

# **The State of the Teacher Workforce: A State-by- State Analysis of the Factors Influencing Teacher Shortages, Supply, Demand, and Equity Technical Supplement**

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## Introduction

This technical supplement provides details on the data and methodology of the *State of the Teacher Workforce* interactive map. The map provides state-level estimates of more than 40 indicators that reflect and influence the supply and demand for teachers in each state, including conditions of teachers' work and equitable access to qualified teachers. These indicators broadly fall into three categories:

1. **Teaching attractiveness:** These indicators reflect the extent to which there are supportive conditions in each state for teacher recruitment and retention.
2. **Teacher equity:** These indicators show the extent to which students in each state have equitable access to certified and experienced teachers.
3. **Additional factors influencing teacher supply and demand:** These indicators capture other conditions that could impact teacher shortages in each state.

The map visualizes how these indicators vary across states, which allows policymakers to identify areas in which an individual state is particularly ahead or behind other states. The map focuses on state-level data because state policies play a large role in shaping the teacher workforce. For example, states hold the authority to license educators and approve educator preparation programs as well as set professional standards for teachers and criteria for career advancement. In addition, state accountability policies and school funding formulas also shape the school environment and resources influencing teachers' daily work. For a subset of indicators on teacher qualifications, the map also shows differences across schools within states.

In this technical supplement, we outline the data sources used for the map and our methodology for calculating the indicators, summary ratings, and state groupings. We also discuss considerations that should be noted when interpreting the information presented.

# Data

## Sources

The map builds on national data sets that are representative at the state level, which allowed us to calculate state-level values using a common data source for each state. For all sources, we used the most recent year of data available as of April 2023. We drew from the following data sources to construct the estimates.

### **National Teacher and Principal Survey and Teacher Follow-Up Survey**

The National Teacher and Principal Survey (NTPS), administered by the U.S. Department of Education's National Center for Education Statistics, collects data every 2 or 3 years on a nationally representative sample of public and private school teachers and principals.<sup>1</sup> The core topics for teachers include teaching assignment, preparation, employment, and demographic background information. Each administration of the NTPS contains rotating modules on important topics such as professional development, working conditions, and evaluation. The NTPS also collects data from participating public and private schools, including information on student population, governance structure, school policies and instructional offerings, staffing, and special programs and services. For the map, we analyzed the 2020–21 and 2017–18 public school teacher surveys and the 2020–21 public school survey.

The Teacher Follow-Up Survey (TFS) is a survey of teachers who participated in the NTPS the year before.<sup>2</sup> The primary purpose of the TFS is to measure teacher attrition and understand why teachers change schools or leave the profession. The data from the 2021–22 TFS, which follows the 2020–21 NTPS, had not yet been released when we finalized the map in May 2023, so the turnover indicators are not currently included (but will be included in subsequent updates of the map).

### **Common Core of Data**

The U.S. Department of Education's Common Core of Data is an annually updated database that compiles administrative data of all public elementary and secondary schools in the United States.<sup>3</sup> The database includes fiscal data, such as per-pupil expenditure, and nonfiscal data, such as staff counts by professional category and school-level counts by student characteristics, including eligibility for free or reduced-price lunch (FRPL). Fiscal and nonfiscal data are released on different schedules, and the map uses the most recently published data for each file, which are the 2021–22 state-level nonfiscal data and the 2019–20 state-level fiscal data. We also linked the 2017–18 school-level FRPL data with the 2017–18 Civil Rights Data Collection for our equity indicators.

## **Civil Rights Data Collection**

The Civil Rights Data Collection, collected by the U.S. Department of Education's Office of Civil Rights, obtains data from all U.S. public schools every other year.<sup>4</sup> Its core topics include student enrollment, teacher experience and qualifications, and student access to educational programs and services. For the map, we analyzed teacher qualifications using the 2017–18 Civil Rights Data Collection. We also linked these data with 2017–18 FRPL data from the Common Core of Data.

## **Title II**

The U.S. Department of Education collects annual data on state-approved teacher preparation programs for all 50 states, plus the District of Columbia and U.S. territories, as required by Title II of the Higher Education Act.<sup>5</sup> The Title II databases include the number of teacher preparation candidate enrollments and completers as reported by teacher preparation programs. For the map, we analyzed teacher preparation enrollment and completion data from 2016–17 to 2020–21.

## **American Community Survey**

The American Community Survey is an annual demographic survey conducted by the U.S. Census Bureau.<sup>6</sup> It relies on a sampling strategy that allows for national and state-specific estimates about demographics, employment, and education. We drew from the 2020 American Community Survey to obtain data on the share of adults of color in each state, which we used to compute the ratio of adults of color to teachers of color.

## **Data from existing research**

In addition to our own data analysis, we drew from existing research that provided state-level estimates on various indicators. These reports include the National Education Association's Teacher Salary Benchmark Report,<sup>7</sup> the Economic Policy Institute's analysis of wage competitiveness,<sup>8</sup> and student enrollment projections by the National Center for Education Statistics.<sup>9</sup>

## **Sample**

The different data sources vary in terms of their samples. Table 1 summarizes the years of data collection, data coverage, unit of respondents, and number of respondents for the data sources that we analyzed for the map. For data sources involving teachers, we focused primarily on teachers in public schools serving prekindergarten through 12th-grade students in the 50 U.S. states and the District of Columbia.<sup>10</sup> We excluded teachers in U.S. territories, private schools, and adult education settings. Some data sources include part-time teachers or teachers with multiple assignments (e.g., a teacher who also serves as an administrator), while others only include full-time teachers.

**Table 1**  
**Coverage of Data Sources Analyzed for the Map**

Data source	Year(s) analyzed	Unit(s) of respondents	Coverage	Number of respondents (in most recent year)
National Teacher and Principal Survey	2017–18 2020–21	Teachers and schools	A representative sample of K–12 public school teachers and schools, including charters	39,633 teachers; 6,261 schools
Common Core of Data <sup>a</sup>	2017–18 2019–20 2021–22	Schools and states	All PreK–12 public schools, including charters and alternative schools	98,949 schools; 50 states and the District of Columbia
Civil Rights Data Collection	2017–18	Schools	All PreK–12 public schools, including charters and alternative schools	95,931 schools
Title II	2016–17 2020–21	Teacher preparation programs	All state-approved teacher preparation programs	2,136 programs
American Community Survey	2020	Individuals	A representative sample of individuals	2,641,054 individuals

<sup>a</sup> The underlying data come with a variety of disaggregations and include U.S. territories.

Sources: National Center for Education Statistics. (2023). *2020–21 National Teacher and Principal Survey (NTPS) restricted-use public school teacher and public school data files*; U.S. Department of Education Office for Civil Rights. (n.d.). *Civil Rights Data Collection, 2017–18 public-use data file*; U.S. Department of Education. (2023). *Title II data tools*; National Center for Education Statistics. (n.d.). *Common Core of Data for SY 2017–18, 2019–20, and 2021–22*; Ruggles, S., Flood, S., Sobek, M., Brockman, D., Cooper, G., ... Schouweiler, M. (2023). *IPUMS USA: Version 13.0 American Community Survey 2020*.

# Methodology

## Creating State-Level and National Estimates

We calculated estimates for each indicator at the national level (see U.S. column in the *State of the Teacher Workforce* interactive map) and for all 50 states and the District of Columbia (see State column in the interactive map). Table A1 in Appendix A defines each indicator and provides additional details about how each indicator was calculated. For all the indicators, we used simple descriptive analyses, including tabulation (for sources that cover the universe of respondents) and weighted means (for sources that surveyed the respondents). For example, to calculate the percentage of uncertified teachers, we added the total number of uncertified teachers from all the schools in the state or country and then divided that number by the total number of teachers. Table 2 includes further descriptive data on each indicator. In the following sections, we provide additional details about how we calculated certain types of indicators.

## Producing estimates using sample data sets

For indicators produced from sample data sets—the National Teacher and Principal Survey (NTPS) and the American Community Survey (ACS)—we applied probability weights and replication techniques to estimate the state means and coefficients of variation (CVs). The CV is the ratio of the standard deviation to the mean and reflects the amount of variability in the data. A higher CV indicates higher variation among the different values that make up the mean, which could suggest that the mean is less representative of the actual data. According to National Center for Education Statistics guidelines, indicators with CVs between 30% and 50% should be interpreted with caution, and those with CVs above 50% should be suppressed. For all indicators using NTPS data, we note such instances in Table A1 (see Appendix A).

## Producing aggregate indicators

Three of the indicators (classroom autonomy, exclusion from school policymaking, and dissatisfaction) were calculated by averaging responses from several survey items in the NTPS. Before creating these aggregate indicators, we examined the relationship between survey responses at both the individual and state levels. We only included an item in an aggregate indicator if its correlation with all other indicators in the scale is at least 0.4. For example, the NTPS set of items about teacher influence over school policy included an item about teacher influence on school budget, but this item was removed from the aggregate measure because of a low correlation. For the aggregate indicators, we first tabulated the percentage of responses for each of the underlying survey items by state and then calculated the mean of these tabulations. Table A1 (see Appendix A) details which underlying survey items were used to construct these aggregate indicators.



## Applying cost-of-living adjustments

All indicators reported in dollars (starting salary, expenditures per pupil, and money spent on school supplies) were adjusted for cost-of-living differences across states. The original values were adjusted using the state-level regional price parities (RPPs) released by the Bureau of Economic Analysis.<sup>11</sup> The RPPs take into account differences in the prices of various goods and services (e.g., food, medical, transportation) and differences in housing rents. This adjustment only accounts for cost-of-living differences across states and does not adjust for differences within states.<sup>12</sup> After cost-of-living adjustment, all dollar values are rounded to the nearest \$10. The monetary values represent the current dollar amount for the given year of data collection for each indicator. Table A1 in Appendix A explains in more detail our procedure for adjusting each indicator.

## Categorizing schools for equity indicators

For equity indicators, we grouped schools based on their percentage of students of color and percentage of students from low-income backgrounds. To identify “higher-minority” and “lower-minority” schools, we sorted schools in each state into quartiles based on the percentage of students identified as American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino of any race, Native Hawaiian or Other Pacific Islander, or multiracial. Schools in the top and bottom quartiles were categorized as higher- and lower-minority schools, respectively. Similarly, to categorize “higher-poverty” and “lower-poverty” schools, we sorted schools in each state into quartiles based on the percentage of students eligible for free or reduced-price lunch (FRPL). Schools in the top and bottom quartiles were categorized as higher- and lower-poverty schools, respectively. Because the Civil Rights Data Collection does not contain FRPL information, we first merged the Civil Rights Data Collection data set with FRPL data obtained from the Common Core of Data. Where FRPL data was missing, we used the percentage of students who were directly certified, which is also included in the Common Core of Data. This number is multiplied by 1.6, as recommended by the U.S. Department of Education.<sup>13</sup> Using this method, we were able to obtain an estimate of the percentage of students from low-income backgrounds (whether students eligible for FRPL or students who were directly certified) for 98% of the schools in the Civil Rights Data Collection data set. While FRPL is not an ideal measure of student poverty,<sup>14</sup> research suggests that it is a strong predictor of academic achievement and reflects educational disadvantage more precisely than income data.<sup>15</sup>

## Calculating gap indicators

To show the extent to which teachers are distributed equitably within a state, we calculated the difference in the percentage of uncertified and beginning teachers in schools with different characteristics. For example, to calculate the gap in the percentage of uncertified teachers between higher- and lower-minority schools, we subtracted the percentage of uncertified teachers in lower-minority schools from the

percentage of uncertified teachers in higher-minority schools in the state. Based on this estimate, teachers tend to be distributed more equitably in states where the gap indicators were closer to zero. We decided to calculate gaps instead of ratios because a few states had no uncertified teachers in lower-minority or lower-poverty schools; calculating a ratio with zero as the denominator would lead to an undefined result. Not reporting a value for these states would overlook situations that could be highly inequitable, if all the uncertified or inexperienced teachers were in schools serving larger shares of minority students or students from low-income backgrounds.

In addition, relative measures such as ratios could be misleading at extreme values, as in the case of the percentage of uncertified teachers, which is very low in some states. For example, state A with 1% of uncertified teachers in higher-poverty schools and 0.2% uncertified teachers in lower-poverty schools would have a ratio of 5:1, which might be interpreted as highly inequitable if a ratio were the measure, when in fact the gap is only 0.8 percentage points, and none of the schools in the state have large proportions of uncertified teachers. In contrast, state B with 20% uncertified teachers in higher-poverty schools and 19.2% uncertified teachers in lower-poverty schools would have a ratio of 1.04:1. Using ratios, state B would appear more equitable than state A, when, in fact, they have the same gap and state B has a much higher share of uncertified teachers overall.

## Grouping States

After the state-level estimates for each indicator were created, we used quintiles to categorize states based on their value on each indicator. Grouping states into quintiles was important for visualizing the data on the map and for creating summary ratings (see “Ratings” section), as it transformed all the indicators to a common scale.

For each indicator, states were sorted from largest to smallest values and grouped into five quintiles (each representing about 20% of the states). Because the map includes all 50 states and the District of Columbia (51 values in total), this process cannot result in five even groups. As such, quintiles were created so that the top quintile included 11 states and the rest had 10 states. Additionally, when there were repeated values (or ties) in the data, states with the same values were assigned to the higher quintile. For example, after sorting states based on their indicator value, if the 10th, 11th, and 12th states all had the same value, they were grouped together into the top (or fifth) quintile. Therefore, some quintiles have more states than others due to ties in the data.

Across all indicators, a higher quintile grouping reflects a more positive or desirable condition. For some indicators included in the map, a higher value on the underlying indicator suggests a *less* desirable condition, such as the percentage of uncertified teachers, teacher dissatisfaction, and pupil-to-teacher ratio. In these cases, we reversed our groupings such that the 20% of states with the highest values were sorted into the lowest quintile and the 20% of states with the lowest values were

sorted into the highest quintile. As with the other indicators, the highest quintile remained the largest (11 states if there are no ties), and states with the same value were grouped together in the higher quintile. Table A1 in Appendix A notes the indicators that were reversed when grouped into quintiles.

Quintiles were created using unrounded data; data for each indicator displayed on the map were rounded after quintiles were calculated. If states seem to have the same value but were grouped in different quintiles, it is because the unrounded values were different, and states were assigned groups based on the unrounded number.

## Ratings

We created two summary ratings that provide an overview of the multiple factors that describe and shape the teaching profession in each state in a simple and compact manner.<sup>16</sup> The Teaching Attractiveness rating, which reflects how attractive the teaching profession is in each state, includes measures of compensation, working conditions, school resources, teacher qualifications, and teacher turnover and hiring. The Teacher Equity rating indicates the extent to which students have equitable access to a well-qualified teaching workforce—specifically, whether students of color and students from low-income backgrounds are taught by teachers who are as qualified as those teaching white students or more economically advantaged students.

### Calculating the ratings

The ratings are a combination of multiple individual indicators; there are currently 17 individual indicators that make up the Teaching Attractiveness rating and 8 indicators that make up the Teacher Equity rating (see Table A1 in Appendix A for the full list of indicators). To calculate the ratings for each state, we added the quintile grouping of that state for each of the individual indicators and then divided that number by the total number of indicators. For example, in calculating the Teacher Equity rating for state X, if state X was in the highest (5th) quintile for four of the individual indicators, 3rd quintile for three indicators, and bottom (1st) quintile for one indicator, the total of its quintile groupings would be  $(5 \times 4) + (3 \times 3) + 1 = 30$ . We then divided this total by the number of indicators in the rating:  $30 / 8 = 3.75$ . Therefore, the Teacher Equity rating for state X would be 3.75. Because the quintile groupings range from 1 to 5, the summary ratings also always range from 1 to 5. In addition, because we created quintile groupings such that the higher quintile is always more positive or desirable (see the previous section, “Grouping States”), a higher rating also indicates more attractive or equitable conditions.

Note that data for two of the underlying indicators for the Teaching Attractiveness rating had not yet been released as of the map’s publication (the percentage of teachers who left the profession and the percentage of teachers who left the school

or profession).<sup>17</sup> We excluded these indicators when calculating the rating and will include them in future iterations of the map. At that point, a total of 19 indicators will constitute the Teaching Attractiveness rating instead of the current 17.

Each underlying indicator is given the same weight in the calculation of the ratings. With the Teaching Attractiveness rating, we included a large number of indicators reflecting different aspects of attractiveness, but all indicators were given equal weight. For example, the indicators measuring starting salary and mentoring for early-career teachers were given the same weight in the summary rating. It may be the case that certain factors are more important to teachers than others. For example, prior research on teacher retention has found that certain factors—like salary and support from school leadership—may be particularly important to retain teachers.<sup>18</sup> It is beyond the scope of our analysis to determine the relative importance of each indicator to estimate a weighted average.

### Grouping states based on ratings

After calculating the ratings for each state, we grouped states into quintiles based on their ratings using the same approach that we used to group the individual indicators (see “Grouping States”).

**Table 2**  
**Summary Statistics of Indicators in the Map**

Indicator	Unit	N	Mean	Median	Min.	Max.	SD
<b>Teaching Attractiveness Indicators</b>							
<b>Compensation</b>							
Starting salary	\$	51	43,930	43,720	36,070	51,530	3,480
Wage competitiveness	%	51	79.43	79.50	64.10	96.60	7.28
<b>Working Conditions</b>							
Leadership support	%	51	51.98	53.00	40.00	63.30	5.78
Collegiality	%	51	38.90	39.80	26.70	47.70	4.26
Classroom autonomy	%	51	47.81	48.13	35.45	58.20	5.69
Test-related job insecurity	%	51	6.08	5.20	2.00	15.10	2.71
Exclusion from school policymaking	%	51	26.93	26.53	17.30	41.97	5.66

Indicator	Unit	N	Mean	Median	Min.	Max.	SD
Dissatisfaction	%	51	10.63	10.34	6.96	16.04	2.21
Mentoring for early-career teachers	%	51	79.38	83.00	37.40	98.50	13.48
Time for professional development	%	51	64.39	65.50	46.10	82.00	7.67
Perceptions of evaluation	%	51	51.27	52.60	16.00	71.50	11.29
<b>School Resources</b>							
Expenditures per pupil	\$	51	13,970	13,020	8,600	23,010	3,480
Pupil-to-teacher ratio	Ratio	50	14.82	14.15	10.50	22.40	2.77
Schools meeting the recommended pupil-to-counselor ratio	%	51	19.94	15.50	5.40	63.50	12.64
<b>Teacher Turnover and Hiring</b>							
Plan to leave teaching	%	51	8.79	8.70	4.30	20.80	2.75
School vacancies unfilled or hard to fill	%	51	47.53	46.00	25.60	67.20	10.42
<b>Teacher Qualifications</b>							
Uncertified teachers	%	51	3.29	2.24	0.17	26.71	4.26
<b>Teacher Equity Indicators</b>							
<b>Equity by School Minority Enrollment</b>							
Gap in percentage of uncertified teachers between higher- and lower-minority schools	PP	51	2.21	1.10	-3.00	19.80	3.95
Uncertified teachers in higher-minority schools	%	51	4.83	3.40	0.20	27.80	5.57

Indicator	Unit	N	Mean	Median	Min.	Max.	SD
Uncertified teachers in lower-minority schools	%	51	2.62	1.60	0.00	27.10	4.19
Gap in percentage of inexperienced teachers between higher- and lower-minority schools	PP	51	5.23	5.30	-5.20	13.10	4.25
Inexperienced teachers in higher-minority schools	%	51	14.77	13.80	7.60	25.30	3.81
Inexperienced teachers in lower-minority schools	%	51	9.54	9.10	4.50	17.10	2.66
<b>Equity by School Poverty</b>							
Gap in percentage of uncertified teachers between higher- and lower-poverty schools	PP	51	2.18	1.70	-4.80	15.00	3.68
Uncertified teachers in higher-poverty schools	%	51	4.69	3.00	0.20	34.20	5.84
Uncertified teachers in lower-poverty schools	%	51	2.50	1.20	0.00	27.10	4.08
Gap in percentage of inexperienced teachers between higher- and lower-poverty schools	PP	51	5.50	5.00	-1.00	15.60	3.19
Inexperienced teachers in higher-poverty schools	%	51	14.71	14.20	8.70	25.60	3.17
Inexperienced teachers in lower-poverty schools	%	51	9.21	9.00	4.80	16.60	2.55

Indicator	Unit	N	Mean	Median	Min.	Max.	SD
<b>Additional Factors Influencing Teacher Supply and Demand</b>							
<b>Teacher Pipeline</b>							
Total number of teacher preparation program (TPP) completers	#	51	3,139	2,174	129	20,633	3,878
Change in TPP completers over past 5 years	% change	51	5.89	0.27	-38.83	88.01	24.04
Total number of TPP enrollees	#	51	11,595	7,659	676	110,309	17,223
Change in TPP enrollees over past 5 years	% change	51	1.23	-5.41	-39.76	91.94	27.47
<b>Workforce Characteristics</b>							
Total number of teachers	#	50	63,734	42,388	7,246	371,002	69,656
Change in number of teachers over past 5 years	% change	50	2.01	2.00	-14.10	17.60	4.96
Teachers of color	%	51	16.45	13.10	1.70	69.00	14.35
Ratio of adults of color to teachers of color	Ratio	51	2.89	2.40	1.00	13.30	1.85
Teachers over 60 years old	%	51	6.65	6.40	2.30	13.10	2.29
<b>Teacher Financial Strain</b>							
Work outside the school system	%	51	18.20	18.30	10.70	26.00	3.05
Money spent on classroom supplies	\$	51	471.18	460.00	360.00	720.00	75.12
Outstanding student loans	%	51	37.20	36.80	22.80	55.70	5.53

Indicator	Unit	N	Mean	Median	Min.	Max.	SD
<b>Student Enrollment</b>							
Total number of students	#	51	967,493	690,934	83,975	5,892,073	1,145,106
Change in student enrollment over past 5 years	% change	51	-2.04	-1.80	-9.00	4.40	3.13
Change in projected student enrollment over next decade	% change	51	-4.26	-4.20	-19.90	7.50	5.77

Notes: N = number of observations; SD = standard deviation; PP = percentage point.

Sources: LPI analyses of the following data sets: National Center for Education Statistics. (2023). *2020–21 National Teacher and Principal Survey (NTPS) restricted-use public school teacher and public school data files*; U.S. Department of Education Office for Civil Rights. (n.d.). *Civil Rights Data Collection, 2017–18 public-use data file*; U.S. Department of Education. (2023). *Title II data tools*; National Center for Education Statistics. (n.d.). *Common Core of Data for SY 2017–18, 2019–20, and 2021–22*; National Education Association. (2023). *NEA 2021–2022 Teacher Salary Benchmark Report: Collective Bargaining and Member Advocacy Department*; Allegretto, S. (2022). *The teacher pay penalty has hit a new high: Trends in teacher wages and compensation through 2021*. Economic Policy Institute; National Center for Education Statistics. (2022). *Enrollment in public elementary and secondary schools, by region, state, and jurisdiction: Selected years, fall 1990 through fall 2031*; Ruggles, S., Flood, S., Sobek, M., Brockman, D., Cooper, G., ... Schouweiler, M. (2023). *IPUMS USA: Version 13.0 American Community Survey 2020*.



## Considerations for Interpretation

The map provides state-level estimates of key indicators that can inform policymakers in their efforts to strengthen the teaching workforce. However, it is important to consider certain limitations to this analysis. While the map contains more than 40 indicators, the list does not cover every factor influencing the teacher labor market and equitable access to qualified and stable teachers. Because the map focuses on state-level estimates, it does not capture differences in local or school-level factors affecting teachers. In the analysis, we found that teachers' experiences varied considerably within states; this variation is not reflected in the state-level averages for most indicators. The teacher equity indicators provide a snapshot of within-state differences in teacher qualifications.

We grouped states using quintiles for ease of interpretation and because it allows for a singular approach to grouping states for every indicator. However, this method attempts to assign an even number of states to each category regardless of the underlying data values. A possible consequence is that states with very similar underlying values may be grouped in different quintiles, especially for certain variables that have skewed data or limited variation. Detailing the distribution of values in the underlying indicators, Table 2 provides further information on the minimum, maximum, mean, and median values for each indicator. In addition, sorting states into quintiles may reduce variation compared to other methods, such as using deciles or standardized measures.<sup>19</sup>

Lastly, these data sources only provide a snapshot of information from a certain point in time. The sources for various statistics represent different academic years (ranging mainly from 2017–18 to 2021–22). Some states may have recently experienced changes in policies or conditions that would change the statistic reported if it were collected today.

While it is important to note these limitations when interpreting the data presented, the map is a valuable resource that consolidates multiple data sources to provide state-level data for numerous indicators that research shows to be important for building a strong, stable, and diverse teaching workforce. The map also highlights the extent to which qualified teachers are distributed across schools within a state, which could inform state policies that improve education equity for students from marginalized backgrounds.

## Appendix A: Description of Map Indicators

The *State of the Teacher Workforce* interactive map presents two summary ratings and more than 40 indicators that shape teacher demand, supply, and equity. Table A1 provides detailed information about how each rating and each indicator is defined. For each indicator, Table A1 also presents the unit, data source, and year of data.

In addition, when states were assigned to quintiles for each indicator, it was done in a manner such that a higher quintile denoted a more positive or desirable condition. Because some indicators are negative (e.g., the percentage of uncertified teachers), we reversed the scale of these indicators before grouping states into quintiles. This is noted in the “direction for quintiles” column.

**Table A1**  
**Description of Ratings and Indicators in the Map**

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
<b>Summary Ratings</b>					
Teaching attractiveness rating	Indicates the attractiveness of the teaching profession in each state by averaging the quintile rank from the indicators capturing compensation, working conditions, school resources, turnover and hiring, and qualifications. <sup>b</sup>	#	Not reversed	Multiple	Multiple
Teacher equity rating	Indicates the extent to which students have equitable access to a well-qualified teaching workforce by averaging the quintile rank from the indicators capturing racial and economic equity. <sup>c</sup>	#	Not reversed	Multiple	Multiple
<b>Teaching Attractiveness Indicators</b>					
<b>Compensation</b>					
Starting salary	The average starting teacher salary per state, adjusted for cost-of-living differences. <sup>d</sup>	\$	Not reversed	NEA <sup>e</sup>	2021–22
Wage competitiveness	The average public school teacher weekly wage as a percentage of the estimated weekly wage for other college-educated workers within each state.	%	Not reversed	EPI <sup>f</sup>	2016 to 2021
<b>Working Conditions</b>					
Leadership support	Percentage of teachers who strongly agree that “the school administration’s behavior toward the staff is supportive and encouraging.”	%	Not reversed	NTPS <sup>g</sup>	2020–21
Collegiality	Percentage of teachers who strongly agree that “there is a great deal of cooperative effort among the staff members.”	%	Not reversed	NTPS <sup>g</sup>	2020–21

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
Classroom autonomy	Average of the percentage of teachers who report they have “a great deal of control” in their classroom in the following areas of planning and teaching: textbooks and class materials, content and skills to be taught, teaching techniques, evaluation of students, discipline, and homework.	%	Not reversed	NTPS <sup>g</sup>	2020–21
Test-related job insecurity	Percentage of teachers who strongly agree with the statement: “I worry about the security of my job because of the performance of my students or my school on state and/or local tests.”  Note: Estimates from Iowa, Nebraska, and Vermont should be interpreted with caution. The coefficient of variation for each state’s estimate is between 30% and 40%.	%	Reversed	NTPS <sup>g</sup>	2020–21
Exclusion from school policymaking	Average of the percentage of teachers who report that teachers have “no influence” over school policy in the following areas: student performance standards, curriculum, in-service professional development, teacher evaluation, teacher hiring, and discipline policy. <sup>h</sup>	%	Reversed	NTPS <sup>g</sup>	2020–21
Dissatisfaction	Average of the percentage of teachers who strongly agree with the following statements: “The stress and disappointments involved in teaching at this school aren’t really worth it”; “If I could get a higher paying job, I’d leave teaching as soon as possible”; “I think about transferring to another school”; “I don’t seem to have as much enthusiasm now as I did when I began teaching”; and “I think about staying home from school because I’m just too tired to go.”  Note: Estimates from Kentucky, Minnesota, Montana, New Hampshire, North Dakota, Oklahoma, Rhode Island, Vermont, and West Virginia should be interpreted with caution. The coefficient of variation of at least one of the underlying metrics is between 30% and 39% for these states.	%	Reversed	NTPS <sup>g</sup>	2020–21
Mentoring for early-career teachers	Percentage of early-career teachers who reported having a mentor assigned by their school or district in their first year of teaching.  Note: Early-career teachers in these data include teachers in their first 5 years of teaching (those starting in 2016–17 or more recently).	%	Not reversed	NTPS <sup>g</sup>	2020–21
Time for professional development	Percentage of teachers who get release time from teaching to attend professional development.	%	Not reversed	NTPS <sup>i</sup>	2017–18
Perceptions of evaluation	Percentage of teachers who strongly agree that “overall, the evaluation process was fair.”	%	Not reversed	NTPS <sup>i</sup>	2017–18

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
<b>School Resources</b>					
Expenditures per pupil	Current expenditures per pupil for public schools, adjusted for cost-of-living differences. <sup>d</sup>	\$	Not reversed	CCD <sup>j</sup>	2019–20
Pupil-to-teacher ratio	Pupil-to-teacher ratio for public schools. <sup>k</sup> Note: Data is not available for Nevada and United States because Nevada did not report the total number of teachers in the 2021–22 data being used for this calculation.	Ratio	Reversed	CCD <sup>j</sup>	2021–22
Schools meeting the recommended pupil-to-counselor ratio	Percentage of public schools with pupil-to-counselor ratio below 250:1, as recommended by the American School Counselor Association. <sup>m</sup>	%	Not reversed	CRDC <sup>n</sup>	2017–18
<b>Teacher Turnover and Hiring</b>					
Left profession	Percentage of teachers who left the teaching profession between 2020–21 and 2021–22. Note: As of May 2023, these data had not been released and are not currently included in the map.	%	Reversed	TFS <sup>o</sup>	2021–22
Left school or profession	Percentage of teachers who moved schools or left the teaching profession between 2020–21 and 2021–22. Note: As of May 2023, these data had not been released and are not currently included in the map.	%	Reversed	TFS <sup>o</sup>	2021–22
Plan to leave teaching	Percentage of teachers who plan to leave teaching as soon as they can or when a more desirable job opportunity comes along.	%	Reversed	NTPS <sup>g</sup>	2020–21
School vacancies unfilled or hard to fill	Percentage of schools with teaching vacancies that found it very difficult to fill the vacancy or could not fill the vacancy.	%	Reversed	NTPS <sup>p</sup>	2020–21
<b>Teacher Qualifications</b>					
Uncertified teachers	Percentage of full-time-equivalent teachers in the state's public schools who have not met state certification requirements, including those teaching while still finishing their preparation or teaching with an emergency-style credential. Note: Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14.	%	Reversed	CRDC <sup>n</sup>	2017–18

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
<b>Teaching Equity Indicators</b>					
<b>Equity by School Minority Enrollment <sup>q</sup></b>					
Gap in percentage of uncertified teachers between higher- and lower-minority schools	<p>Percentage-point difference between the percentage of uncertified teachers in the state's schools serving the highest proportions of students of color ("higher-minority schools") and those in the state's schools serving the lowest proportions of students of color ("lower-minority schools").</p> <p>Note: Uncertified teachers are those who have not met the state certification requirements for a standard credential. Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14, and this could influence the estimated values by type of school.</p>	Percentage point (PP)	Reversed	CRDC <sup>n</sup>	2017–18
Uncertified teachers in higher-minority schools	<p>Percentage of uncertified teachers in the quartile (25%) of schools in the state with the highest proportions of students of color.</p> <p>Note: Uncertified teachers are those who have not met the state certification requirements for a standard credential. Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14, and this could influence the estimated values by type of school.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
Uncertified teachers in lower-minority schools	<p>Percentage of uncertified teachers in the quartile (25%) of schools in the state with the lowest proportions of students of color.</p> <p>Note: This indicator is used to construct the gap indicator but is not included in the overall teacher equity rating. Uncertified teachers are those who have not met the state certification requirements for a standard credential. Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14, and this could influence the estimated values by type of school.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18
Gap in percentage of inexperienced teachers between higher- and lower-minority schools	<p>Percentage-point difference between the percentage of inexperienced teachers in the state's schools serving the highest proportions of students of color and those in the state's schools serving the lowest proportions of students of color.</p> <p>Note: Inexperienced teachers are those in their first 2 years of teaching.</p>	PP	Reversed	CRDC <sup>n</sup>	2017–18
Inexperienced teachers in higher-minority schools	<p>Percentage of inexperienced teachers in the quartile (25%) of schools in the state with the highest proportions of students of color.</p> <p>Note: Inexperienced teachers are those in their first 2 years of teaching.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18
Inexperienced teachers in lower-minority schools	<p>Percentage of inexperienced teachers in the quartile (25%) of schools in the state with the lowest proportions of students of color.</p> <p>Note: This indicator is used to construct the gap indicator but is not included in the overall teacher equity rating. Inexperienced teachers are those in their first 2 years of teaching.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
<b>Equity by School Poverty<sup>r</sup></b>					
Gap in percentage of uncertified teachers between higher- and lower-poverty schools	<p>Percentage-point difference between the percentage of uncertified teachers in the state's schools serving the highest proportions of students living in low-income households and those in the state's schools serving the lowest proportions of students in low-income households.</p> <p>Note: Uncertified teachers are those who have not met the state certification requirements for a standard credential. Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14, and this could influence the estimated values by type of school.</p>	PP	Reversed	CRDC <sup>n</sup>	2017–18
Uncertified teachers in higher-poverty schools	<p>Percentage of uncertified teachers in the quartile (25%) of schools in the state with the highest proportion of students living in low-income households.</p> <p>Note: Uncertified teachers are those who have not met the state certification requirements for a standard credential. Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14, and this could influence the estimated values by type of school.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
Uncertified teachers in lower-poverty schools	<p>Percentage of uncertified teachers in the quartile (25%) of schools in the state with the lowest proportion of students living in low-income households.</p> <p>Note: This indicator is used to construct the gap indicator but is not included in the overall teacher equity rating. Uncertified teachers are those who have not met the state certification requirements for a standard credential. Estimates for Alabama, Colorado, and North Carolina should be interpreted with caution because the estimated value for uncertified teachers in 2017–18 varied considerably from prior values and from state-reported estimates of uncertified teachers. The percentage of uncertified teachers estimated in 2017–18 for these states was more than 5 percentage points different from the average percentage of uncertified teachers estimated in 2015–16 and 2013–14, and this could influence the estimated values by type of school.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18
Gap in percentage of inexperienced teachers between higher- and lower-poverty schools	<p>Percentage point difference between the percentage of inexperienced teachers in the state’s schools serving the highest proportions of students living in low-income households and those in the state’s schools serving the lowest proportions of students in low-income households.</p> <p>Note: Inexperienced teachers are those in their first 2 years of teaching.</p>	PP	Reversed	CRDC <sup>n</sup>	2017–18
Inexperienced teachers in higher-poverty schools	<p>Percentage of inexperienced teachers in the quartile (25%) of schools in the state with the highest proportion of students living in low-income households.</p> <p>Note: Inexperienced teachers are those in their first 2 years of teaching.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18
Inexperienced teachers in lower-poverty schools	<p>Percentage of inexperienced teachers in the quartile (25%) of schools in the state with the lowest proportion of students living in low-income households.</p> <p>Note: This indicator is used to construct the gap indicator but is not included in the overall teacher equity rating. Inexperienced teachers are those in their first 2 years of teaching.</p>	%	Reversed	CRDC <sup>n</sup>	2017–18



Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
<b>Additional Factors Influencing Teacher Supply and Demand</b>					
<b>Teacher Pipeline</b>					
Total number of teacher preparation program (TPP) enrollees	Total number of enrollees in the state's teacher preparation programs. <sup>i</sup> Note: Enrollees include completers in that year.	#	Not included in ratings	Title II <sup>s</sup>	2020–21
Change in TPP enrollees over past 5 years	Percent change in the state's number of enrollees in teacher preparation programs over 5 years (2016–17 to 2020–21). Note: Enrollees include completers across all years of data.	% change	Not included in ratings	Title II <sup>s</sup>	2016–17 to 2020–21
Total number of TPP completers	Total number of completers from the state's teacher preparation programs.	#	Not included in ratings	Title II <sup>s</sup>	2020–21
Change in TPP completers over past 5 years	Percent change in the state's number of completers from teacher preparation programs over 5 years (2016–17 to 2020–21).	% change	Not included in ratings	Title II <sup>s</sup>	2016–17 to 2020–21
<b>Workforce Characteristics</b>					
Total number of teachers	Number of teachers working in the state's PreK–12 public school system. <sup>k</sup> Note: Data is not available for Nevada and United States because Nevada did not report the total number of teachers in the 2021–22 data being used for this calculation.	#	Not included in ratings	CCD <sup>l</sup>	2021–22
Change in number of teachers over past 5 years	Percent change in the number of teachers in the state's public schools over 5 years (2017–18 to 2021–22). <sup>k</sup> Note: Data is not available for Nevada and United States because Nevada did not report the total number of teachers in the 2021–22 data being used for this calculation.	% change	Not included in ratings	CCD <sup>l</sup>	2017–18 to 2021–22
Teachers of color	Percentage of teachers who self-identify as American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, multiracial, or of Hispanic or Latino origin. Note: Estimates from Kentucky, Montana, and Nebraska should be interpreted with caution. The coefficient of variation for each state's estimate is between 32% and 35%.	%	Not included in ratings	NTPS <sup>g</sup>	2020–21

Rating/ Indicator	Definition	Unit	Direction for quintiles <sup>a</sup>	Data source	Year
Ratio of adults of color to teachers of color	Ratio of the percentage of nonelderly adults of color (ages 20 to 64) in the state to the percentage of teachers of color in the public schools. <sup>u</sup>  Note: Estimates from Kentucky, Montana, and Nebraska should be interpreted with caution because of caveats associated with the NTPS estimate of teachers of color (see Teachers of Color indicator).	Ratio	Not included in ratings	ACS <sup>v</sup> and NTPS <sup>g</sup>	2020–21
Teachers over 60 years old	Percentage of teachers who are over 60 years old and may be nearing retirement.  Note: Estimates from Kentucky and Oklahoma should be interpreted with caution. The coefficient of variation for each state's estimate is between 30% and 34%.	%	Not included in ratings	NTPS <sup>g</sup>	2020–21
<b>Teacher Financial Strain</b>					
Work outside the school system	Percentage of teachers who reported earning additional compensation from working in a job outside of the school system during the school year.	%	Not included in ratings	NTPS <sup>g</sup>	2020–21
Money spent on classroom supplies	Average amount of their own money that teachers in a state report spending on classroom supplies without being reimbursed, adjusted for cost-of-living differences. <sup>d</sup>  Note: This average only includes teachers who reported spending money that was not reimbursed (an estimated 95% of all teachers nationally).	\$	Not included in ratings	NTPS <sup>g</sup>	2020–21
Outstanding student loans	Percentage of teachers in a state who still owe money on student loans that they used to help pay for undergraduate or graduate education.	%	Not included in ratings	NTPS <sup>g</sup>	2020–21
<b>Student Enrollment</b>					
Total number of students	Number of students enrolled in the state's PreK–12 public schools.	#	Not included in ratings	CCD <sup>l</sup>	2021–22
Change in student enrollment over past 5 years	Percent change in the number of students enrolled in the state's PreK–12 public schools over 5 years (2017–18 to 2021–22).	% change	Not included in ratings	CCD <sup>l</sup>	2017–18 to 2021–22
Change in projected student enrollment over next decade	Percent change in the projected student enrollment in the state's public schools from 2021 to 2030.	% change	Not included in ratings	NCES <sup>w</sup>	2021–22

Notes:

<sup>a</sup> For certain indicators, a higher value suggests a less positive condition. This column indicates which indicators we reversed before grouping states into quintiles such that a higher quintile grouping reflects a more positive condition.

- <sup>b</sup> The current version of the teaching attractiveness rating is calculated as the average quintile rank (1–5) of the following indicators: starting salary (2021–22), wage competitiveness (2016–2021), leadership support (2020–21), collegiality (2020–21), classroom autonomy (2020–21), dissatisfaction (2020–21), testing-related job insecurity (2020–21), exclusion from school policymaking (2020–21), mentoring for early-career teachers (2020–21), time for professional development (2017–18), perceptions of evaluation (2017–18), expenditures per pupil (2019–20), pupil-to-teacher ratio (2021–22), schools meeting the recommended pupil-to-counselor ratio (2017–18), plan to leave teaching (2020–21), school vacancies unfilled or difficult to fill (2020–21), and uncertified teachers (2017–18). The following indicators are reversed so that a higher quintile rating indicates a more positive outcome: dissatisfaction, testing-related job insecurity, exclusion from school policymaking, pupil-to-teacher ratio, plan to leave teaching, school vacancies unfilled or difficult to fill, and uncertified teachers.
- <sup>c</sup> The current version of the teacher equity rating is calculated as the average quintile rank (1–5) of the following indicators: gap in percentage of uncertified teachers in higher- and lower-minority schools (2017–18), uncertified teachers in higher-minority schools (2017–18), gap in percentage of inexperienced teachers in higher- and lower-minority schools (2017–18), inexperienced teachers in higher-minority schools, gap in percentage of uncertified teachers in higher- and lower-poverty schools (2017–18), uncertified teachers in higher-poverty schools (2017–18), gap in percentage of inexperienced teachers in higher- and lower-poverty schools (2017–18), and inexperienced teachers in higher-poverty schools (2017–18). All indicators are reversed so that a higher quintile rating indicates a more equitable outcome.
- <sup>d</sup> Bureau of Economic Analysis. (2022). *Regional price parities by state and metro area*. <https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>. To adjust for cost-of-living differences, we first calculated the average regional price parity (RPP) for each state for the school year of the indicator being adjusted. For example, for expenditures per pupil for the 2019–20 school year, we calculated the average RPP for 2019 and 2020 for each state and then used this average RPP to adjust the starting salary.
- <sup>e</sup> National Education Association. (2023). *NEA 2021–2022 Teacher Salary Benchmark Report: Collective Bargaining and Member Advocacy Department*. <https://www.nea.org/sites/default/files/2023-05/2021-2022-teacher-salary-benchmark-report-final-5.4.23.pdf>. Starting salary is defined by NEA as the salary paid to a teacher with a bachelor’s degree and no prior experience. The average salary for each state is calculated by averaging the starting salaries reported at the district level. Nationally, 87% of districts are included in these calculations. After being adjusted for cost-of-living differences, each salary value was then rounded to the closest \$10. All values are in 2021–22 dollars.
- <sup>f</sup> Allegretto, S. (2022). *The teacher pay penalty has hit a new high: Trends in teacher wages and compensation through 2021*. Economic Policy Institute. <https://www.epi.org/publication/teacher-pay-penalty-2022/>. This state-level metric is estimated using 5 years of data from the Current Population Survey (2016–2021).
- <sup>g</sup> National Center for Education Statistics. (2023). *2020–21 National Teacher and Principal Survey (NTPS) restricted-use public school teacher data file*. <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2023003>. All estimates were calculated by LPI using the restricted-use data. We include educators in the K–12 public school teacher file.
- <sup>h</sup> This item was created after examining the pattern of results for all survey questions about teacher influence over school policy. We excluded survey responses related to teacher influence over the school budget because state-level correlation with the remaining items was lower than 0.4.
- <sup>i</sup> National Center for Education Statistics. (2020). *2017–18 National Teacher and Principal Survey (NTPS) restricted-use data files*. <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020321>. All estimates were calculated by LPI using the restricted-use data. We include educators in the K–12 public school teacher file.
- <sup>j</sup> National Center for Education Statistics. (2023). *Common Core of Data, fiscal data for SY 2019–20*. <https://nces.ed.gov/ccd/files.asp#Fiscal:1,SchoolYearId:34,Page:1>. All estimates were calculated by LPI using the Common Core of Data’s National Public Education Financial Survey data. Specifically, we calculated current expenditures (TE5) per student (Total Student Members, MEMBR19). Amounts are in 2019–20 dollars. After being adjusted for cost-of-living differences, values were rounded to the closest \$10.
- <sup>k</sup> CCD staffing data are expressed in full-time equivalent (FTE) units. The missing teacher data from Nevada affects the lack of U.S. information in three indicators: Pupil-to-teacher ratio, Total number of teachers, and Change in number of teachers over the past 5 years.

- <sup>l</sup> National Center for Education Statistics. (2022). *Common Core of Data, nonfiscal data for SY 2021–22*. <https://nces.ed.gov/ccd/files.asp#Fiscal:2,LevelId:2,SchoolYearId:36,Page:1>. All estimates were calculated by LPI using the state-level data files. For all files, we included observations from schools serving prekindergarten to 12th grade but did not include adult education.
- <sup>m</sup> The pupil-to-counselor ratio is calculated by dividing the school’s student enrollment by the total number of full-time equivalent (FTE) counselors in the school (not including intersession or summer). Schools with a pupil–counselor ratio of 250:1 or lower are considered to meet the recommended ratio. For more on the 250:1 recommendation, see American School Counselor Association (2023). *School counselor roles and ratios*. <https://www.schoolcounselor.org/About-School-Counseling/School-Counselor-Roles-Ratios>.
- <sup>n</sup> U.S. Department of Education Office for Civil Rights. (n.d.). *Civil Rights Data Collection, 2017–18 public-use data file*. <https://ocrdata.ed.gov/resources/downloaddatafile>. All estimates were calculated by LPI using the CRDC data files.
- <sup>o</sup> National Center for Education Statistics. (2023). *Teacher Follow-Up Survey (TFS) for 2021–22*. <https://nces.ed.gov/surveys/ntps/TFSquestion2022.asp>. As of May 2023, this data had not yet been released.
- <sup>p</sup> National Center for Education Statistics. (2023). *2020–21 National Teacher and Principal Survey (NTPS) restricted-use public school data file*. <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2023003>. All estimates were calculated by LPI using the restricted-use data. We include schools in the public school file.
- <sup>q</sup> To identify “higher-minority” and “lower-minority” schools, for each state we sorted schools into quartiles based on the percentage of students of color (students identified as American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino of any race, Native Hawaiian or Other Pacific Islander, or multiracial). Schools in the top and bottom quartiles were categorized as higher- and lower-minority schools, respectively.
- <sup>r</sup> To identify “higher-poverty” and “lower-poverty” schools, for each state we sorted schools into quartiles based on the percentage of students eligible for free or reduced-price lunch (FRPL). Schools in the top and bottom quartiles were categorized as high- and low-poverty schools, respectively. Where FRPL data was missing, we used the percentage of students who were directly certified. This number is multiplied by 1.6, as recommended by the U.S. Department of Education. See Cookson, P. W., Jr. (2020). *Measuring student socioeconomic status: Toward a comprehensive approach*. Learning Policy Institute. FRPL data source: National Center for Education Statistics (n.d.). *Common Core of Data, nonfiscal data for SY 2017–18*. <https://nces.ed.gov/ccd/files.asp#Fiscal:2,LevelId:7,SchoolYearId:32,Page:1>
- <sup>s</sup> U.S. Department of Education. (2023). *Title II data tools*. <https://title2.ed.gov/Public/DataTools/Tables.aspx>. Enrollment was calculated using the “Enrollment, by state, by program type” file. Completers was calculated using “Completers, by state, by program type.” All totals include all program types in a given state.
- <sup>t</sup> Title II changed its definition of enrollment in 2018. Prior to 2018–19, enrollment totals did not include those who completed the program in that year. We have recoded the earlier years of data (prior to 2018–19) so that all years of data use the same definition of enrollment (including enrolled students and those completing in a given year).
- <sup>u</sup> This ratio is meant to capture the extent to which the teacher workforce reflects the racial diversity of the working-age population in a given state. It is calculated by comparing the percentage of nonelderly adults of color (non-white adults) age 20–64 from the 2020 American Community Survey to the percentage of teachers of color as calculated in the 2020–21 National Teacher and Principal Survey. (Note that although definitions of nonelderly adults include 19-year-olds, we excluded them because no teachers were younger than 20 in the NTPS 2020–21 study).
- <sup>v</sup> Ruggles, S., Flood, S., Sobek, M., Brockman, D., Cooper, G., ... Schouweiler, M. (2023). *IPUMS USA: Version 13.0 American Community Survey 2020*. <https://doi.org/10.18128/D010.V13.0>. Estimates were calculated by LPI using the ACS public-use data file.
- <sup>w</sup> National Center for Education Statistics. (2022). *Enrollment in public elementary and secondary schools, by region, state, and jurisdiction: Selected years, fall 1990 through fall 2031*. [https://nces.ed.gov/programs/digest/d21/tables/dt21\\_203.20.asp](https://nces.ed.gov/programs/digest/d21/tables/dt21_203.20.asp)

## Endnotes

1. National Center for Education Statistics. *National Teacher and Principal Survey*. <https://nces.ed.gov/surveys/ntps/>
2. National Center for Education Statistics. *The 2021–22 Teacher Follow-Up (TFS) and Principal Follow-Up (PFS) Surveys*. [https://nces.ed.gov/surveys/ntps/participants\\_2022.asp](https://nces.ed.gov/surveys/ntps/participants_2022.asp)
3. National Center for Education Statistics. *Common Core of Data*. <https://nces.ed.gov/ccd/>
4. U.S. Department of Education Office for Civil Rights. *Civil Rights Data Collection (CRDC)*. <https://ocrdata.ed.gov/>
5. U.S. Department of Education. *Title II Reports*. <https://title2.ed.gov/Public/Home.aspx>
6. U.S. Census Bureau. *American Community Survey (ACS)*. <https://www.census.gov/programs-surveys/acs>
7. National Education Association. (2023). *NEA 2021–2022 Teacher Salary Benchmark Report: Collective Bargaining and Member Advocacy Department*. <https://www.nea.org/sites/default/files/2023-05/2021-2022-teacher-salary-benchmark-report-final-5.4.23.pdf>
8. Allegretto, S. (2022). *The teacher pay penalty has hit a new high: Trends in teacher wages and compensation through 2021*. Economic Policy Institute. <https://www.epi.org/publication/teacher-pay-penalty-2022/>
9. National Center for Education Statistics. (2022). *Enrollment in public elementary and secondary schools, by region, state, and jurisdiction: Selected years, fall 1990 through fall 2031*. [https://nces.ed.gov/programs/digest/d22/tables/dt22\\_203.20.asp](https://nces.ed.gov/programs/digest/d22/tables/dt22_203.20.asp)
10. Although most public school systems serve students through 12th grade, some states in the Common Core of Data report nonfiscal data on schools serving students through grade 13.
11. Bureau of Economic Analysis. (2022). *Regional price parities by state and metro area*. <https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>
12. We acknowledge that there may be differences in both the indicators (e.g., starting salaries and per-pupil expenditures) and cost of living within states that cannot be accounted for in this adjustment.
13. Cookson, P. W., Jr. (2020). *Measuring student socioeconomic status: Toward a comprehensive approach*. Learning Policy Institute.
14. The 2010 Healthy, Hunger-Free Kids Act introduced the Community Eligibility Provision (CEP), which grants free school meals to all students in districts and schools that have 40% or more students eligible for free or reduced-price lunch (FRPL). CEP schools may count all students as eligible for free lunch regardless of their family income; therefore, FRPL data reported in these schools may not accurately reflect the share of students from low-income families. See National Center for Education Statistics. (2020). *Understanding school lunch eligibility in the Common Core of Data*. <https://nces.ed.gov/blogs/nces/post/understanding-school-lunch-eligibility-in-the-common-core-of-data>
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16. These ratings expand on and update the summary ratings included in LPI's *Understanding Teacher Shortages: 2018 Update* interactive map. See Learning Policy Institute. (2018). *Understanding Teacher Shortages: 2018 Update* [Interactive map]. <https://learningpolicyinstitute.org/product/understanding-teacher-shortages-interactive>
17. The Teacher Follow-Up Survey (TFS) is the only national data source that offers comparable state-level data on teacher turnover. At the time of the map's publication, the most recent published version of the TFS was from 2012–13.
18. Carver-Thomas, D., & Darling-Hammond, L. (2017). *Teacher turnover: Why it matters and what we can do about it*. Learning Policy Institute. <https://learningpolicyinstitute.org/product/teacher-turnover-report>; García, E., Han, E., & Weiss, E. (2022). Determinants of teacher attrition: Evidence from district-teacher matched data. *Education Policy Analysis Archives*, 30(25), n25; Nguyen, T. D., Pham, L. D., Crouch, M., & Springer, M. G. (2020). The correlates of teacher turnover: An updated and expanded meta-analysis of the literature. *Educational Research Review*, 31, 100355.
19. As a sensitivity analysis of this approach, we calculated the ratings using Z-scored variables, the Cronbach Alpha approach, and recoding the indicators into categorical variables that identified outliers and looked into the position of each state in the distribution without outliers. In all cases, the findings were substantially similar.

## About the Authors

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