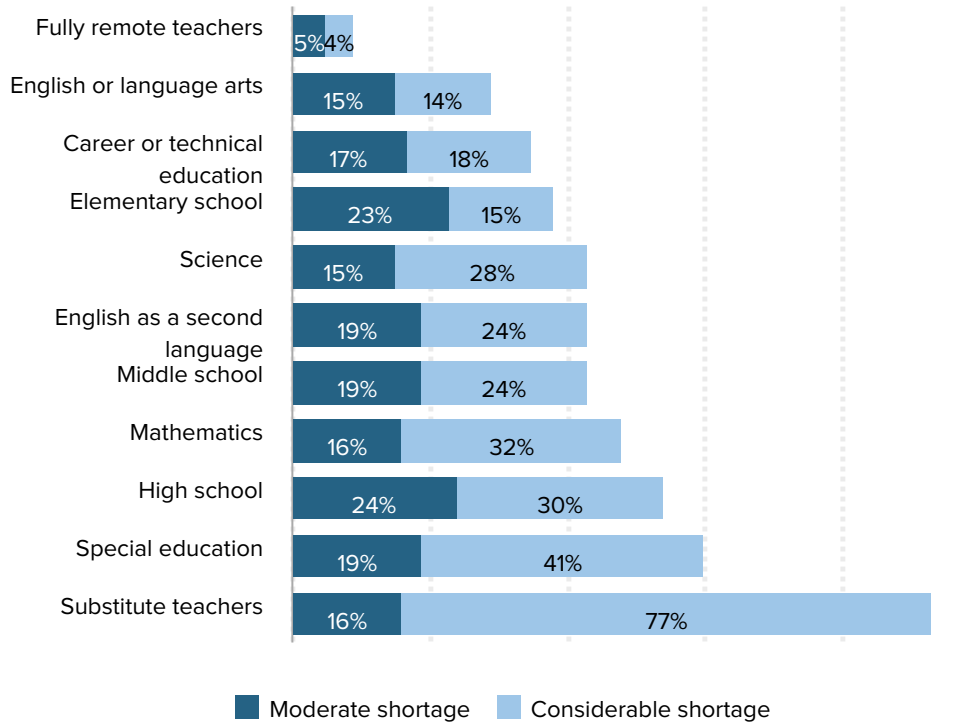
Decline in interest in the teaching profession

At the same time that we have observed high and rising levels of vacancies, interest in entering the teaching profession has been on the decline. In addition to declining interest in majoring in education among incoming college freshmen across the U.S., there has been a decrease in the number of education degrees conferred by postsecondary institutions, as well as a falling number of people completing nontraditional teacher preparation programs. These findings are consistent with the idea that teaching is becoming less attractive relative to other professions employing a high share of college graduates.

Figure E

Teaching vacancies cut across subject areas (2)

Percentage of district leaders reporting levels of staff shortages, Fall 2021



Note: Responses to survey of 358 school leaders conducted by the RAND Corporation between October and December 2021.

Source: Heather Schwartz and Melissa Kay Diliberti, [Flux in the Educator Labor Market: Acute Staff Shortages and Projected Superintendent Departures: Selected Findings from the Fourth American School District Panel Survey](#), RAND Corporation, 2022.

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Falling interest in education as a field of study

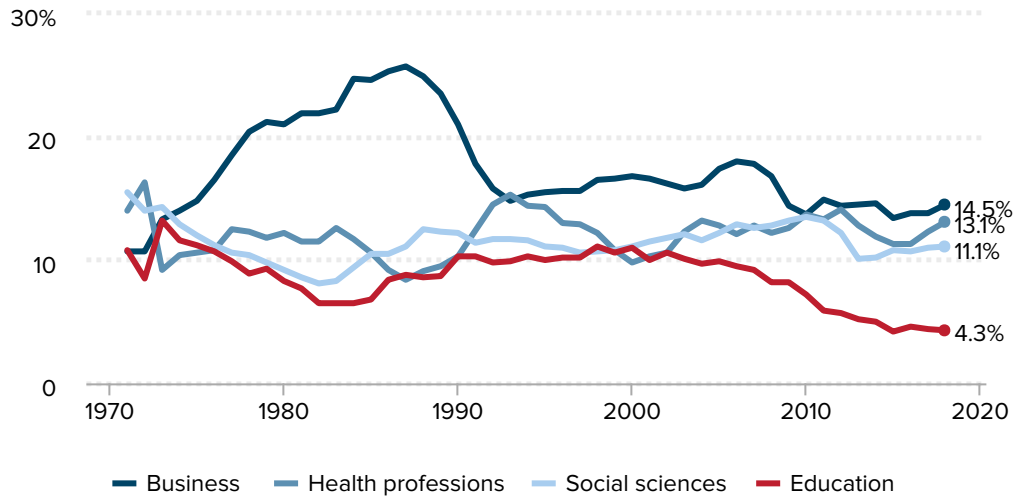
For the past five decades, the University of California at Los Angeles (UCLA) Higher Education Research Institute has surveyed incoming college freshmen nationwide to learn more about their backgrounds, beliefs, and expectations. In addition to questions regarding the respondents’ political views, levels of empathy, tolerance, and openness, and the distance of their chosen college from home, the survey also asks: “What is your probable field of study?” Respondents can choose from “arts and humanities,” “business,” “education,” “engineering,” “health professions,” “mathematics or computer science,” “physical and life sciences,” “social sciences,” and “other and undecided.”

Figure F illustrates the sharp decline since the early 2000s in the share of incoming college freshman intending to major in education. The percentage of students intending to study education remained steady at about 10% for much of the 1990s but fell to 4.3% by 2018. In 2000, interest in education (11.0%), health professions (9.8%), and social sciences

Figure F

Interest in majoring in education has dropped by half since the 1970s

Percent of incoming college freshmen intending on studying in various fields, 1971–2018



Source: Cooperative Institutional Research Program, Higher Education Research Institute, U. of California at Los Angeles (Brian O’Leary, “Backgrounds and Beliefs of College Freshman,” *The Chronicle of Higher Education*, August 12, 2020).

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(11.1%) was nearly level. By 2018, however, interest in education had fallen by more than half, even as interest in health professions grew by one-third to 13.1% and social sciences remained steady at 11.1%. The falling student interest in education majors is consistent with results of the 2022 Phi Delta Kappan survey, which found that only 37% of parents with children in public schools would like to have their child “take up teaching in the public schools as a career”—down from 75% in 1969 (Walker 2022).

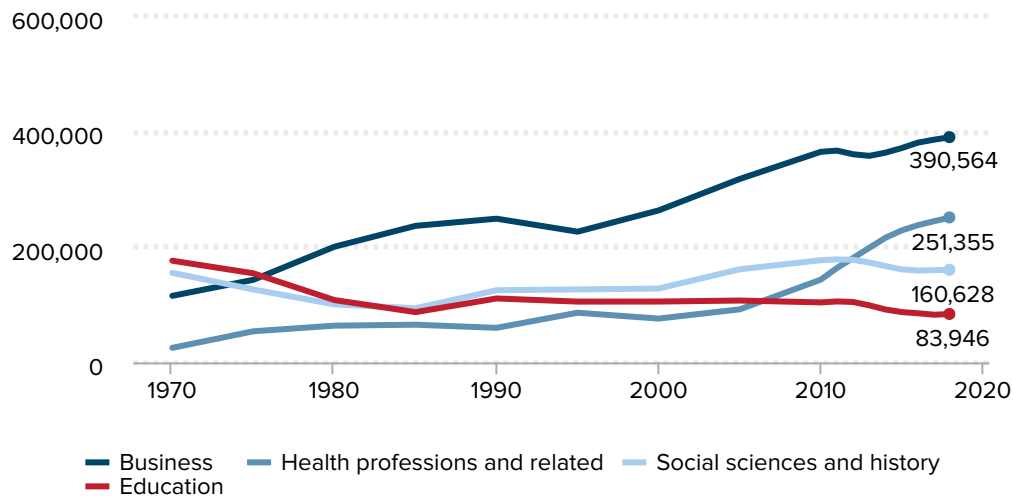
Falling number of education degrees conferred

The falling interest in education majors is reflected in the data for education degrees conferred, which have declined steadily since the early 2010s. **Figure G** presents data from the National Center for Education Statistics (NCES) on the number of bachelor’s degrees conferred in education and selected other majors. The absolute number of education degrees conferred was substantially lower in 2018 than it was in 1970, and lower in 2018 than at any point in the entire period in the last five decades. More importantly, the relative standing of education dropped substantially over the period: In 1970, education degrees were more popular than degrees in business, health professions, and social sciences and history. By 2018, education was, by a substantial margin, the least popular choice of major among these same categories.

Figure G

The share of bachelor's degrees conferred in education is low and falling

Bachelor's degrees conferred by postsecondary institutions, by selected field of study, academic years beginning 1970–2010 (five-year intervals) and 2010–2018



Source: Authors' analysis of U.S. Department of Education, National Center for Education Statistics (NCES) data (National Center for Education Statistics, "DES Table 322.10: Bachelor's Degrees Conferred by Postsecondary Institutions, by Field of Study," *Digest of Education Statistics*, November 2019).

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Nontraditional teacher prep programs don't make up the difference

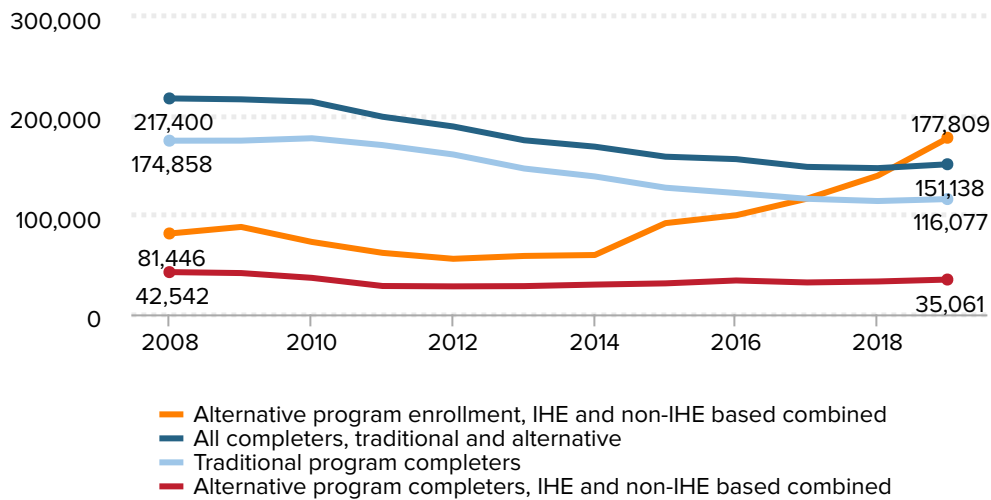
Meanwhile, nontraditional teacher preparation programs have not made up for the steep decline in bachelor's degrees in education. The U.S. Department of Education tracks enrollment and completion in nontraditional teacher preparation programs as part of its Title II State Report Card. The Title II Report provides data on the total number of teacher preparation programs, the number of individuals enrolled, and the number of program completers by program type.

Figure H illustrates the overall decline in the number of teacher preparation program completers, as well as the respective declines in completers in traditional and alternative programs. Although the number of traditional program completers remained steady between the 2008–2009 and 2010–2011 academic years, since the 2008–2009 academic year the number of traditional program completers has fallen by 34%. Over the same period, the number of alternative program completers fell by 18%, indicating that alternative program completers have not been able to make up for the decline in traditional program completers. While the Title II data show a large, steady increase in *enrollment* in nontraditional teacher preparation programs after 2014, the large and growing gap between initial enrollment and *successful completion* casts doubt on the ability of nontraditional programs, as currently structured, to contribute to the total supply

Figure H

Nontraditional paths to teaching have not made up for the decline in traditional teacher preparation

Traditional and alternative teacher preparation program completers, academic years 2008–2019



Note: IHE refers to institutions of higher education that conduct teacher preparation programs, while non-IHE programs are state-approved teacher preparation programs operating outside of IHEs.

Source: EPI analysis of U.S. Department of Education, Higher Education Act Title II State Report Card System data (Department of Education, “National Teacher Preparation Data,” 2021 Title II Reports, October 2021).

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of potentially qualified teachers.

Large shares of teacher prep graduates decide not to teach

The decline in interest in teaching is even worse than the preceding data on teacher preparation programs suggest because a large portion of those who complete traditional and nontraditional teacher preparation programs ultimately decide not to enter teaching or to leave the profession soon after entering. As Dee and Goldhaber (2017) note, “the number of education graduates produced annually far exceeds the number of teachers new to the labor market who are hired” (pp. 7–8). Pennington McVey and Trinidad (2019) estimate that “about half of teachers who have degrees in teaching do not teach” (p. 10).

Analysts skeptical of the existence of teacher shortages sometimes argue that the large number of potential teachers who are not teaching is evidence that there is not a teacher shortage.¹⁷ Alternatively, the declining interest in education majors, the fall in the number of education degrees conferred, and the large share of adults who invest in a teaching career and then decide not to pursue it all signal a long-term decline in the attractiveness

of the teaching profession.

The teacher shortage is bigger than unfilled or underfilled vacancies

All the evidence of shortages that we have reported so far relied explicitly on school administrators' assessments of the number of teachers needed based on their professional judgement and their understanding of the budget constraints they face. If schools were less financially constrained, the teacher shortage could be even larger than what the existing data already suggest.

A quick calculation can give a rough sense of how large the teacher shortage would be if school administrators were able to make staffing decisions based on educational goals, rather than strictly on financial constraints. A recent analysis by Baker, Di Carlo, and Weber (2022) used a national education cost model to estimate “the funding levels required to achieve the goal of national average math and reading scores” in all U.S. public schools, a goal that they identified as “modest but reasonable [and] common” (p. 2). Their comprehensive review of current spending levels and student outcomes (student results on standardized tests) concluded that achieving this benchmark of “universal adequacy” would require an increase of \$132 billion in total local, state, and federal spending, which would represent an increase of 13% in total 2019 state and local spending.

If the 13% increase were spent in the same proportion as current spending, this would require a 13% increase in the number of teachers. Using the NCES estimate for 2019 of 3.2 million public K–12 teachers in the United States,¹⁸ the Baker, Di Carlo, and Weber (2022) “universal adequacy” target would have required 416,000 more teachers, even before the pandemic. Even if increases in teaching staff were only half as large as the overall percentage increase, the number of new teachers required over and above 2019 staffing levels would be more than 200,000.¹⁹

Main drivers of the teacher shortage

As we have emphasized, the United States does not have a shortage of individuals qualified (or potentially qualified) to teach in K–12 public schools. The teacher shortage we are experiencing is, instead, a shortage of qualified teachers who are *also* willing to work for current levels of compensation and under the working conditions currently on offer. Researchers have identified many factors that make teaching an increasingly less attractive profession.²⁰ We focus here on two of those factors that are particularly important: the low pay relative to other professions requiring similar levels of formal education and the increasingly stressful working conditions.

Poor compensation

Almost all public K–12 teachers have at least a four-year college degree (96%); a large share also have advanced (56%) degrees.²¹ Teachers, however, consistently earn substantially less—in salary and benefits—than other workers with a similar level of formal education. Most importantly for our analysis, the gap between teacher pay and the pay of other college graduates has grown in recent decades. Financially, teaching is substantially less attractive now than it was before the teaching shortage emerged.

Current Population Survey data

Since the mid-2000s, our colleagues at the Economic Policy Institute have used data from the nationally representative Current Population Survey (CPS) to track the pay of teachers relative to other college graduates. **Figure I** summarizes their most recent findings (Allegretto 2022). In 2021, teachers made on average 23.5% less per week of work than other college graduates in the workforce, after controlling for workers' education, age, state of residence, and a range of additional characteristics that may affect earnings. The teacher pay gap measured in this way has increased almost continuously since the mid-1990s, when it stood at about 5% overall.

One potential objection to this analysis is that nonwage benefits (such as health insurance and retirement benefits) more than compensate for lower teacher salaries. However, even after accounting for the more generous benefits paid to teachers, teachers remained 14.1% behind their nonteaching counterparts.²² Moreover, the growth in benefits over the period was not enough to prevent the teacher compensation gap—including both salary and benefits—from rising in recent decades. Allegretto (2022) calculated that the total teacher compensation gap increased by 11.5 percentage points between 1993 and 2021.

A second potential objection is that teachers only work part of the year, while most workers with college degrees work year-round. To address this concern, the analysis in Figure I compares weekly, rather than annual, earnings of teachers and nonteachers.

To understand the role of pay in the teacher shortage, the most important feature of the data summarized in Figure F is that the relative earnings of teachers—measured on a consistent basis in each year—steadily declined over the last three decades. This finding implies that the earnings of teachers today relative to their college-educated counterparts are substantially lower than the earnings of teachers in the 1990s relative to their own college-educated counterparts in the same decade. This decline in the financial standing of teachers relative to other college graduates coincides with a sustained rise in unfilled teaching vacancies, an increase in the rate of teachers quitting their jobs, and a long-term decline in interest in the teaching profession.

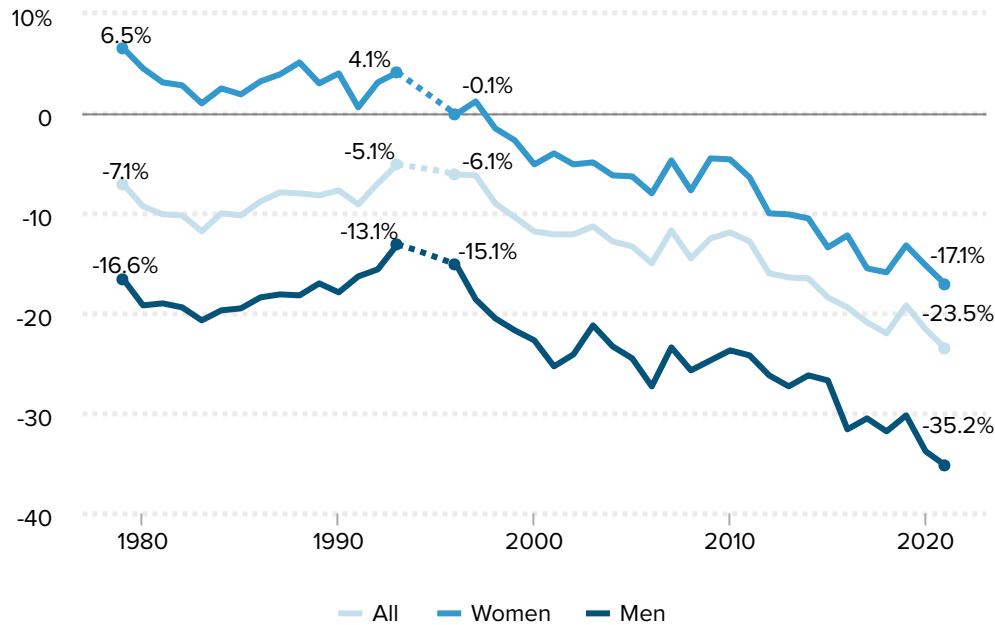
American Community Survey data

A separate, recent analysis by the U.S. Census Bureau American Community Survey (ACS),

Figure I

The earnings of teachers have fallen relative to other college graduates for three decades

Public school teacher weekly wage penalty (or premium) for all teachers and by gender, 1979–2021



Notes: Figure shows regression-adjusted weekly wage penalties (or premiums) for public school teachers (elementary, middle, and secondary) relative to their college-educated, nonteaching peers. Data points for 1994 and 1995 are unavailable; dotted lines represent interpolated data. See [Allegretto and Mishel 2019](#), Appendix A, for more details on data and methodology.

Source: Figure B, analysis of Current Population Survey Outgoing Rotation Group data accessed via the EPI Current Population Survey Extracts, Version 1.0.29, <https://microdata.epi.org> (Sylvia Allegretto, [The Teacher Pay Penalty Has Hit a New High: Trends in Teacher Wages and Compensation through 2021](#), Economic Policy Institute, August 22).

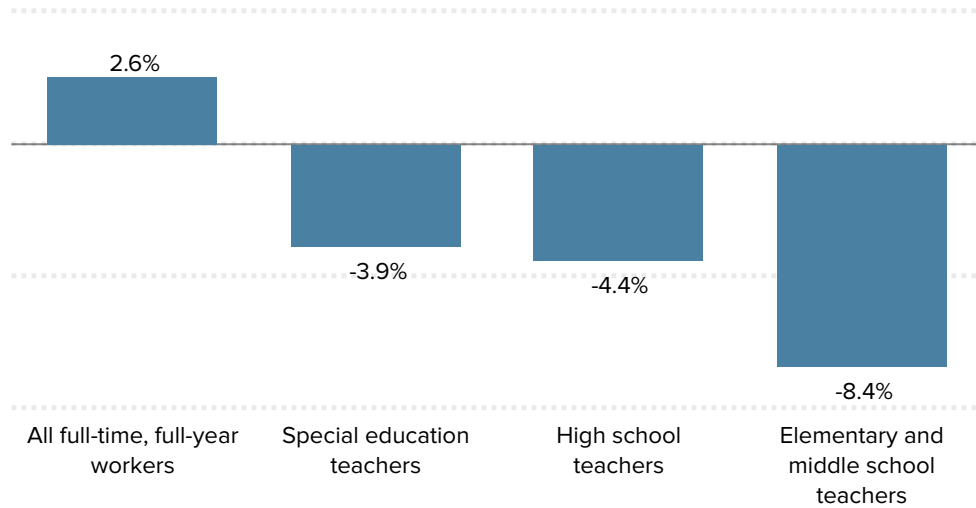
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another nationally representative survey of U.S. households, arrived at similar conclusions: “Although teachers are among the nation’s most educated workers, they earn far less on average than most other highly educated workers and their earnings have declined since 2010” (Cheeseman Newburger and Beckhusen 2022). According to the Census Bureau, the inflation-adjusted median annual earnings of all full-time, full-year workers—60% of whom have less than a four-year college degree—grew 2.6% between 2010 and 2019 (**Figure J**). Over the same period, median earnings for elementary and middle school teachers fell 8.4%, for high school teachers fell 4.4%, and for special education teachers, where shortages have been particularly acute, fell 3.9%.

Figure J

Census Bureau analysis shows inflation-adjusted annual earnings of teachers fell between 2010 and 2019

Change in inflation-adjusted median annual earnings, 2010–2019



Source: Jennifer Cheeseman Newburger and Julia Beckhusen, [Teachers Are Among Most Educated, Yet Their Pay Lags](#), U.S. Census Bureau, July 2022.

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Organisation for Economic Co-operation and Development data

International data compiled by the Organisation for Economic Co-operation and Development (OECD) suggest that teacher pay in the United States is poor when compared with other rich countries. For 2019 (or the most recent year available), the OECD calculates the annual earnings of teachers in each country relative to the annual earnings of full-time, full-year workers with the equivalent of a college degree or more in the same country.

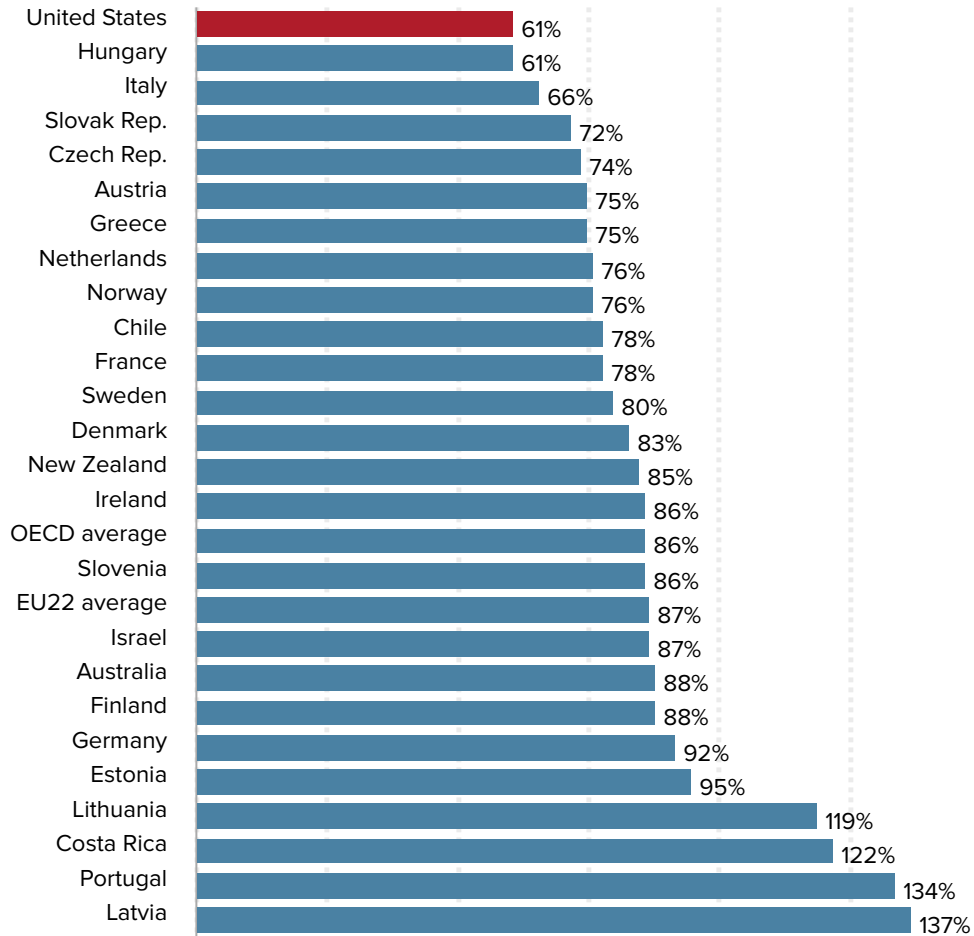
Figure K presents the OECD data on pay for primary school teachers. The relative pay for teachers in the United States is at the bottom—tied with Hungary—of the set of countries for which the OECD has data. In the United States, the annual earnings of public primary school teachers are 61% of the earnings of full-time, full-year workers with a college degree or more. By comparison, the ratio is 80% or higher in other rich countries, including Sweden, Denmark, New Zealand, Ireland, Slovenia, Israel, Australia, Finland, and Germany. Similar data for lower secondary and upper secondary school teachers (not shown here) show a similar pattern (OECD 2021).²³

The low level of relative teacher pay in the United States is particularly problematic given that OECD data also indicate that, on average, U.S. teachers work more hours per year

Figure K

Relative pay for teachers is far lower in the United States than in other OECD countries

Pay of public primary school teachers, as a percentage, relative to other college graduates, most recent year available, 2017–2019



Source: Organization of Economic Cooperation and Development (OECD), “Teachers’ and School Heads’ Actual Salaries Relative to Earnings of Tertiary Educated Workers (2020),” Education at a Glance: OECD Indicators, 2021.

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than teachers in all other OECD countries. **Figure L** presents the corresponding annual hours data for primary school teachers; annual hours data for lower and upper secondary school teachers follow the same pattern.

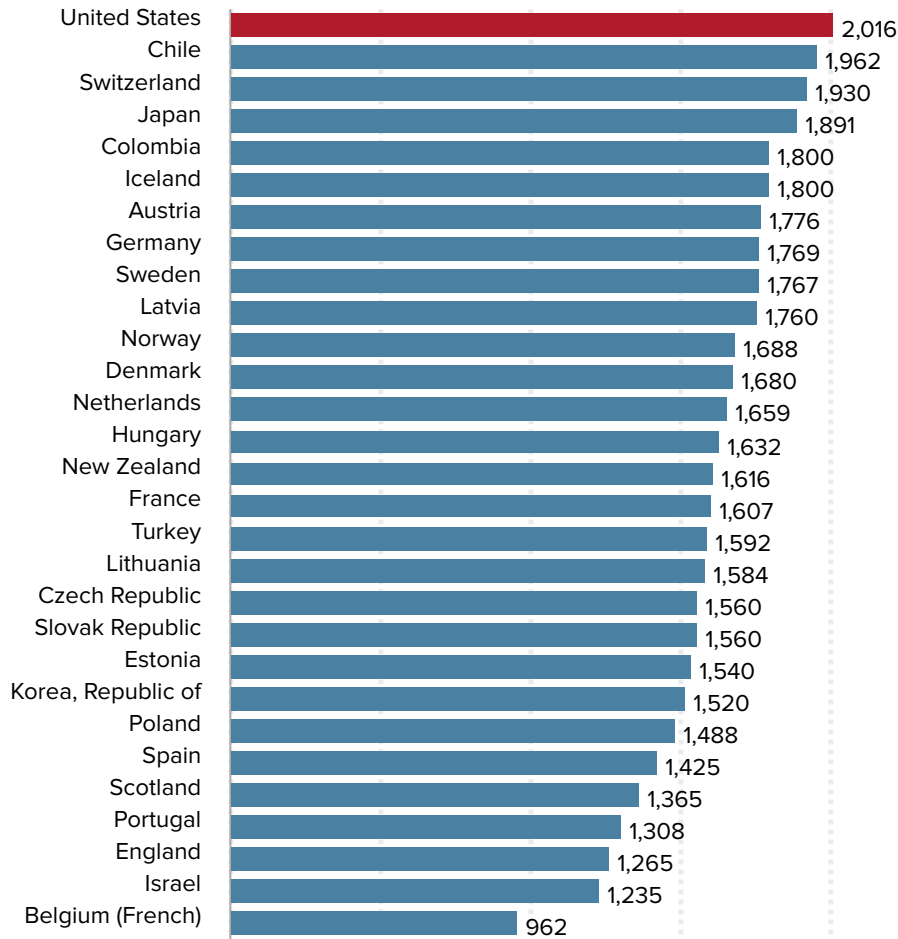
Stress

Teaching is stressful. Sources of teacher stress include long hours during the school year, large class sizes, juggling second jobs to supplement pay, evaluation processes that depend heavily on standardized testing results, discrimination against teachers of color,

Figure L

U.S. teachers work more hours per year than teachers in other OECD countries

Annual hours worked by primary school teachers, by country, 2018



Notes: Data from multiple sources—including international comparisons—suggest that teachers in the United States are paid less than their college-educated counterparts. These differences persist even after factoring in nonwage benefits and controlling for differences in the length of the work year. Most importantly, the U.S. data show that the earnings of teachers relative to other professions have been in steep and steady decline for at least three decades.

Source: Organization for Economic Cooperation and Development (OECD), “Teachers’ Statutory Teaching and Total Working Time and Average Class Size in Public Elementary and Secondary Schools, by Level of Education and Country: 2017 and 2018,” Education at a Glance, 2019.

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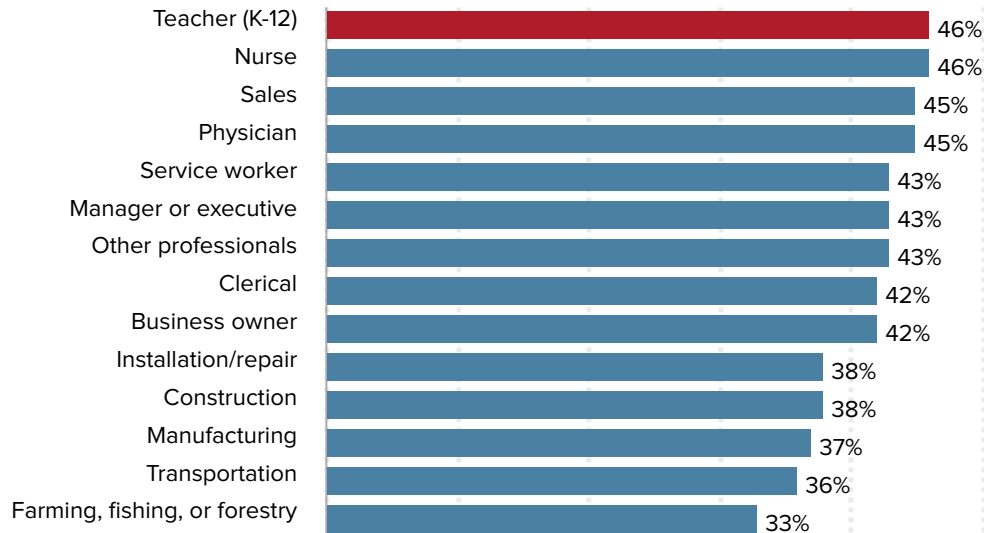
lack of control over the curriculum, and an increasingly politicized environment.²⁴ From the onset of the pandemic, teachers have also had to cope with a host of new stressors, including elevated health risks, complicated child care arrangements, and challenges involved in switching between in-person, remote, and hybrid learning.

These old and new sources of stress are a major driver of the rising level of unfilled teaching vacancies and the diminished interest in teaching. A recent survey conducted by

Figure M

Teachers report high levels of stress relative to other professions

Percentage responding “yes” to having experienced stress “during a lot of the day yesterday,” 2013



Source: Recreation of 2013 Gallup-Healthways Well-Being Index survey (Gallup, *State of America's Schools: The Path to Winning Again in Education*, 2014).

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the RAND Corporation of teachers who left teaching before and during the COVID-19 pandemic found that “stress was the most commonly reported reason for leaving the profession among both those teachers who left before and those teachers who left during the pandemic” (Diliberti, Schwartz, and Grant 2021, p. 10). Stress is particularly acute for teachers of color and contributes to their higher attrition rates.²⁵

Pre-pandemic stress

Data from a variety of sources show that, even before the pandemic, teacher stress was as high as or higher than stress for workers in other professions, including occupations known for challenging working conditions.

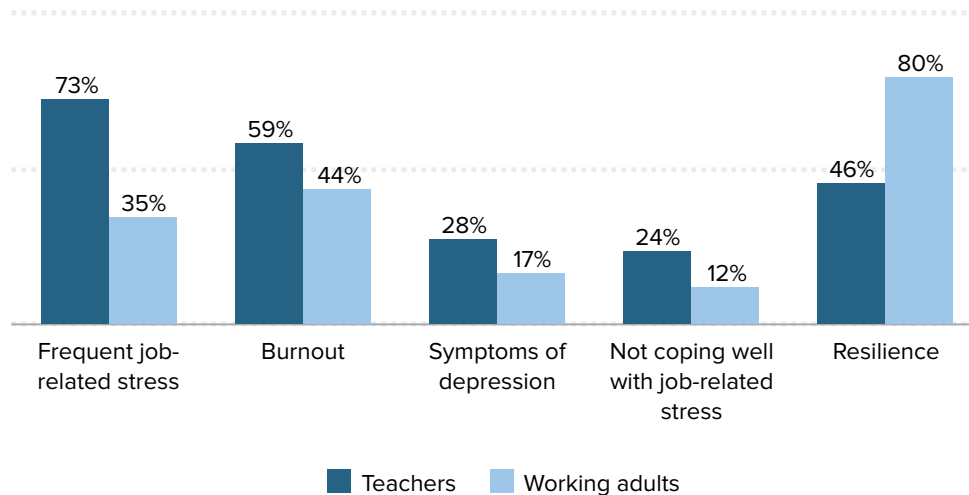
A 2013 Gallup-Healthways Well-Being Index survey found that 46% of K–12 teachers experienced “stress during a lot of the day” immediately before they were interviewed by Gallup (Gallup 2014). This rate was as high as or higher than rates for nurses (46%), physicians (45%), managers or executives (43%), service workers (43%), and business owners (42%) who were asked the same question (**Figure M**).

A 2017 study by the American Federation of Teachers (AFT) interviewed 4,000 educators, including 830 randomly sampled AFT members, and found similarly high levels of stress. Almost one-fourth (23%) said work is “always stressful” and another 38% said work is

Figure N

Teachers report higher levels of stress, burnout, and symptoms of depression than other working adults

Percentage who reported experiencing each indicator of well-being, January 2022



Source: Based on Figure 1 (Elizabeth D. Steiner, Sy Doan, Ashley Woo, Allyson D. Gittens, Rebecca Ann Lawrence, Lisa Berdie, Rebecca L. Wolfe, Lucas Greer, and Heather L. Schwartz, *Restoring Teacher and Principal Well-Being Is an Essential Step for Rebuilding Schools: Findings from the State of the American Teacher and State of the American Principal Surveys*, RAND Corporation, 2022).

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“often stressful” (AFT and BAT 2017, Chart 1). The AFT also reported that one-fifth (21%) of respondents stated that their mental health was “not good” for 11 or more days in the preceding 30 days, double the 10% rate for working adults responding to a similar question in a 2014 National Institute of Occupational Safety and Health (NIOSH) -sponsored survey (AFT and BAT 2017, Chart 7).

The NCES’s 2017–2018 school year National Teacher and Principal Survey (NTPS) reported that more than one-fourth (27.8%) of public school teachers said that they “strongly” or “somewhat” agreed with the statement that “the stress and disappointments involved in teaching at this school aren’t really worth it” (NCES 2020b).

Pandemic-related stress

Unsurprisingly, measures of teacher stress have increased substantially since the pandemic. A January 2022 RAND Corporation survey of over 2,300 teachers found that 73% reported “frequent job-related stress,” just over twice the 35% rate in the nonteaching working population at the same point in time; 59% of teachers were experiencing burnout, compared with 44% of other working adults; and 28% had symptoms of depression, versus 17% for other workers (See **Figure N**, drawn from Steiner et al. 2022, p. 5).

Steiner and Woo (2021, Figure 1) reported large differences in 2021 between a sample of

teachers surveyed in RAND’s American Life Panel and all U.S. adults surveyed in the Understanding America Study conducted by the University of Southern California Dornsife Center for Economic and Social Research. More than three-fourths (78%) of teachers reported experiencing “frequent job-related stress” compared with 40% of adults in general. More than one-fourth (27%) of teachers had symptoms of depression, compared with 10% of all adults.

Diliberti and Schwartz (2022) found that almost nine out of 10 (87%) of school district leaders responding to RAND’s American School District Panel in November 2021 expressed “concern” about the mental health of teachers, with 56% indicating that mental health was a “major concern” (p. 2).

In a recent analysis, RAND researchers Diliberti, Schwartz, and Grant (2021) concluded that “stress seems to be at the heart of teachers leaving the profession early, both before and during the pandemic” (p. 10). They surveyed 958 teachers who had left public school teaching shortly before or after the outbreak of COVID-19. The survey found that “four in ten voluntary early leavers—including both those who left before and during the pandemic—selected ‘the stress and disappointments of teaching weren’t worth it’ as a reason for leaving” (p. 6). **Table 1** reproduces the complete set of reasons for leaving teaching from the same survey.²⁶

The high levels of stress teachers endure are concurrent with declining earnings relative to other college-educated workers. The teacher shortage itself amplifies stress levels by increasing the workloads of those teachers who remain. Together, rising stress and declining relative earnings have made it harder and harder for public schools to fill vacancies with qualified teachers.

Conclusion

At least since the onset of the Great Recession, public K–12 schools have struggled to hire and retain the teachers they need to educate the next generation. Data on vacancies from a range of sources all point to a growing shortage of teachers. The shortage cuts across geographic regions and subject areas, but it is particularly acute in some states and in some teaching specialties. In almost every case, shortages are worst in schools with high shares of low-income students or students of color, thereby exacerbating broader inequalities along lines of class and race.

The shortage does not stem from a lack of qualified teachers. Even with recent declines in the share of individuals completing teacher preparation courses, the number of qualified (or potentially qualified) teachers substantially exceeds the number of teaching vacancies. The shortage is, instead, the result of a lack of qualified teachers willing to work in what has long been a highly stressful job for compensation that is well below what is available to college-educated workers in other professions.

Table 1

Stress is a leading cause for leaving teaching in a public school

Percent share of teachers citing each possible reason

| Reason | Percentage |
|---|------------|
| <i>The stress and disappointments of teaching weren't worth it</i> | 43% |
| <i>I didn't like the way things were run at my school</i> | 32% |
| <i>Other</i> | 32% |
| <i>I did not get enough support from my district or school</i> | 29% |
| <i>My pay was not sufficient</i> | 24% |
| <i>I found a better job that is education-related (e.g. school administration, tutoring)</i> | 23% |
| <i>I found a better job that is not education-related</i> | 13% |
| <i>COVID-19 was the only reason I left public school teaching</i> | 7% |
| <i>I found a better traditional teaching job in another school</i> | 6% |
| <i>I found a better nontraditional teaching job (e.g. leading a learning pod or teaching in a micro school)</i> | 5% |

Notes: December 2020 responses from 958 K–12 public school teachers who had left teaching in a public school before or after the March 2020 onset of the COVID-19 pandemic to the survey question: "What were the reasons you left teaching in a public school, regardless of whether COVID-19 influenced your departure?" Respondents were allowed to cite more than one reason, therefore reasons listed do not sum to 100%.

Source: Table B.8 from Melissa Kay Diliberti, Heather L. Schwartz, and David Grant, "Stress Topped the Reasons Why Public School Teachers Quit, Even Before COVID-19," RAND Corporation, 2021.

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We thank Madilynn O'Hara for research assistance.

Notes

1. For comprehensive discussions, see Sutchter, Darling-Hammond, and Carver-Thomas 2016, 2019 and García and Weiss 2019a–e.
2. Though it may be the case that there is an absolute shortage of qualified teachers in some subject areas.
3. See also García and Weiss 2019a–e and Sutchter, Darling-Hammond, and Carver-Thomas 2016, 2019.
4. See references below, but especially García and Weiss 2019a–e.
5. For another recent analysis of the teacher shortage, see NEA 2022.
6. See, for example, Cowan et al. 2016 and Dee and Goldhaber 2017.

7. See Pennington McVey and Trinidad's 2019 review of the TSA methodology (pp. 19–21) for a discussion of limitations of the data. States are encouraged, but not required to submit data. The Department of Education does not provide states with a standard reporting template and, as a result, descriptions of shortage areas can vary across states. Perhaps most importantly in the current context, states do not provide information on the size of the shortages reported.
8. To be clear, Pennington McVey and Trinidad are less concerned about the state of the labor market for teachers than our interpretation of their results suggests here. They believe that “contrary to popular talking points, there is no generic shortage of teachers...[there is not a] lack of certified teachers *overall*, but a chronic and perpetual misalignment of teacher supply and demand...there are unique teacher shortages in specific subject areas, school types, and geographies” (p. 5, emphasis in original). However, the authors do not comment on the implications for teacher shortages of the substantial rise they document after 2003–2004 in the share of states reporting shortages across nearly all of the subject areas covered in their Figures 5, 6, 7, and 8.
9. See Pennington McVey and Trinidad's 2019 methodological discussion for additional limitations of the data (pp. 1–22). States are encouraged, but not required, to submit data. The Department of Education does not provide states with a standard reporting template and, as a result, descriptions of shortage areas can vary across states.
10. As the authors note, they report the “minimum number of teachers not fully certified for their teaching assignments” because state data often underestimate total shortages. For example, some states report uncertified teachers only in core academic areas rather than in all subjects, and other states report tallies from surveys that represent a subset of districts in the state.”
11. Authors’ calculations based on the Current Population Survey, 2014–2019.
12. Public K–12 schools are also experiencing shortages of staff in nonteaching occupations, such as cafeteria workers, cleaners, bus drivers, and others (Cooper and Martinez Hickey 2022).
13. An alternative explanation is that state and local education workers are quitting at a faster rate, but switching jobs within the sector. The rising rate of vacancies and other information presented here on reported shortages, falling teacher compensation, and rising teacher stress suggest that this is a less likely explanation.
14. See Gould 2022.
15. For more information on the survey, see IES and NCES 2021.
16. For other recent accounts of teacher shortages, see also Carver-Thomas 2022 and NEA 2022. For additional analysis of the pre-pandemic teacher shortage, see Sutchter, Darling-Hammond, and Carver-Thomas 2016, 2019 and García and Weiss 2019a–e.
17. See, for example, Cowan et al. 2016 and Dee and Goldhaber 2017.
18. See National Center for Education Statistics (NCES) 2021.
19. As Gould (2022) notes, as of September 2022 state and local government employment was still 3.2% below pre-pandemic employment levels.
20. See Carver-Thomas 2022, DiNapoli 2022, García and Weiss 2019a–e, Kemper Patrick and Carver-Thomas 2022, and Kini 2022.
21. Authors’ calculations using Current Population Survey data for 2021.

22. In 2021, the teacher salary gap was 23.5%, while the teacher benefit advantage was 9.3% (Allegretto 2022).
23. A similar pattern of high annual hours for U.S. teachers also holds across lower and upper secondary education levels.
24. For reviews of these and related issues, see Kyriacou 2001, McCarthy, Lambert, and Ullrich 2012, McCarthy et al. 2016, Ryan et al. 2017, García and Weiss 2019a–e, among many others.
25. See García and Weiss 2019a–e, Cormier et al. 2021, Steiner et al. 2022.
26. See Diliberti, Schwartz, and Grant 2021, p. 6, and Table B.8. For further evidence on the impact of stress on teacher turnover, see the recent survey of National Education Association members conducted by GBAO Strategies 2022: “More than half (55%) of [3,621] members [surveyed] say they are more likely to leave or retire from education sooner than planned because of the pandemic, almost double the number saying the same in July 2020. Black and Hispanic educators are more likely to say they are more likely to retire or leave early, which could leave the teaching profession less diverse” (p. 2).

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