Driven by Data

Using licensure tests to build a strong, diverse teacher workforce

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National Council on Teacher Quality

CONTENTS

INTRODUCTION

The nation needs a strong, diverse teacher workforce to fulfill its promise of equal opportunity for all. The quality of the teacher workforce is of paramount importance in the early grades, a time when teachers bear an extraordinary responsibility for laying the foundational skills that will not only determine students' success in later grades but also in their future lives.[1]

Building a strong, diverse teacher workforce in sufficient numbers requires us to understand the points along the pathway into the teaching profession where we are most likely to lose aspiring teachers. Currently, policymakers, state education agencies, and teacher prep programs have limited insight into the obstacles along this pathway, largely due to incomplete or inaccurate data. This makes it hard to identify when and why prospective teachers, particularly persons of color, elect not to consider teaching or, having started down the pathway, exit prematurely.

In this study, NCTQ focuses on a pivotal point for elementary teachers: when teacher candidates take their licensure tests on the content knowledge defined by states as necessary for the job of teaching. **States generally expect elementary teachers to have foundational knowledge in English/language arts, mathematics, science, and social studies**. Low rates of candidates passing licensure tests, especially for candidates of color, have become the subject of considerable debate in states across the country and have some states questioning their testing regimes.[2] These low pass rates present a challenge for policymakers and educator preparation programs working to both diversify the profession and also ensure that every classroom is staffed with a well-prepared teacher.

Elementary teacher candidates, regardless of race and ethnicity, are too often poorly prepared and supported to pass their state licensure tests. The data in this report shows 55% of test takers failing on their first attempt in states that use a well-structured licensure test which does not exempt some candidates nor allows a candidate's high score in one subject area (e.g., English language arts) to compensate for a low score in another (e.g., mathematics).

The burden of this uniquely high rate of failure is placed on teacher candidates, rather than on an education system that has failed them. This burden is significant, as candidates are beset by costly retakes, delays, and no doubt angst.

The data needed to document the extent of this problem has, until now, remained largely hidden from public view. The U.S. Congress tried twice to get this data made public and its efforts have been met with mixed success. The data obtained from programs and states, reported under Title II of the Higher Education Act, are a source of confusion in that for much of the history of Title II data collection, programs have been permitted to

exclude candidates who did not pass the test from their reported counts, obfuscating the intent of Congress; some pass rate data reported via Title II is still limited to only program completers. The data has other limitations, telling little about the struggles required to achieve a passing score.[3] This data cannot show how many candidates pass on their first attempt, what the breakdown of pass rate by race or ethnicity is, how many attempts candidates need to ultimately pass the test, or what proportion of candidates pass all subtests of a licensure test.[4]

> **We cannot fix a problem we cannot see or fully understand.**

Having more accurate, publicly accessible data is a foundational first step to shift the burden from candidates to the entities that prepare them. Over the past two years, NCTQ has worked with state education agencies and their testing companies to gather far more comprehensive licensure test data than has been available to date, including first-attempt pass rates, number of attempts, and best-attempt pass rate data for all test takers, as well as pass rates broken out by race and ethnicity,[5] admissions selectivity, and socioeconomic indicators. The collected data was gathered prior to the pandemic, and therefore has not been affected by states' changes to licensure test policies during the pandemic.

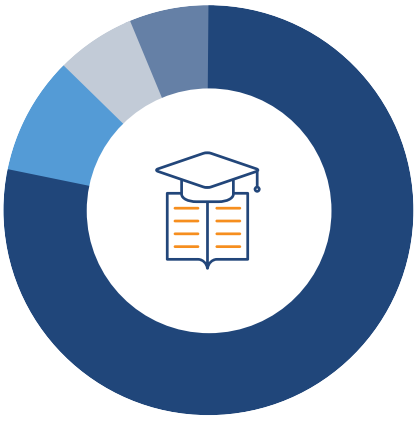
> **The effort presented here encourages states and programs to consider multiple perspectives on licensure test pass rates.**

Each perspective conveys important insights on the quality of program preparation, the level of encouragement for retaking a failed test, persistence on the part of test takers, as well as commitment and innovation to overcome educational inequities and inadequate K–12 preparation.

Questions sometimes arise about the value of licensure tests. To explore the full breadth of research on licensure tests, NCTQ identified thousands of potentially relevant studies published over the last three decades.[6] Of these, only 15 were directly relevant to the question of whether licensure tests predict teacher effectiveness as measured by student outcomes. Of these, 11 found a statistically significant positive relationship between a teacher's test scores (or a binary measure of whether or not they passed the content licensure test) and that teacher's effectiveness in the classroom.[7] Among the four remaining studies, one reported finding no statistically significant relationship between licensure test performance

and effectiveness[8] while two found a mixed effect (generally some models or subtests were predictive of effectiveness while others were not).[9] The last of these four studies found no relationship in most models and a negative relationship between California's CSET exam and students' reading achievement.[10]

For more on the research exploring whether licensure tests predict teacher effectiveness, see Appendix B.



The overwhelming majority of research studies found a positive relationship between licensure tests and student outcomes.

Positive relationship (11) Mixed results (2) No relationship (1) Negative relationship (1)

This paper provides the framework for the pass rate data available for each state. While the focus here is on elementary content licensure tests, the analysis can be applied to any assessment on any subject or grade span.

Aspiring teachers' content preparation started when they were young students and continues throughout college and teacher preparation. Supporting candidates in learning the content they need to succeed on licensure tests and in the classroom, especially for aspiring teachers who reach college without a firm grasp of core subjects, requires a concerted effort from both states and teacher preparation programs in collaboration with their broader institutions. Better data can shed more light on current circumstances and can help guide efforts toward where they are most needed.

Data collection & methodology

NCTQ collected the data for this report over a two-year period, 2019-2021.[11] Requested data included the topics listed below, both for the 2017-2018 school year and aggregated across the 2015-2018 school years.[12] Unless otherwise indicated, pass rates are based on the three-year time period and reflect the proportion of test takers who took the test and passed within that window.[13] This report captures all of the data that was turned in by 37 states as of April 13, 2021 (listed below).[14] While new data from additional states will be added to the state dashboards as it is submitted, this summary report will not be updated.

This data was gathered prior to the pandemic and therefore is not affected by states' changes to licensure test policies during the pandemic.

NCTQ requested the following data from states for the 2015-2016 through 2017-2018 academic years:

- State-level number of test takers and first-attempt and best-attempt pass rate data for all test takers in aggregate, and disaggregated into *White non-Hispanic test takers and Test takers of color (aggregated test takers of racial and ethnic groups other than White non-Hispanic)*[15]
- Institution-level number of test takers and first-attempt and best-attempt pass rate data for all test takers, and disaggregated into *White non-Hispanic test takers and Test takers of color (aggregated test takers of racial and ethnic groups other than White non-Hispanic)*[16]
- Number of times test takers took the test, at the state and institution level, disaggregated by the racial groups described above
- Technical reports or other reports offering information about the validity or specification of the licensure test
- The formal contract between contract between the state and the testing company

NCTQ obtained the data by reaching out to the schools chief in each state, multiple times if necessary. In the absence of a response to these requests, NCTQ submitted formal open records requests to 24 states.

States varied in the extent to which they were able to provide the requested data. Few states were able to fulfill the request based on their own data system, and therefore most states enlisted the support of their testing companies, ETS and/or Pearson. ETS was able to provide state- and institution-level data, both for composite tests (i.e., pass rates representing the proportion of test takers who passed all subtests) and broken out by subtest, free of charge. Pearson was only able to provide state- and institution-level data by subtest but not for composite tests. However, some Pearson states with more advanced data systems, such as Florida, were still able to provide composite data based on their own records. In cases

where Pearson had to create a new report to produce the requested data, Pearson charged their states a fee to provide the pass rate data, which NCTQ agreed to pay on behalf of states when requested. In addition, Pearson provided data that was not fully responsive to NCTQ's request for data on test takers' number of attempts over a three year period, and asserted that it would not provide new data unless states submitted a new request (which may incur additional fees). Many states chose not to do so.

States that have provided institutional pass rate data included in this report

Full data*		Partial data	No data
Alabama	Missouri	Arizona	Georgia
Alaska	Nebraska	California***	Kansas**
Arkansas	Nevada	Indiana	Maine
Colorado	New Hampshire	Iowa	Montana
Connecticut	New Jersey	Mississippi***	North Carolina
Delaware	New York	New Mexico***	South Dakota
District of Columbia	North Dakota	Oklahoma***	Tennessee**
Florida	Ohio	Washington***	Utah
Hawaii	Oregon		Wisconsin
Idaho	Pennsylvania		
Illinois	Rhode Island		
Kentucky	South Carolina		
Louisiana	Texas		
Maryland	Vermont		
Massachusetts	Virginia		
Michigan	West Virginia		
Minnesota	Wyoming		

*Providing "full data" means that states have provided first- and best-attempt pass rates at the state and institution level for all test takers and disaggregated by race/ethnicity, as well as data on test takers' number of attempts.

**Kansas and Tennessee provided data after this report was finalized, and so are not included in this report but are included in data dashboards.

*** State's data not included in report because of data limitations (e.g., providing subtest data but not composite data) or because of missing data.

For information on the specific data provided by each state, see Appendix A.

Important notes about this data

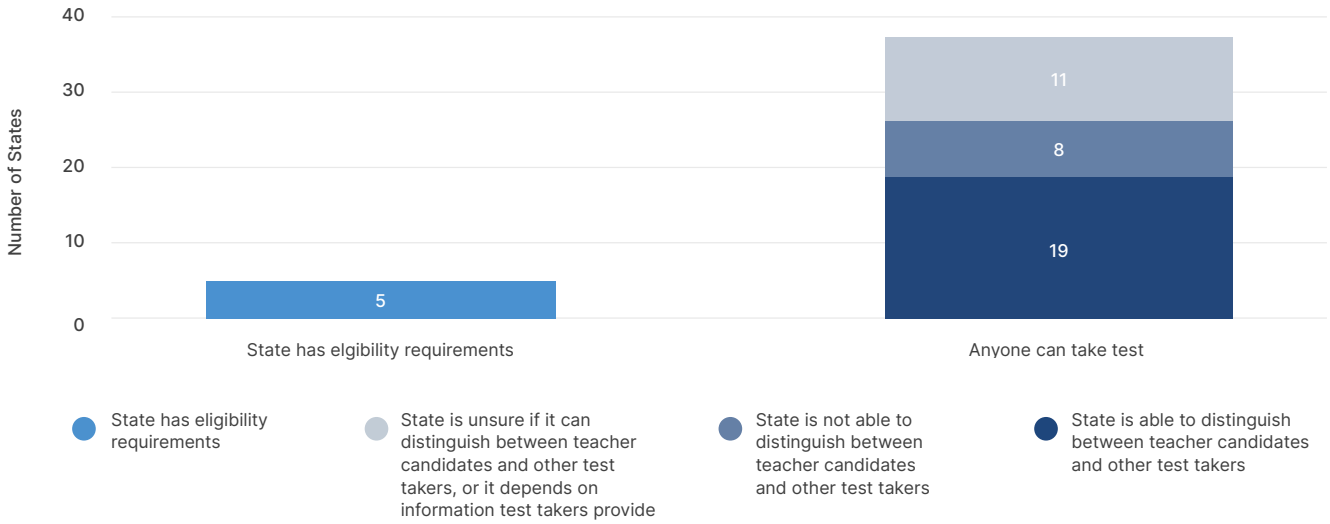
The institutional pass rate data provided for this initiative offer much richer and more layered information than the pass rates that states currently report through the Title II requirement of the Higher Education Act.

Even with the more meaningful data in this report several notable limitations exist.

States have different eligibility rules for who can take licensure tests.[17] An NCTQ survey of state education agencies found that most states allow anyone to take a licensure test, though a small number of states control who can take the test by a variety of eligibility requirements, such as the approval by a teacher preparation program, being a licensed teacher seeking additional certification, applying to an alternative certification program, or moving from another state. These rules mean that in many states, individuals taking the test who are not enrolled in a program may report an affiliation with an institution and therefore be included in that institution's pass rate count. Many states assert that they cannot positively identify test takers who are enrolled in the teacher preparation program without also examining the program's enrollment rosters, a step that is taken when submitting pass rate data under Title II to the federal government.[18] For the NCTQ data request, three states (Florida, Massachusetts, and Texas) took this extra step, but most did not.

Few states set eligibility requirements to take licensure tests

(N=43 STATE RESPONDENTS)



Of the 43 states that responded to NCTQ's survey exploring this issue, nearly all states allow anyone to take content licensure tests.

In many states, data on test taker race and ethnicity is limited by small numbers of test takers. To report data on race and ethnicity, states were asked to group their test takers into two categories: White non-Hispanic, and aggregated test takers of racial and ethnic groups other than White non-Hispanic.[19] The reason for this grouping was to mitigate against lost data due to small numbers of people of color in some states and institutions. An accepted convention for protecting test taker privacy is to not report aggregated data for small subgroups (although states vary in their standard for "small"). Despite this level of aggregation, many institutions still do not have data on test takers of color because of small sample sizes.

The dearth of test takers of color in many states is itself valuable information when addressing the lack of diversity in the teaching force. Many states and institutions of higher education are launching initiatives to attract, prepare, and support teacher candidates of color. Access to reliable data can support these efforts.

Most data systems cannot calculate pass rates at the program level, only the institution level. As a result, most colleges and universities with multiple programs (e.g., undergraduate, graduate, alternative route) do not provide separate designations or codes for these programs at test registration. This is a problem because there are differences in coursework and approaches between undergraduate and graduate programs at the same institution,[20] and because this lack of disaggregation complicates efforts to identify strong performers among preparation programs. In this study, all data is reported at the institution level rather than the program level, although three states were able to provide program level data.[21]

> ## Few programs appear to use the licensure test as a diagnostic of candidates' knowledge at admission into the program.

Programs vary with regard to when during the program they ask candidates to take or pass the licensure test. For example, some require passing the test as a condition of completing the program, and others require it prior to student teaching. Some preparation program leaders raised a concern that programs' using licensure tests as diagnostic assessments may drive lower pass rates. NCTQ reviewed admissions materials for 894 undergraduate elementary education programs and 324 elementary graduate programs, and found that only 3% require taking or passing a test of content knowledge as a diagnostic for admission to the program.[22]

For more about the caveats to each state's data, see the state dashboards.

The three hallmarks of a strong testing system

Three key parts of a licensure test system affect the quality of data that states, teacher preparation programs, and others can glean from the test results: whom the state requires to take the test, whether each subject is separately tested, and the point where the minimum passing score is set.

1 **The test is required of all candidates.** Requiring every candidate to pass the test before earning a teaching license provides insight into whether all candidates enter the classroom knowing core content. When states allow alternative assessments or exemptions, they need to consider whether these **alternatives measure the same breadth of content knowledge with the same validity and reliability** that strong licensure tests do. For example, one state permits candidates to use a degree or major in the content area in lieu of passing a licensure test. If the degree requirements do not include appropriate content coursework for teaching elementary grades, this could be weak proxy for a licensure test and does not provide results that can be reliably compared across institutions.

2 **The test is structured to separately score each content area.** Elementary content tests most often look for teachers' knowledge of the four subjects they will be licensed to teach. Combining multiple subjects under one subscore makes it harder to identify weaknesses, especially systemic weaknesses across candidates, which is important for directing candidates to the targeted coursework to address specific areas. For example, one state's elementary content test includes a subtest that comprises language and literacy development (66% of the subtest) and social studies, arts, and humanities (34% of the subtest). Consequently, this test will offer little information about whether a teacher is sufficiently knowledgeable in any single area.

3 **The minimum passing score, or the cut score, adheres to the recommended scores resulting from the formal 'standard setting' process.** The passing scores that are determined by experts and practitioners in standard setting are considered to represent "the level of knowledge for a test taker to be considered minimally qualified

for independent, beginning practice."[23] Licensure tests offer a more valid measure of candidates' knowledge if states use the recommended score. For example, on the most commonly required elementary content test, the ETS Elementary Education: Multiple Subjects (5001) test, the multistate standard-setting study recommended a minimum score of 155 on the Social Studies subtest. Most states follow this recommendation but several set lower scores.[24] Some states do not make public the recommended score from the standard setting process, making it impossible to determine if the state adheres to this recommended score.

State and teacher preparation program leaders now have an opportunity to access more accurate and robust data and to connect it with other available information.

To learn more, visit the pass rate data dashboards for each state.

As states continue to provide pass rate data, more state dashboards will be added.

Twenty-one states meet the hallmarks of a strong testing system

States with stronger testing system		States with weaker testing system	
Arkansas	Texas*	Alabama	Montana
Colorado	Utah	Alaska	Nebraska
Connecticut	Vermont	Arizona	Nevada
Delaware	Virginia	California	New Mexico
District of Columbia	West Virginia	Georgia	New York
Florida	Wyoming	Hawaii	North Carolina
Idaho		Illinois	North Dakota
Kentucky		Indiana	Ohio
Louisiana		Iowa	Oklahoma
Maine		Kansas	Oregon
Missouri*		Maryland	Pennsylvania
New Hampshire		Massachusetts	South Dakota
New Jersey		Michigan	Tennessee
Rhode Island		Minnesota	Washington
South Carolina		Mississippi	Wisconsin

For more information about the strength of each state's licensure test requirements, see Appendix C.

*Missouri and Texas meet most hallmarks of a strong testing system but do not make public the recommended cut score established in the standard setting process.

Bypassing licensure tests

States often consider alternatives to licensing tests as measures of content knowledge. Six states offer the following alternatives to elementary content licensure tests:

- A degree or major in the content area (Arizona, Hawaii, Oregon)
- An exemption for candidates who fail a licensure test by 5% or less but who have a 3.5 GPA or higher (New Jersey)
- Completion of a subject-matter preparation program (California)
- A content-based portfolio (Wisconsin)
- Coursework in the content area (Arizona, Hawaii)
- A cumulative GPA of 3.0 or higher in the subject area (Wisconsin)
- National Board Certification (Arizona, Hawaii)
- Prior teaching experience or work experience in the subject area (Arizona)
- A score of 70 or higher on the Teacher Standards and Practices Commission (TSPC) content preparation matrix. The matrix factors in scores from the applicable content test. (Oregon)

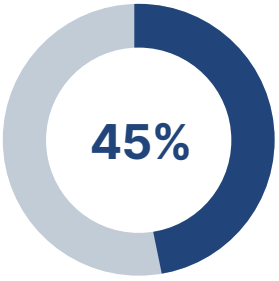
Three states do not require any content test before becoming a teacher of record. Iowa allows candidates to substitute the edTPA, which is not a content test. Ohio only requires a content test of early childhood teachers who are adding an endorsement to teach grades 4 and 5. North Carolina only requires teachers to pass a math subtest, and they can teach for three years before passing.

Data in states that meet all three hallmarks of a strong testing system can help identify and remedy systematic weaknesses in candidates' preparation

When states require all candidates to pass the same licensure test, when they structure their tests appropriately so they can pinpoint the subjects where candidates excel or struggle, and when they adhere to the recommended score needed to pass, it stands to reason that fewer candidates pass.

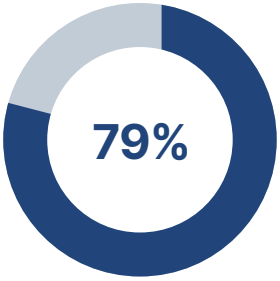
States with stronger testing systems are able to more rigorously measure candidates' knowledge of the subjects they will be expected to teach.[25]

First-attempt pass rate



In states with stronger test systems, the average first-attempt pass rate is 45%.

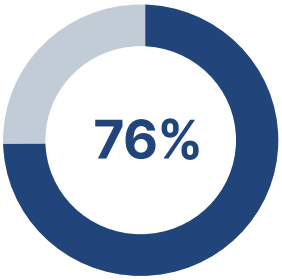
Best-attempt pass rate



However, most of the test takers in states with stronger testing systems, 79%, eventually do succeed and meet the states' higher expectations.

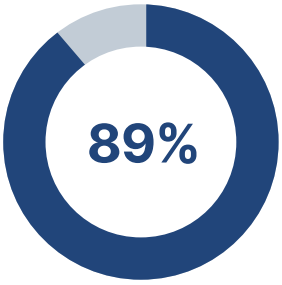
States that have weaker testing systems have much higher first attempt pass rates. It's not clear that these states ultimately gain much, though, with best attempt pass rates only 10 percentage points higher than those with stronger test systems.[26] Lower guardrails for entry into the profession mean that states may allow teachers into the classroom who have not mastered core knowledge. These teachers, some of whom might not have qualified to teach in a state with higher standards, may struggle to meet the needs of their students.

First-attempt pass rate



In states with weaker testing systems, the average first-attempt pass rate is 76%.

Best-attempt pass rate



In states with weaker testing systems, 89% of test takers pass the test on their best attempt.

Preparation programs may also receive less information about where their candidates struggle when tests' data output does not distinguish among individual subjects, making it more difficult for them to recommend the appropriate coursework and other targeted support.

Analysis

Providing targeted preparation and support to teacher candidates to meet state standards is the best way to ensure that every teacher has the knowledge and skills needed for the job.

Pass rate data can shed light on a teacher's pathway into the classroom. Equipped with the data included here, state and teacher prep program leaders can determine what outcomes they value with regard to building a strong, diverse, knowledgeable teacher workforce and can evaluate the data through the lens of those values.

The following section illustrates different approaches to analyzing pass rate data and how these approaches can help identify strong preparation programs that may offer guidance for their peers, offering examples from real states' data.

TEACHER QUOTE

"Thinking about students' knowledge gap, background knowledge matters. You remember things because you connect them to prior points of reference. You have to have something to connect new information to."

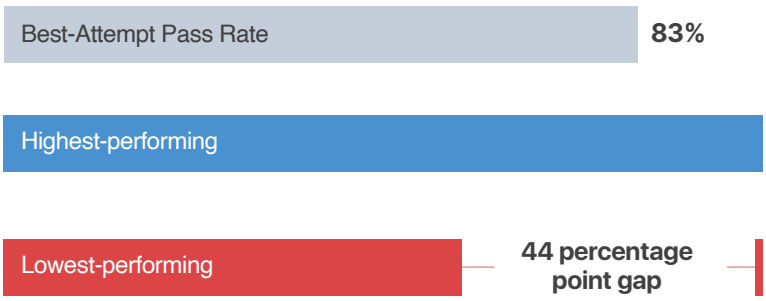
Stefanie, 15th year teaching (Current first grade teacher)

Click here to see these graphs for your state and to download a file with this data for further analysis.

Best-attempt pass rate

In all states, candidates have multiple opportunities to pass their test. To explore where most test takers are passing, regardless of the number of attempts, examine institutions' best-attempt pass rates.

Best-attempt pass rates demonstrate the culmination of efforts to help test takers succeed on licensure tests. While this data does not address questions of efficiency of preparation or of the challenges faced by candidates who must make repeated attempts to pass, it does offer a window into which institutions are achieving the greatest final results.[27]

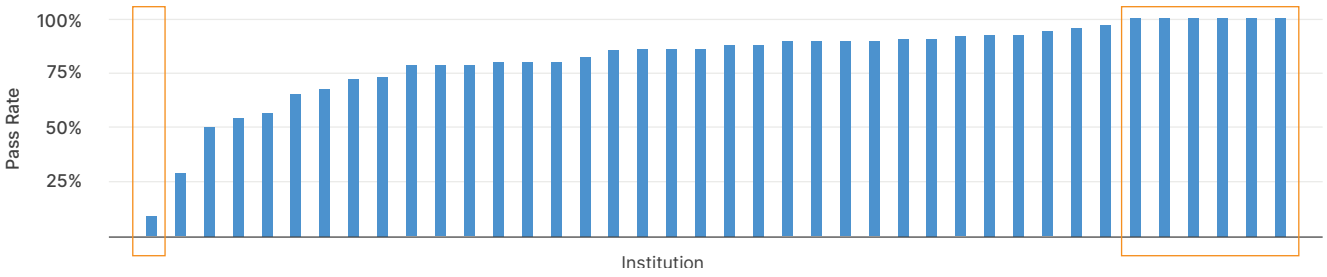


The average best-attempt pass rate across all states that provided data is 83%, with an average 44 percentage point gap between the lowest- and highest-performing institutions within each state.

The following example using real pass rate data from Virginia illustrates the variation among institutions within the state using best-attempt pass rate data.

EXAMPLE

Best-attempt pass rates in Virginia



The above graph illustrates data from Virginia's Praxis Elementary Education: Multiple Subjects (5001) test. While the average best-attempt pass rate for all test takers in the state is 87%, this ranges among institutions from 8% to 100%.

First-attempt pass rate

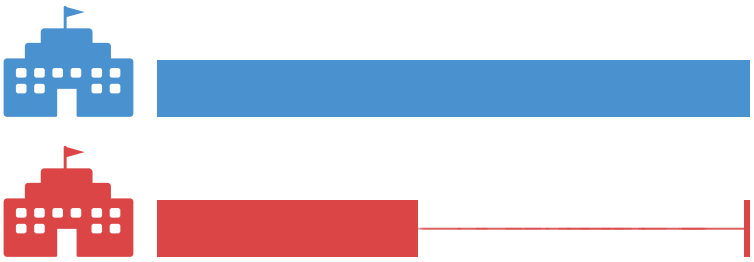
To explore where test takers are mastering content on their first try, examine institutions' first-attempt pass rates.

First-attempt pass rates may indicate how well test takers' institutions and preparation programs have prepared them in the core content knowledge aligned with the state's expectations.[28] As the data from Virginia (see graph below), illustrates, first-attempt pass rates show greater variation among institutions within each state than do best-attempt pass rates.

TEACHER QUOTE

"I spent a lot of time searching online to figure out what I needed to know—some of it credible sources, and some not at all."

Sarah (veteran 1st grade teacher)

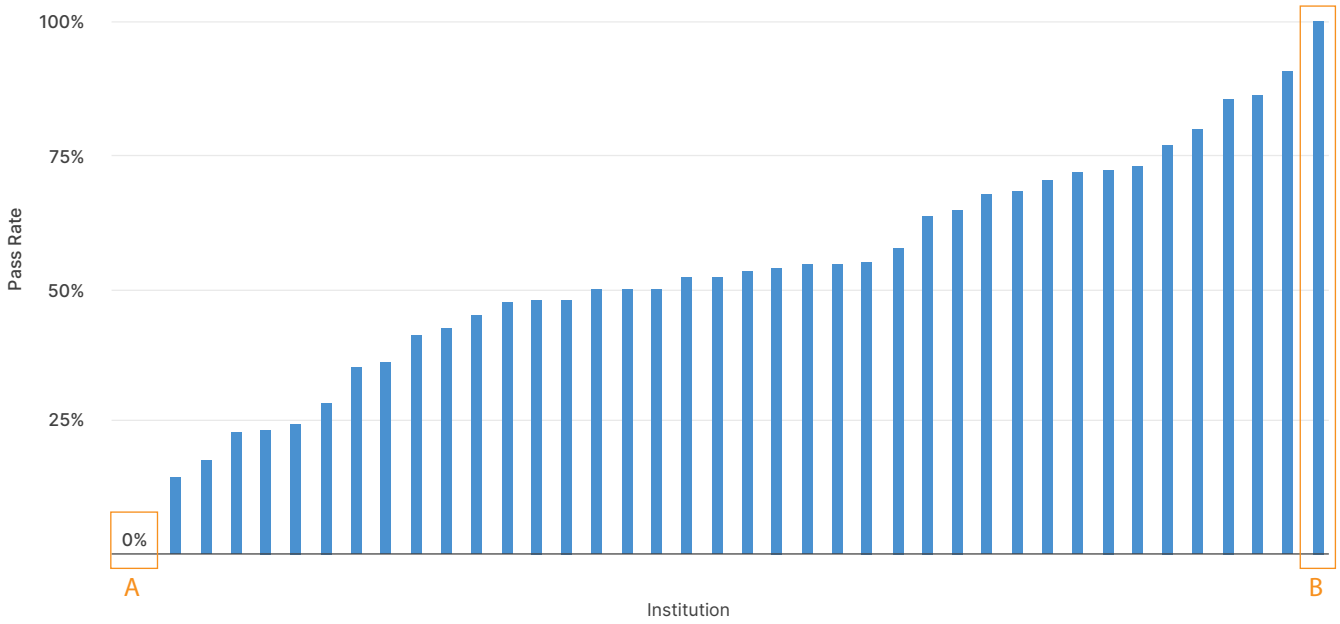


There are startling differences in pass rates among institutions within the same state. On average, there is a 56 percentage point gap between the highest and lowest performing institutions.

In six states, there is at least one state-approved institution where not a single test taker passes on his or her first attempt on his or her first attempt.[29]

EXAMPLE

First-attempt pass rates in Virginia



The above graph illustrates data from Virginia's Praxis Elementary Education: Multiple Subjects (5001) test. The state illustrates tremendous variation among institutions, as no test takers at one institution pass on their first attempt (A) and all test takers at another (B) pass on their first attempt.

TEACHER QUOTE

"I was prepared to teach the subjects that I am teaching now, but I could have been more prepared in breaking down the components within the content knowledge and standards. Yes, I did struggle some to pass my tests because of what I didn't understand, however, after several years of teaching, my own content knowledge has enriched my instruction and gave my students a deeper meaning to reading literature and informational text. Building student knowledge is so important to their critical thinking skills, in that, the students are able to comprehend, make real world connections, and become problem-solvers within any genre of text they are reading."

Beatrice (5th grade teacher)

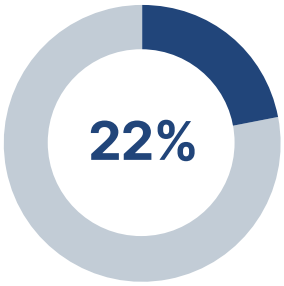
Walk-away rate

To examine where aspiring teachers are lost from the pathway toward teaching, examine the "walk-away rate," or the proportion of test takers who fail on their first attempt and do not retake the test.

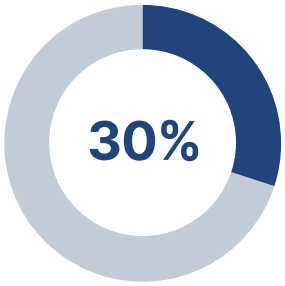
When teacher candidates fail the licensure test, they hit a fork in their pathway to the classroom. They can regroup, study more, seek out additional support, even take more coursework to address their weaknesses, and then take the test again. But faced with this decision point, some aspiring teachers do not make another attempt. Consistent with other research, test takers of color who do not pass on their first attempt are less likely to retake the licensure test.[30]

Across all states that provided relevant data,[31] a quarter of test takers who do not pass the test the first time do not retake it within the three-year period.[32] That number climbs significantly for test takers of color, with 34% of those who fail on their first try not making another attempt.

Walk-away rates across 24 states



Test takers who fail the first time and do not retake the test



Test takers of color who fail the first time and do not retake the test

While more test takers ultimately pass the test after multiple attempts, this exit from the pathway to teaching after the first test failure represents a substantial loss of aspiring teachers. Walk-away rates can be calculated for individual institutions to identify those that help test takers persist on their journey into the classroom.

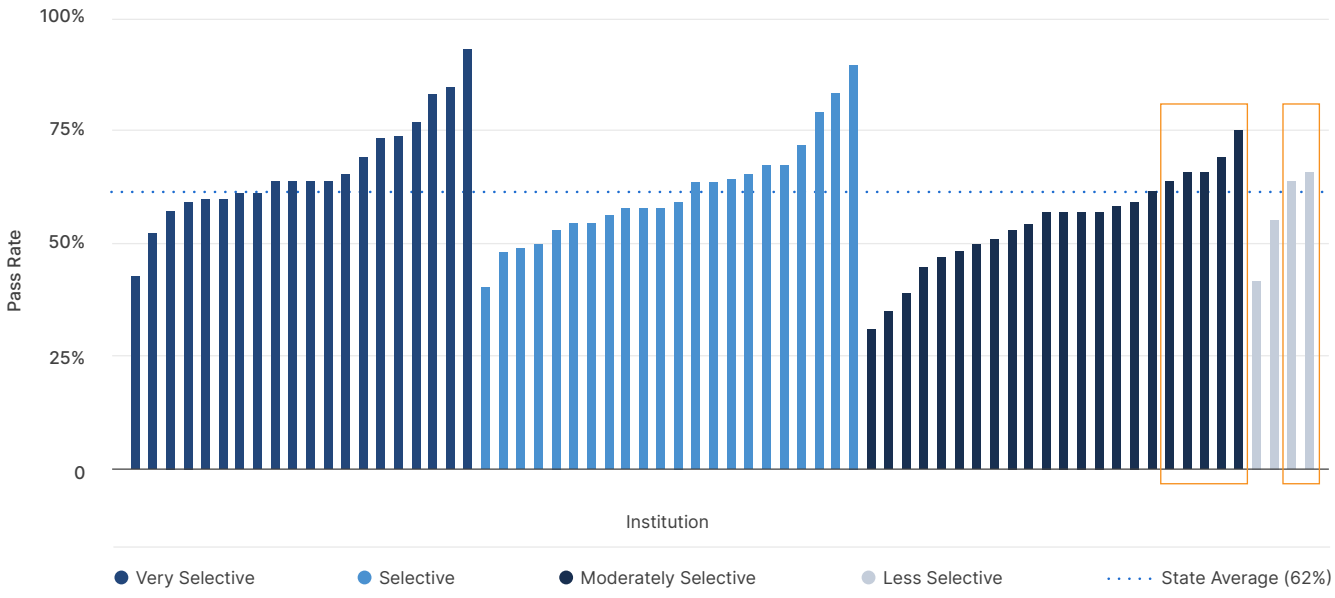
Pass rates by selectivity in admissions

To identify and scale practices from institutions that successfully support all groups of candidates, sort pass rate data by categories such as admissions selectivity or the proportion of students who receive Pell grants.

In general, more selective institutions have higher pass rates on licensure tests. However, this trend is not universally true. By sorting first-attempt or best-attempt pass rate data based on the admissions selectivity of the institution or teacher preparation program,[33] as illustrated below, leaders can identify institutions that stand out for supporting their test takers and defying this trend.

EXAMPLE

First-attempt pass rates in Pennsylvania grouped by selectivity



The above graph illustrates data from Pennsylvania's Module 3 subtest[34] (which tests mathematics, science, and health) and finds that while more selective institutions have higher pass rates on average, several moderately selective and less selective institutions (identified by the orange boxes) exceed the state's average pass rate. Conversely, several very selective institutions have pass rates well below the state's average.

Importantly there are 56 institutions that have relatively open admissions standards and exceed their state's average first-attempt pass rate.[35]

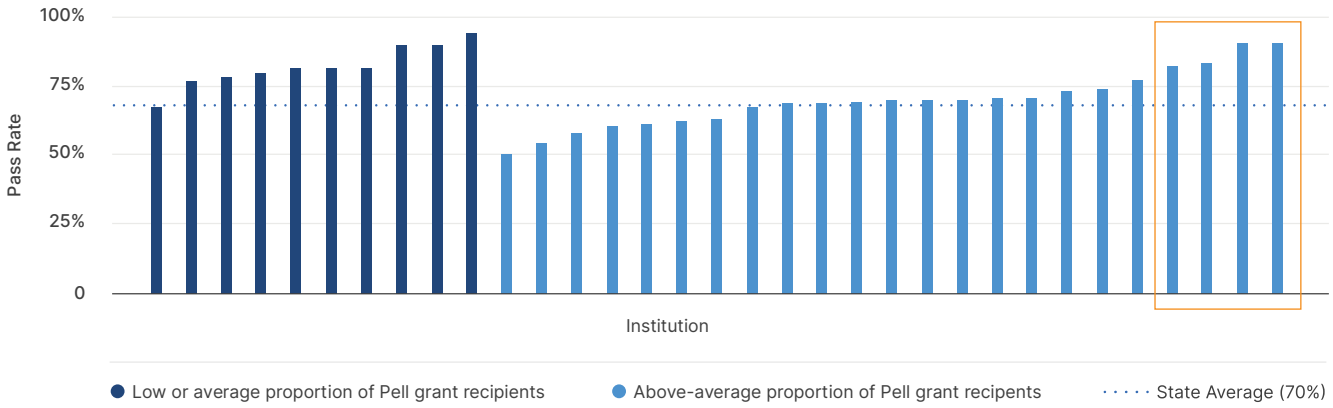
To learn more, see the lists of Standout Institutions

Pass rates by socioeconomic factors

Institutions with fewer students who receive Pell grants, a measure of students' financial need, also tend to have higher first-time pass rates. However, sorting pass-rate data by the proportion of students who receive Pell grants[36] can help identify institutions with greater economic diversity where test takers are surpassing the state's average pass rate.

EXAMPLE

First-attempt pass rates in Illinois grouped by proportion of undergraduate Pell grant recipients



The above graph illustrates data from Illinois' Subtest 1[37] and finds that while institutions with a lower proportion of students receiving Pell grants have higher pass rates on average, several institutions with more Pell grant recipients than the national average exceed the state's average pass rate (for example, see those highlighted in the orange box).

Note that this analysis uses the proportion of all undergraduate students who receive Pell grants, data that is publicly available via the IPEDS database. However, state education agencies and preparation programs have the opportunity to collaborate to use more targeted data, such as Pell grant recipient status or first-generation college-going status linked to individual test takers.

There are 161 institutions with relatively high percentages of Pell grant recipients where the first-attempt pass rate exceeds the state average.[38]

To learn more, see the lists of Standout Institutions.

Three or more attempts

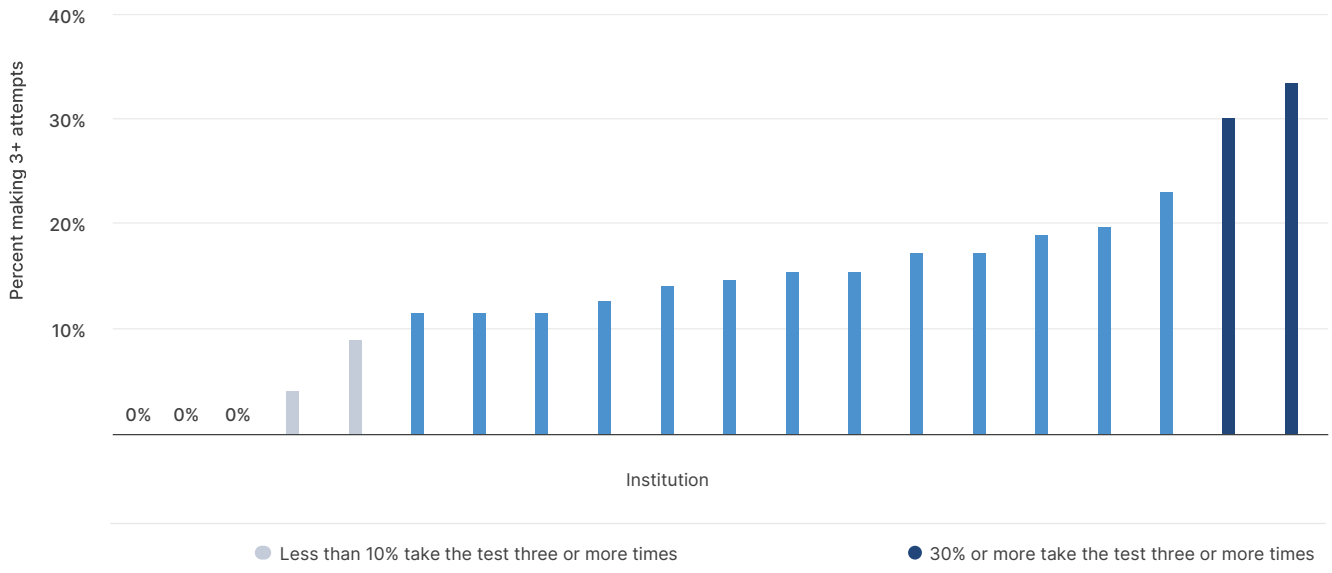
To explore where candidates are more likely to succeed with the least amount of time and money spent on test taking, examine institutions' proportion of test takers who retake the test numerous times.

While states want to give candidates the opportunity to retake their licensure tests if they fail, the fewer retakes, the better. Each retake costs candidates time and money and may necessitate additional support from programs.

One way to measure which programs help candidates get through this hurdle more efficiently is to calculate what proportion of test takers take the test three or more times.[39] While most states allow test takers an unlimited number of attempts, the vast majority of test takers take the test only once or twice.[40] Several states (e.g., Texas and Tennessee) use pass rates on the first two attempts as an indication of preparation program quality, as both the state and preparation programs agree that most candidates should be able to pass within only two attempts.

EXAMPLE

Percent of test takers making 3+ attempts in Connecticut



The above figure illustrates data from Connecticut's Science subtest of the Praxis 5001 Elementary Education: Multiple Subjects test. In Connecticut, there are some institutions where less than 10% of individuals take the test three or more times, compared with about a third of test takers at other institutions.

This data could be coupled with best-attempt pass rates to identify which institutions help test takers pass the test with relatively fewer attempts. Also, while the figure above sets the number of retakes at three or more, this analysis could instead set the bar for number of attempts higher or lower.

Leaders can use pass rate data to consider other ways that institutions add or mitigate the burden on test takers.[41] Beyond the "walk-away rate" described previously, one could explore the effectiveness of the support that institutions and prep programs provide to those who struggle through a measure of "retake success." This measure could be as simple as calculating the proportion of those who retake the test and end up passing, or it could be calculated as an institution's incremental pass rate gain per retake.

Supporting candidates of color

Building a racially diverse teacher workforce offers clear benefits for all students, especially for Black students who have the opportunity to learn from Black teachers. The country has seen some progress in the last 20 years, but Black and Hispanic teachers still comprise roughly 18% of the teaching population—making the teaching workforce not only far more White than the student body but also more White than the U.S. adult population.[42]

Teachers of color, who bring tremendous benefits to their students and especially their students of color,[43] face many challenges on the pathway into the classroom, likely stemming in large part from systemic inequities in the broader educational system.[44] Once they earn a teaching license, teachers of color are more likely to choose to teach in high-needs schools, which tend to have higher teacher attrition. While teachers of color have better retention in these more challenging schools than their White colleagues, working in these challenging settings means that teachers of color overall have a lower retention rate than White teachers.[45]

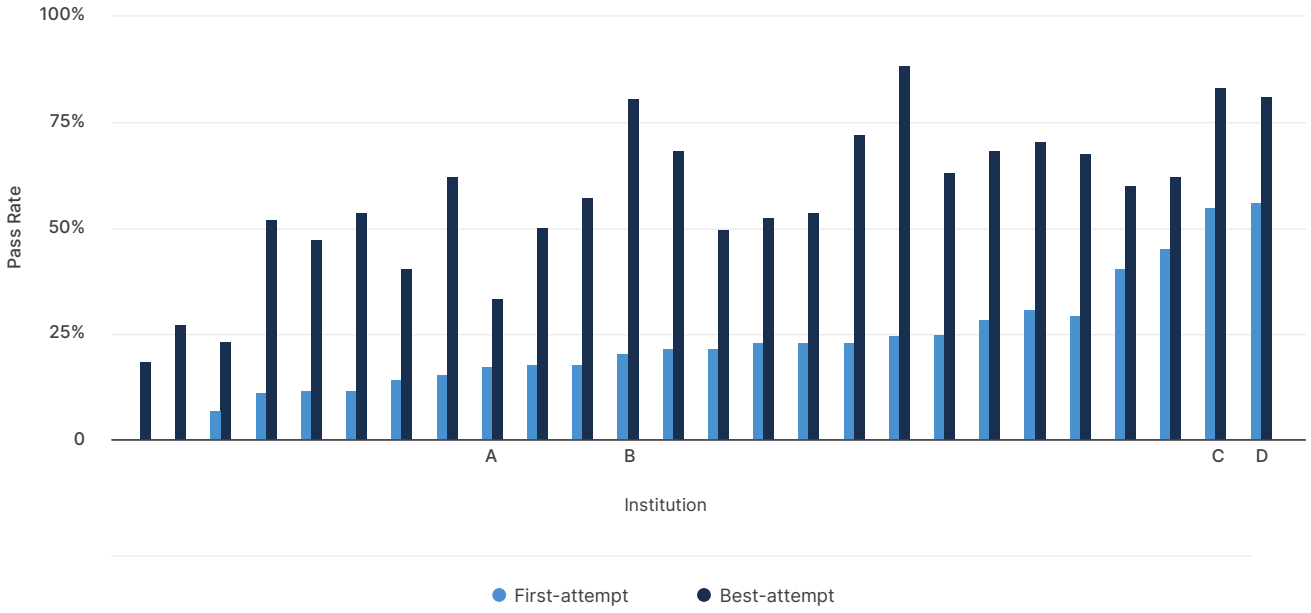
> **Given these challenges in diversifying the workforce, it is that much more imperative that aspiring teachers of color receive the preparation and support they need to reach the classroom equipped with the knowledge and skills they will need to be successful.**

Inadequate content preparation disproportionately affects test takers of color, with first-attempt pass rates averaging 43%, compared with 58% for White test takers -- a 15 percentage point gap.[46] That gap is in the double-digits in all but a handful of states (Kentucky, Nebraska, and West Virginia).

To identify institutions supporting teachers of color in entering the workforce, examine pass rate data for test takers of color.

EXAMPLE

First-attempt and best-attempt pass rates for test takers of color in New Jersey

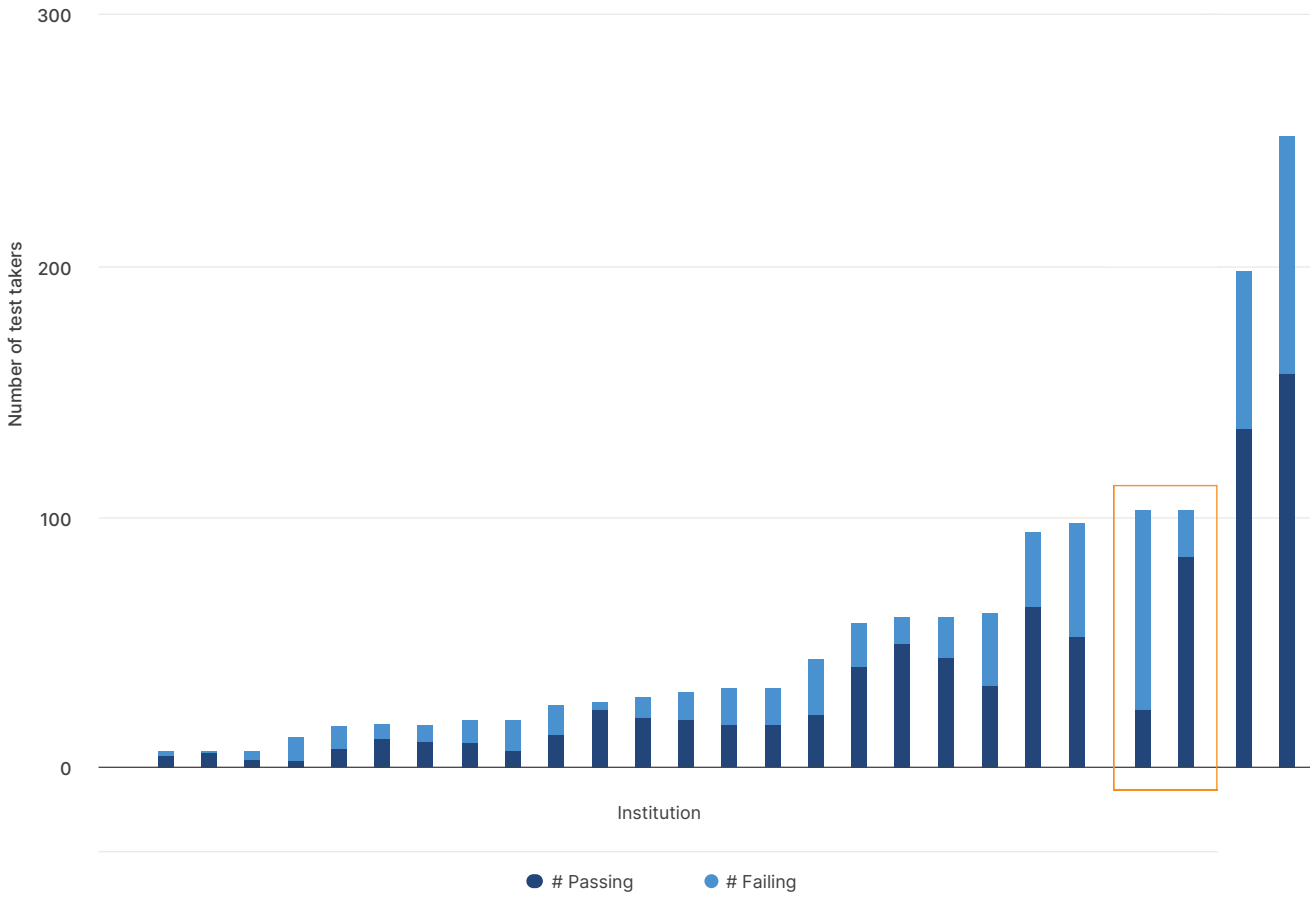


The above figure, illustrating pass-rate data for test takers of color on New Jersey's Praxis 5001 Elementary Education: Multiple Subjects test, demonstrates that test takers of color achieve much greater success at some institutions than at others. At institutions C and D, test takers of color achieve high first-attempt and best-attempt pass rates. At institutions A and B, test takers of color have similarly low first-attempt pass rates, but the pass rate rises dramatically for institution B after test takers have had the opportunity to retake the test.

Another way to analyze pass rate data is to focus on how many test takers of color are successfully passing licensure tests at each institution and how many are falling short (see figure below). This information can help focus efforts on institutions that are serving many aspiring teachers of color, and that could substantially contribute to the diversity of the teacher workforce if their test takers were more successful on licensure tests.

EXAMPLE

Number of test takers of color passing and failing, best-attempt, in New Jersey



The above figure, illustrating pass-rate data for New Jersey's test takers of color on the Praxis 5001 Elementary Education: Multiple Subjects test, illustrates that many more test takers of color are successful at some institutions than others, even among those with similar numbers of test takers of color. The two highlighted institutions in the graph each have about 100 test takers of color, but far more test takers pass in one institution than the other, potentially keeping many aspiring teachers of color from entering the classroom.

To further the goal of educational equity, the disparities in pass rates for White test takers and test takers of color within the same institution will be important. Analysis could include comparing first- and best-attempt pass rates, "walk away" rates, or the number of times test takers retake the test.

There are 153 institutions where the first-attempt pass rate for test takers of color exceeded the state's average first-attempt pass rate for all test takers.[47]

To learn more, see the lists of Standout Institutions.

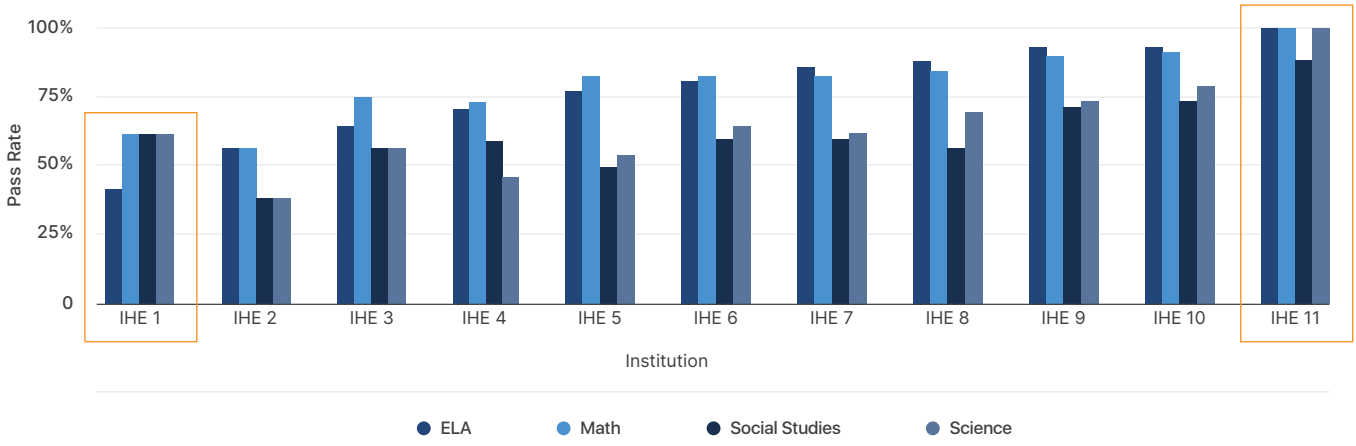
Supporting program improvement

In addition to the analyses described above, leaders of teacher preparation programs can conduct additional analyses to diagnose strengths and opportunities in their own programs and institutions.

For example, examining test takers' pass rates on each subtest across institutions can point to both broad systemic issues across a state, as well as institution-specific issues. These findings may suggest an opportunity for programs to examine their own practices and to learn from others.

EXAMPLE

Subtest pass rates for a subset of Arkansas institutions



Institutions' pass rates on subtests of the Praxis 5001 Elementary Education: Multiple Subjects test shows nearly every institution struggles with science and social studies far more than ELA and mathematics. However, IHE 11 seems to be performing exceptionally well in science, and IHE 1 has lower scores in ELA than the other subjects.

Institutions can also explore their internal data to compare outcomes among different groups of students based on criteria such as race and ethnicity, gender, socioeconomic status, pathways into the program (e.g., through the university versus a community college), as a way to identify groups that tend to need more support, and to proactively provide that support.

TEACHER STORY

Lacey (4th grade teacher in Tennessee)

Thinking back, I did not feel prepared on many different levels when I first started teaching. I think there are so many extra things that no one prepares you for, your first year is basically survival mode. For me, diving deeper into the content comes that second year when you have some experience under your belt. Initially, our county did not have a universal curriculum for reading. We had to find our own great quality resources to teach the standards. We have since adopted Core Knowledge curriculum. This was a huge help (that is even an understatement) to me. Most Tennessee standards are embedded in this curriculum.

With that said, many of the topics in Core Knowledge contain a great deal of information. I spend a good amount of time during summer breaks learning more about the actual topics (American Revolution, Middle Ages, etc.). This takes time! I can say with confidence that if teachers don't take the time to truly dig into their subjects/topics, it is a struggle. You have to commit to still being a learner yourself. I can also speak from experience to the fact that when you know your content…student success automatically goes up!

> **When you are excited about what you teach, it carries over to your students and you see first hand the actual learning taking place. It never gets old!**

I was able to pass the state licensing test the first time I took it. I used my mentor teachers that had already taken it to seek advice from. I purchased Praxis study books and read those backwards and forward. I took as many practice tests as I could find. The reason I spent so much time studying and preparing was because I had friends and acquaintances that were not able to pass the test the first time and even the second time they took it. I knew it was going to be tough.

I believe being well-prepared in content knowledge helped me because I was confident in the classroom. I'm not saying that happens every single day, but you HAVE to be willing to be a continuous learner to be a good teacher. Just like our students…we have to put in the time and effort to WANT to become experts on our topics. Read trade books about your subject. Go to trainings on your time off. Watch documentaries about those subject areas. Talk to people that have wisdom and experience.

If I'm being honest, I'm not sure any actual program prepared me for the classroom or content knowledge development. It's a personal drive you have to have within yourself to push you. I can say that having mentors in the program would be a huge benefit. Individuals that are preparing to become teachers can learn so much from people thathave gone through it and use their experience to help navigate each step. There is an abundance of content knowledge out there to soak up. Study books from my prep program were also beneficial to me as well.

Explore your state's data

Want to know more about test takers' success on elementary content licensure tests in your state? While the data available varies by state, most states dashboards include:

- First-attempt and best-attempt pass rates for all test takers in the state
- Estimates of the proportion of all test takers and of test takers of color who fail the test and do not retake it
- Institution-level best-attempt pass rates
- Institution-level calculations of the proportion of test takers who take the test three or more times
- Institution-level first-time pass rates grouped by admissions selectivity
- Institution-level first-time pass rates grouped by the proportion of undergraduate students who receive Pell grants
- Institution-level first- and best-attempt pass rates for test takers of color.
- A list of notable institutions in your state that have above-average pass rates and lower levels of admissions selectivity, greater socioeconomic diversity, or above-average pass rates for test takers of color.

In addition, your state's pass rate data is available to download. As states continue to provide pass rate data, more state dashboards will be added. States must provide a minimum of institution-level first-attempt and best-attempt pass rate data in order to have a state-level dashboard developed.

Visit your state's dashboard.

For more on how to interpret the downloadable data, see Appendix E.

A vision for what is possible

Every student deserves to learn from teachers who enter the classroom with a firm grasp of the content they teach. Every student deserves the opportunity to learn from teachers who look like them and share their background, at least at some points during their education. And teachers should not be expected to learn an entire curriculum as they go, staying up late every night just to stay ahead of their students. Being a teacher, especially a new one, is hard enough already.

The field overwhelmingly agrees that new teachers should demonstrate that they know what they'll be able to teach before they enter the classroom.

A recent NCTQ survey found that leaders from prep programs and leaders from state education agencies agree that elementary teachers should demonstrate they have core knowledge before they begin teaching (see the FAQs for more information). Moreover, virtually all teachers agree that teachers should have to demonstrate their knowledge before earning a teaching license.[48] Licensure tests offer a valuable guardrail to verify that knowledge, and the data from these tests provides unparalleled insights into the preparation candidates receive.

Percentage that agree teachers should have to demonstrate knowledge before entering the classroom

84%
of prep program leaders

95%
of state education agency leaders

98%
of teachers

Revising our education system so that it supports all teacher candidates in achieving the necessary level of core knowledge can be done. High-performing institutions show that higher pass rates are possible. Success in other professions such as nursing illustrate that higher pass rates are possible.[49]

Despite the numerous benefits that teachers of color bring to the classroom, decades of systemic inequities in education have led to the inevitable byproduct of low pass rates for candidates of color on licensure exams.

> **Teacher prep programs did not create these problems, but they can be a bulwark against this vicious cycle, ensuring that future generations of students can benefit from a strong, diverse teacher workforce.**

By shoring up content preparation, we can support more candidates, and especially more candidates of color, on their pathway into the profession with a strong background in the subjects they will teach. Doing so will mean more enriching, engaging lessons for students, a stronger foundation to support reading comprehension, and better outcomes for students of color.

These changes require deliberate action from all levels. Institutions with teacher prep programs should work with those programs to leverage existing general education coursework. Teacher prep programs should provide better guidance to candidates on what courses to take so that they learn core content. States need to push for stronger, more aligned preparation by gathering and using pass rate data. And testing companies must be partners in this work, ensuring that states and prep programs are equipped with the data they need to make good decisions based on unbiased, valid assessments.

Better information about pass rate data offers one key piece in a teacher workforce data system. Pass rate data can help identify where programs are better supporting their candidates, where candidates are being lost before they earn a license, and where candidates of color are most likely to be successful.

NCTQ's state dashboards are just the beginning. With these, state and program leaders can start conversations about what the data demonstrates, what questions remain, and what steps they may want to explore. NCTQ is eager to support further inquiry into states' pass rate data.

Pass rate data transparency can be the compass, pointing toward stronger programs and policies that others can learn from, and helping programs with lower pass rates discover that they have strayed from their mission. Publishing this data, and building out the data system to support it, is a crucial step in states' effort to better identify their greatest needs and greatest challenges.

Recommendations

Building a stronger, more diverse teacher workforce by building teacher candidates' content knowledge is a critical task that requires the support of actors at many levels. The following recommendations address direct actions that can be taken by state licensing agencies, educator preparation programs (and their colleges/universities), and test publishers — either alone or in collaboration.

Recommendation for collaborative action

Working together, state education agencies, teacher prep programs, test publishers, and school districts need to establish or verify alignment between teacher preparation, licensure tests, and the job demands of elementary classrooms.

These four entities must together establish requirements that reflect state standards and select appropriate licensure tests — whether national or customized — that align with the requirements. The alignment should be apparent in the state's standards for teacher preparation, the coursework that programs require, and the licensure tests that teachers must pass.

It is possible to modify tests to make them more predictive of teachers' effectiveness.

As economist Dan Goldhaber has suggested, key decisions about licensure tests' development and design are made in the absence of empirical evidence on their connection to teacher or student outcomes. In particular, the determination of the specific items included in licensure tests as well as the required passing score is based on expert judgment. An alternative approach would be to use empirical evidence on the relationship between teacher candidates' performance on individual items and the student outcomes they achieve once in the classroom to better inform the weights attached to each item, i.e., weight items more heavily that are more predictive of valued teacher and student outcomes more heavily.

Recommendations for States

1 Use a valid and reliable elementary education licensure test that separately measures knowledge of language arts, mathematics, science, and social studies.

Given the nature of elementary teaching, a strong licensure test must be able to generate separate scores in the four core subject areas to provide: a) the state education agency (SEA) with the necessary evidence to be confident in granting an initial license and b) teacher candidates and their preparation programs with information to better identify strengths and weaknesses. These high-quality tests are currently in place in 25 states. A compensatory elementary education licensure assessment, as currently required in some form or another in 18 states (one that combines two or more subject areas into a single score), is unable to determine whether teacher candidates are sufficiently knowledgeable in each of the subjects they will be asked to teach.

States seeking alternatives to licensure tests need to consider evidence that a proposed alternative is sufficiently broad in the scope of content that is being measured, and that it is both **a valid and reliable measure of content knowledge**.

2 Set the minimum score needed to pass the licensure test at the score that has been recommended by the standard setting process.

The minimum score needed to pass a licensure test should be determined by a formal standard setting process in which practitioners and experts analyze test items and scoring for the purpose of deciding the minimum knowledge needed for the job. While the responsibility for establishing the passing scores rests ultimately with the state, which acts upon the recommendations from the standard-setting process, states should align minimum passing scores with the foundational psychometric work that is developed by expert practitioners. Deciding to lower the recommended passing score so that higher numbers of candidates will pass is not only harmful to the aspiring teacher—giving him a false sense of preparedness—but also harms the students whose teacher may lack adequate subject-matter knowledge.

States should make the recommended score part of the public record as well as any rationale behind a decision to change the score.

3 Improve access to and use of assessment data.

Build a data system that helps answer important questions about the state's supply of teachers.

States need data systems that can inform an understanding of the states' supply of teachers, as well as identify challenges in the pipeline. Better systems support the ability to examine data through multiple perspectives, providing insight on a range of important questions. This data offers the opportunity to pinpoint how to better support aspiring teachers and strengthen teacher quality overall.

For examples of states that have accomplished this goal, *see the case studies on Illinois, Florida, Massachusetts, and Texas*. For states that are early in the process of developing such a system, their licensure test provider's data management system is a valuable resource. For more complex analyses such as customizing subgroups of test takers or combining pass rates across subtests to create composite pass rates, states need contractual arrangements that can accommodate the additional help of testing providers.

One challenge many states face is that they do not currently link test takers to their teacher preparation programs. To resolve this challenge, states can consider implementing an eligibility system for taking licensure tests, as states such as Georgia, Iowa, and Texas have done. Another approach would be to work with the existing data management system and require preparation programs to provide rosters of candidates by program that can be matched to the testing records. Linking test takers back to their preparation programs can lay the groundwork for later improvements to the data system, such as tracking candidates into the classroom.

For more on this process, see Appendix D.

Leverage the many uses of a strong data system

These data systems offer myriad benefits. For example, states with data on enrollment and completion of preparation programs can use this information to vet the accuracy of Title II data submitted by teacher preparation programs. States can use this data in program approval processes; currently, 22 states publish teacher preparation program performance data in either program report cards or a dashboard, and 14 states tie that data to program accountability. Many

states that start this work find that preparation programs themselves are eager to have better data systems, as they use this information in the accreditation process and benefit from states' broader reach in gathering data. This data offers an opportunity to extend conversations about rooting policy and practice in localized data.

4 Make sure that the state's needs are reflected in agreements made with licensure test publishers.

State licensing agencies should expect test publishers to support the state, teacher preparation programs, and teacher candidates. States should require from their testing companies:

- The **sound validity evidence** that guided the design and development of the assessments. If the test publisher conducts standard-setting studies, results of the studies, whether multistate or state-specific, should be provided to the state licensing agency and/or published. (The state should make this information public.)
- **Regular reporting** of psychometric and statistics results, as well as disaggregated summary results of licensure test outcomes to assist with ongoing monitoring and improvement initiatives. (The state should make this information public.)
- The ability to apply preparation programs' **roster verification** from Title II data to all pass rate data, making it possible to generate the pass rates for individual programs.
- **Access to a data management system** with training, staff assistance, and the ability to build customized reports. A number of states seeking to supply NCTQ with the data for this report were charged by their test publisher due to the nature of their contractual arrangements.

Recommendations for Teacher Preparation Programs

1 Look to coursework, not just test prep strategies, to best prepare candidates in the content they need to teach elementary grades.

Align coursework requirements with the content elementary teachers will need to know.

Teacher preparation programs must align coursework and fieldwork requirements with the state's standards for teacher preparation programs and for elementary students, as well as with the assessments their candidates will need to pass. To support this effort, test publishers can supply test specifications for the required assessments. Preparation programs need to crosswalk required course content with the state standards and test specifications to determine if each teacher candidate has the opportunity — or multiple opportunities — to learn the content they will be expected to know and teach.

Provide additional guidance on course requirements when needed

Coursework can include both general education requirements and specific preparation program requirements. Trends in higher education have recently shifted these requirements to give students greater flexibility in how they meet requirements. When candidates can choose from among several course options in a subject, teacher prep programs need to give additional guidance for course requirements. In many institutions, teacher prep programs can set specific requirements about which course a candidate must take to satisfy a general education requirement. In the few cases where states do not allow teacher prep programs to take this step, they can still recommend which courses a candidate takes, or they may be able to require selected courses as prerequisites for the education major.

Enlist the support of other colleges in the institution.

To facilitate candidates' ability to take relevant courses, some programs have found success in working with their institutions to set aside seats in key classes specifically for teacher candidates, or create separate sections of a course for teacher candidates. Successful programs have employed strategies, including having the university's provost take the lead in creating collaboration between

education faculty and liberal arts faculty, and inviting liberal arts faculty to regular education faculty meetings on relevant topics.

Programs where large numbers of students transfer from a community college should work with the community college to advise future teachers on the best courses to take during the early part of their college career.

2 Review and act on pass rate data to monitor program effectiveness and to inform improvements.

Preparation programs should review all available pass rate information for their candidates. If the preparation program has access to a data management system, staff should be trained to query the data to inform decisions. Programs should review pass rate data for teacher candidates, overall and by demographic groups, to identify areas for growth. For licensure tests that provide subscores in specific content areas, programs can use disaggregated data to monitor course requirements and course effectiveness.

Key stakeholders in the institution, including both teacher prep programs and liberal arts faculty, should build a strategy to act on this data. Many protocols exist to support data-driven meetings, including ATLAS Looking at Data from National School Reform Faculty and Data-Driven Analysis Meetings by Paul Bambrick-Santoyo.

3 Use diagnostic testing to identify candidates' strengths and weaknesses.

For students applying to an elementary education program, diagnostic testing can be used to address strengths and weaknesses stemming from coursework required before the students declared a major. Early testing is perhaps even more valuable for graduate programs that, much like alternative route programs, rarely spend much time on content coursework. Preparation programs can explore the use of test prep materials available from its state's test provider (e.g., practice tests) to flag potential weaknesses early and guide students to courses or other supports. If practice tests are not available, preparation programs could collaborate with testing companies to design low-cost, low-stakes assessment to pinpoint strengths and weaknesses, or they could use existing commercially available options.

Recommendations for Testing Companies

1 Standard operating procedure should be to provide first-attempt and best-attempt pass rate data and data on the number of attempts for all test takers at the institution level to state education agencies and preparation programs.

Testing companies have access to much of the data that states and programs need on licensure tests, but this data is not always easily accessible. Compounding the problem, the state licensing agency or preparation program may not have the technical expertise to access the data. Therefore, testing companies should automatically provide regular, detailed pass rate reports.

2 Strengthen data collection to provide more accurate program-level data.

Testing companies already work with preparation programs in many states to help programs "claim" candidates for Title II reporting requirements. A similar process can be used to connect all test takers back to their preparation programs, allowing for more targeted reporting and simplifying the process for future Title II reports.

The test publisher should work with higher education institutions to support disaggregation of results by programs housed within the institution. A large number of institutions offer undergraduate, graduate, and/or alternative preparation programs. Without having a straightforward way to disaggregate the data, it is difficult for the state and the institution to identify strong programs or those that need additional support.

3 Work with the education field to explore concerns around bias in testing.

While testing companies already have a process in place to identify and mitigate bias, the education field has ongoing concerns about bias permeating licensure test results. Testing companies should communicate the process they currently have in place and engage diverse stakeholders in an ongoing process to determine what additional steps can be taken. Testing companies should publish results of their efforts to inform stakeholders and spur ongoing conversations.

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The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of any funders, project advisors, or other entities.

ENDNOTES

1 For example, students in higher-quality K-3 classrooms have higher rates of college attendance and greater earnings. Chetty, R., Friedman, J. N., Hilger, N., Saez, E., Schanzenbach, D. W., & Yagan, D. (2011). How does your kindergarten classroom affect your earnings? Evidence from Project STAR. *The Quarterly Journal of Economics, 126*(4), 1593-1660. Students who are not able to read proficiently by the end of third grade are less likely to finish high school. Hernandez, D. J. (2011). *Double Jeopardy: How Third-Grade Reading Skills and Poverty Influence High School Graduation.* Annie E. Casey Foundation. Black male students who have just one Black elementary teacher are more likely to graduate high school and attend college. Gershenson, S., Hart, C. M., Hyman, J., Lindsay, C., & Papageorge, N. W. (2018). *The long-run impacts of same-race teachers* (No. w25254). National Bureau of Economic Research.

2 See, for example, Program Evaluation Division, North Carolina General Assembly. (2020). *Lack of a dedicated state-level effort challenges North Carolina's capacity to increase teacher diversity: Final report to the Joint Legislative Program Evaluation Oversight Committee Report Number 2020-09*. Retrieved from https://www.ncleg.gov/PED/Reports/documents/Teacher_Diversity/Teacher_Diversity_Report.pdf; Kats, R. (2021). *Education committee considers changes to the teacher licensure system.* Minnesota Legislature. Retrieved from https://www.house.leg.state.mn.us/SessionDaily/Story/15699.

3 Title II reporting gathers two sets of pass rate data: Summary pass rates and Single-assessment pass rates. Summary pass rates represent "the percentage of students who passed all tests they took for their area of specialization." U.S. Department of Education: Office of Postsecondary Education. (2014). *Higher Education Act Title II State Report Card System (STRC) User Manual.* Retrieved April 27, 2021, from https://web.archive.org/web/20170508023138/https://title2.ed.gov/Public/TA/STRCManual.pdf; These pass rates are only reported for program completers and are only reported in aggregate at the institution level (not disaggregated by program or assessment). For this summary pass rate, programs can require that candidates pass their licensure test in order to complete the program, and therefore can report a 100% pass rate; U.S. Department of Education, Office of Postsecondary Education. (2016). *Preparing and credentialing the nation's teachers: The Secretary's 10th report on teacher quality*. Retrieved March 29, 2018, from https:// title2.ed.gov/Public/TitleIIReport16.pdf.

The second set of pass rate data is the "single assessment pass rate," which is the "percentage of students who passed the assessment among all who took the assessment." U.S. Department of Education: Office of Postsecondary Education. (2014). *Higher Education Act Title II State Report Card System [STRC] User Manual.* Retrieved April 27, 2021, from https://web.archive.org/web/20170508023138/https://title2.ed.gov/Public/TA/STRCManual.pdf. This pass rate is reported for all teacher candidates, both those enrolled in the program and those who have completed it. The data is reported at the assessment level; for licensure tests with multiple subtests, the pass rates are reported at the subtest level but not the composite level.

4 In states with non-compensatory elementary education licensure testing requirements (i.e., separate tests for core subjects), Title II passing rates are reported for the separate subtests and not the composite passing rate for the set of subtests. Reporting passing rates for the components could mask the difficulty candidates may have with one or more subject areas.

5 Protecting candidates' personally identifiable information is essential and limits the reporting of even aggregated results for small subgroups. The number of candidates of color at many educator preparation programs remains small and limits subgroup reporting. To maximize reporting for candidates of color, NCTQ has collapsed race/ethnicity data into two subgroups—White non-Hispanic test takers and aggregated test takers of racial and ethnic groups other than White non-Hispanic.

6 These studies were identified using combinations of the search terms: "elementary content" "licens* test" "certification test" "teacher" "student outcomes" "elementary" "core subjects" "core knowledge" "outcomes" "student learning" "learning gains" "Praxis" "teacher effective" "race" "Black" "Latino" "Hispanic" "Latinx" "predictive validity" "predict*" "licensing" "certification" "Pearson."

7 Araujo P. M. D., Heineck, G., & Cruz Aguayo, Y. (2020). *Does test-based teacher recruitment work in the developing world? Experimental evidence from Ecuador* (No. 165). BERG Working Paper Series; Boyd, D., Lankford, H., Loeb, S., Rockoff, J., & Wyckoff, J. (2008). *The narrowing gap in New York City teacher qualifications and its implications for student achievement in high-poverty schools* (No. w14021). National Bureau of Economic Research; Chingos, M. M., & Peterson, P. E. (2011). It's easier to pick a good teacher than to train one: Familiar and new results on the correlates of teacher effectiveness. *Economics of Education Review,* 30(3), 449-465; Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2006). Teacher-student matching and the assessment of teacher effectiveness. *The Journal of Human Resources,* 41(4), 778- 820; Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007). *How and why do teacher credentials matter for student achievement?* (No. w12828). National Bureau of Economic Research; Ferguson, R. F. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation,* 28, 465–498; Goldhaber, D. (2007). Everyone's doing it, but what does teacher testing tell us about teacher effectiveness? *Journal of Human Resources,* 42(4), 765-794; Cowan, J., Goldhaber, D., Jin, Z., & Theobald, R. (2020). *Teacher licensure tests: Barrier or predictive tool*? CALDER Working Paper No. 245-1020; Shuls, J. V., & Trivitt, J. R. (2012). What makes a teacher effective? An analysis of teacher credentials and student achievement. In *Annual Conference Association for Education Finance and Policy*, Boston, MA; Shuls, J. V., & Trivitt, J. R. (2015). Teacher effectiveness: An analysis of licensure screens. *Educational Policy*, 29(4), 645-675 ; Shuls, J. V. (2018). Raising the bar on teacher quality: Assessing the impact of increasing licensure exam cut-scores. *Educational Policy, 32* (7), 969-992.

8 Rockoff, J. E., Jacob, B. A., Kane, T. J., & Staiger, D. O. (2011). Can you recognize an effective teacher when you recruit one? *Education Finance and Policy,* 6(1), 43-74.

9 Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis,* 19(2), 141-164; Goldhaber, D., & Hansen, M. (2010). Race, gender, and teacher testing: How informative a tool is teacher licensure testing? *American Educational Research Journal,* 47(1), 218-251.

10 Buddin, R., & Zamarro, G. (2009). Teacher qualifications and student achievement in urban elementary schools. *Journal of Urban Economics,* 66(2), 103-115.

11 Data collection began with a pilot test of a sample of states on a subset of test data; the data request was modified based on lessons learned from that pilot test, including the addition of all subtests and numbers of attempts and the exclusion of requests for basic skills test pass rates.

12 Data was requested for September 1, 2015, to August 31, 2018, with the caveat that states could adjust the time period to better align with their data system outputs if needed.

13 Test takers may have retaken and passed the test after the three-year window.

14 The 37 states provided, at minimum, first-attempt and best-attempt data at the state and institution levels on either subtests or the composite test. States that did not provide composite data were not included in calculations of first-attempt and best-attempt pass rates. Several other states provided some portions of data (e.g., best-attempt data at the institution level) and may be included in specific analyses but are not included in this count. The 37 states that provided partial or complete data for inclusion in this report are: Alabama, Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, Virginia, West Virginia, and Wyoming. Because not all states provided all pieces of information, the number of states included in each piece of analysis varies.

15 Note that during the pilot test, we learned that disaggregating racial and ethnic groups further would lead to missing data due to small N sizes because most states will not publicly report data on groups that fall below a certain threshold, ranging from five to 20 people.

16 Program-level data was also requested, but most states were not able to provide data at the program level.

17 Passing licensure tests is generally only one of several state requirements to earn a teaching license. States often also require completing an approved preparation program, completing a supervised practicum experience, and possessing a bachelor's degree, among other requirements.

18 Test providers may invite preparation programs the opportunity to "scrub" the roster of test takers who designated it as the attending institution, but this review is not required or consistent across programs.

19 States using ETS reported data grouped into: White, All Other Ethnicities (i.e., non-White), Two or More Races, and No Response. For this study, "All Other Ethnicities" and "Two or More Races" were grouped into the "test takers of color" category. In some cases, states receiving data from Pearson followed the disaggregation into two groups, and in others, states using Pearson tests broke out race and ethnicity data into multiple, more discrete categories. When that occured, NCTQ aggregated the data into the two described groups.

20 Greenberg, J., & Dugan, N. (2015). *Incoherent by design: What you should know about differences between undergraduate and graduate training of elementary teachers.* National Council on Teacher Quality. Retrieved from https://www.nctq.org/publications/Incoherent-By-Design

21 Massachusetts, Texas, and Colorado for part of the request (Colorado provided program-level data in response to the pilot study request, but worked with ETS and provided only institution-level data in response to the full-scale study request).

22 Not all of these programs require candidates to pass the test for admission into the program, only to take it. Note that there are several programs located in California where candidates applying to state-approved 2042 programs can bypass the licensure test.

23 According to one study: "[S]tates rely on a panel of education experts who attempt to relate the minimum levels of content and teaching knowledge required of beginning teachers to what is measured by the various licensure tests—the resulting cutoff score is where they deem a minimally qualified teacher candidate should perform." Goldhaber, D. (2007). Everyone's doing it, but what does teacher testing tell us about teacher effectiveness? *Journal of Human Resources*, 42(4), 765-794. ETS confirms this approach for their exams. ETS. (2018). *Standard-setting studies.* Retrieved March 29, 2018, from https://www.ets.org/praxis/states_agencies/adoption_process/standard_setting_studies/.

24 Alabama's social studies cut score is 142, and South Dakota's is 147.

25 Of the 21 states that meet the hallmarks of a strong testing system, 17 provided data for this study. These first-attempt averages are based on *composite pass rates*. On tests with multiple subtests, candidates must pass all of them. These pass rates reflect the proportion of test takers who pass all subtests, known as the composite pass rate. The average pass rate across these 17 states was calculated with the state as the unit of analysis; averages are not weighted by number of test takers. Only Delaware had two different content tests in operation during the relevant time period, but the number of test takers taking the newer 7801 test was too low to report pass rate data. The states included in this calculation are Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Idaho, Kentucky, Louisiana, New Hampshire, New Jersey, Rhode Island, South Carolina, Vermont, Virginia, West Virginia, and Wyoming. Iowa provided first-attempt data but was omitted from this calculation because of questions about the data's accuracy; specifically, the first-attempt pass rate it provided appeared higher than the best-attempt pass rate. First-time pass rates ranged from 32% in Louisiana to 59% in the District of Columbia.

Best-attempt pass rates in these states range from 62% in Louisiana to 87% in Virginia. Best-attempt pass rates reflect the proportion of test takers who pass within the three-year data window, the academic years of September 1, 2015, to August 31, 2018.

26 These average first-attempt pass rates are based on composite pass rates. On tests with multiple subtests, candidates must pass all subtests. These pass rates reflect the proportion of test takers who pass all subtests, known as the composite pass rate. Nine of the states with weaker testing systems provided composite pass rate data; these states' pass rates are included in this calculation: Alabama, Alaska, Hawaii, Indiana, Maryland, Michigan, Nebraska, Nevada, and North Dakota. This average best-attempt pass rate is 10 percentage points higher than in states with stronger systems but is brought down by four states that reported data on higher-quality tests--Hawaii and Alaska--which give the Praxis 5001 (Elementary Education: Multiple Subjects) as an option; Alabama, which uses the Praxis 5001 but allows a lower passing score than the one recommended by the standards-setting committee; and Maryland, which recently transitioned to the Praxis 7801 (Elementary Education: Content Knowledge for Teaching), and consequently few test takers have been able to retake the test. Best-attempt pass rates for states with weaker testing systems includes data for: Alabama, Alaska, Hawaii, Illinois, Indiana, Iowa, Maryland, Michigan, Nebraska, Nevada, and North Dakota.

Average first-attempt pass rates ranged from 38% in Hawaii (Hawaii offers candidates ways to demonstrate content knowledge other than a licensure test, including having a degree in the content area, coursework in the content area, or National Board Certification) to 90% in Nebraska. For this analysis, averages are calculated with the state as the unit of analysis, meaning that pass rates are averaged across all states, regardless of the number of test takers in a state. In the two states that reported pass rates on multiple tests (Alaska because candidates can choose among several tests and Maryland because the state was transitioning among tests during the time period), the state's average pass rates were weighted based on the number of people taking each test.

27 This reflects the average best-attempt pass rate on the composite test across 28 states that provided best-attempt composite data: Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Michigan, Nebraska, Nevada, New Hampshire, New Jersey, North Dakota, Rhode Island, South Carolina, Vermont, Virginia, West Virginia, and Wyoming. In Alaska and Maryland, which had multiple tests in use during the relevant time period, pass rates reflect a weighted average based on the number of people taking each test.

This data tells the story at a high level but is ripe for further exploration. For example, preparation programs can use a roster verification process like they do for Title II data to learn more about which program at the institution the test takers were enrolled in (if any), what courses they were taking, when in their preparation they took the licensure test, and so on.

28 State education agencies and preparation programs can use this data as a starting point and can dig deeper to understand the passing rates. The percentage point difference in first-attempt pass rates is based on composite pass rates for 25 states: Alabama, Alaska, Arkansas, Colorado,Connecticut, Delaware, District of Columbia, Florida, Hawaii, Idaho, Kentucky, Louisiana,Maryland, Michigan, Nebraska, Nevada, New Hampshire, New Jersey, North Dakota, Rhode Island,South Carolina, Vermont, Virginia, West Virginia, and Wyoming. In Alaska, only one of three testsreported pass rates for multiple institutions; the other two tests had low numbers of test takers. InMaryland, the ranges between institutions were 45 percentage points on one test and 49 percentagepoints on the other; these ranges were averaged together to calculate the state's range in pass ratesamong institutions.

29 These states are Connecticut, Florida, Louisiana, New Jersey, South Carolina, and Virginia.

30 A study of Massachusetts' MTEL test found that teacher candidates of color who fail on their first attempt are 7 to 13 percentage points less likely to retake the test within one year. Cowan, J., Goldhaber, D., Jin, Z., & Theobald, R. (2020). *Teacher licensure tests: Barrier or predictive tool?* CALDER Working Paper No. 245-1020. Retrieved from https://caldercenter.org/publications/teacher-licensure-tests-barrier-or-predictive-tool.

31 In states with a test with multiple subtests, candidates who fail any part of the test can retake a single subtest again. For that reason, data on test takers' number of attempts is only available at the subtest level and not at the composite-test level. NCTQ selected the subtest with the lowest first-attempt pass rate in each state for this analysis, as candidates must pass all subtests in order to pass the overall test. Most commonly, social studies had the lowest pass rate (in 13 states). The states included in this calculation of "walk-away rates" are: Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Hawaii, Idaho, Kentucky, Louisiana, Maryland, Nebraska, Nevada, New Hampshire, New Jersey, North Dakota, Rhode Island, South Carolina, Vermont, Virginia, West Virginia, and Wyoming.

Note that Florida is able to distinguish between test takers who are enrolled in teacher prep programs ("program test taker") and those who are not. Because the purpose of this analysis is to learn what proportion of aspiring teachers stay in the teacher pipeline, all non-program test takers were excluded from the analysis of Florida's data. If all Florida test takers were included, 28% of all test takers and 36% of test takers of color who failed on their first attempt would not retake the test during the testing window.

Note that only data for Maryland's test, The Praxis 5019 (Elementary Education: Instructional Practice and Applications), which is no longer in use, is used here. The Praxis 7801 (Elementary Education: Content Knowledge for Teaching) test had not been in place long enough for most test takers to have the opportunity to retake the test during the relevant time period and therefore would not be meaningful for this analysis.

32 To calculate the "walk-away rate," we first calculate how many people fail on the first attempt (all people who take the test the first time minus those who pass on their first attempt). We then calculate how many people fail the test and don't retake it (the number who take the test only once, based on data on the number of attempts, minus the number who pass on their first attempt). To calculate the "walk-away rate," or the proportion of test takers who fail the test on their first attempt and do not retake it, we divide the number of test takers who fail the test and don't retake it by the total number who failed on the first attempt. While this calculation is imperfect (because test takers may choose to retake the test after the three-year window and because some states offer alternative means to demonstrate content knowledge besides a licensure test), it gives a good approximation of the proportion of aspiring teachers who leave the pathway into the classroom at this point.

33 Admissions selectivity is measured using undergraduate elementary program ratings from the 2021 *Teacher Prep Review*, which considers mean university SAT/ACT scores, Barron's selectivity ratings (in the absence of data on SAT/ACT scores), minimum GPA and admissions test requirements for the preparation program, and mean GPA for the most recently admitted cohort of teacher candidates provided by the program. "Very selective" represents an A on the *Teacher Prep Review* Admissions standard, "Selective" a B, "Moderately selective" a C, "Less selective" a D, and "Not selective" an F. This report only uses the Admissions standard grade for undergraduate programs and not for graduate programs. For more information about these categories and the scoring methodology, see https://www.nctq.org/review/standard/Admissions#about.

34 Pennsylvania was able to provide subtest-level pass rates but not composite pass rates. The Module 3 subtest includes math, science and health. Note that institutions that were not rated on selectivity are excluded from this figure.

35 When available, this analysis uses pass rates on the composite test. When states were not able to provide composite pass rates, this analysis uses pass rates on the subtest that had the lowest state average passing rate, based on the assumption that the subtest represented the greatest challenge to test takers.

36 This analysis uses the proportion of all undergraduate students at the institution who receive Pell grants, based on IPEDS data. The Pell grant recipient data is not specific to test takers or to those enrolled in teacher preparation programs.

On average for the time period of interest (2015–2018 academic years), 35.3% of undergraduate students received Pell grants. (U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Student Financial Aid component final data (2008–09 – 2017–18) and provisional data (2018–19). Financial Aid: What is the percent of undergraduate students awarded Pell grants? Retrieved from https://nces.ed.gov/ipeds/TrendGenerator/app/answer/8/35). For that reason, institutions are grouped by 35% or fewer undergraduates receiving Pell grants and 36% or more receiving Pell grants.

37 Illinois was able to provide subtest-level pass rates but not composite pass rates. The Subtest 1 includes language and literacy.

38 When available, this analysis uses pass rates on the composite test. When states were not able to provide composite pass rates, this analysis used pass rates on the subtest that had the lowest state average passing rate, based on the assumption that the subtest represented the greatest challenge to test takers.

39 It is possible that someone could pass the test and still take it again to raise her score. However, this is unlikely, as state licensure generally only requires passing the test, and anecdotal evidence suggests that licensure test scores are rarely a factor in the teacher hiring process.

40 Data on the most commonly required elementary education content test, the Praxis 5001 (Elementary Education: Multiple Subjects), previously shared with NCTQ by ETS, demonstrates that between 89% to 95% of test takers take each subtest only once or twice.

41 The following examples require data on first-attempt and best-attempt pass rates and the number of test takers, as well as the number of attempts for test takers.

42 Racial composition of the teacher workforce drawn from U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. (2019). Table 209.22. Number and percentage distribution of teachers in public elementary and secondary schools, by instructional level and selected teacher and school characteristics: 1999–2000 and 2017–2018. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of education statistics*. Retrieved from https://nces.ed.gov/programs/digest/d19/tables/dt19_209.22.asp?current=yes

Racial diversity of the student population drawn from: U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. (2020). Table 203.70. Percentage distribution of enrollment in public elementary and secondary schools, by race/ethnicity and state or jurisdiction: Fall 2000 and fall 2018. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of education statistics*. Retrieved from https://nces.ed.gov/programs/digest/d20/tables/dt20_203.70.asp?current=yes

Racial diversity of the adult population is drawn from The Annie E. Casey Foundation. (2020). *Adult population by race in the United States*. Kids Count Data Center. The Annie E. Casey Foundation. Retrieved from https://datacenter.kidscount.org/data/tables/6539-adult-population-by-race#detailed/1/any/false/1729,37,871,870,573,869,36,868,867,133/68,69,67,12,70,66,71,2800/13517,13518.

43 For example, students of color see greater achievement gains when taught by same-race teachers (Egalite, A., Kisida, B., & Winters, M. (2015). Representation in the classroom: The effect of own race teachers on student achievement. *Economics on Education Review*, 45, 44–52; Goldhaber, D., & Hansen, M. (2010). Race, gender and teacher testing: How informative a tool is teacher licensure testing and how does it impact student achievement? *American Educational Research Journal,* 47(1), 218–51; Dee, T. S. (2004). Teachers, race, and student achievement in a randomized experiment. *The Review of Economics and Statistics,* 86(1), 195–210.), and for Black students, having even one Black teacher in elementary school is associated with an increased likelihood of high school graduation and college matriculation (Gershenson, S., Hart, C. M. D., Hyman, J., Lindsay, C., & Papageorge, N. W. (2018). *The long-run impacts of same-race teachers* (NBER Working Paper No. 25254). Retrieved from https://www.nber.org/papers/w25254).

44 Goldhaber, D., Lavery, L., & Theobald, R. (2015). Uneven playing field? Assessing the teacher quality gap between advantaged and disadvantaged students. *Educational Researcher,* 44(5), 293–307; Goldhaber, D., Quince, V., & Theobald, R. (2018). *How did it get this way? Disentangling the sources of teacher quality gaps across two states.* Working Paper No. 209-1118-1. National Center for Analysis of Longitudinal Data in Education Research (CALDER). Retrieved from https://caldercenter.org/sites/default/files/CALDER%20WP%20209-1118-1.pdf; Goldhaber, D., Quince, V., & Theobald, R. (2018). Has it always been this way? Tracing the evolution of teacher quality gaps in U.S. public schools. *American Educational Research Journal,* 55(1), 171–201.

45 Putman, H., Hansen, M., Walsh, K., & Quintero, D. (2016). *High hopes and harsh realities: The real challenges to building a diverse workforce.* Brookings Institution; Hopper, E. B., Robinson, D., & Fitchett, P. (2021). Early career African American teachers and the impact of administrative support. *Urban Education,* 0042085920988335.

46 For this analysis, averages are calculated with the state as the unit of analysis, meaning that pass rates are averaged across all states, regardless of the number of test takers in a state. In the two states that reported pass rates on multiple tests (Alaska because candidates can choose among several tests and Maryland because the state was transitioning among tests during the time period), the average pass rates were weighted based on the number of people taking each test.

47 When available, this analysis uses pass rates on the composite test. When states were not able to provide composite pass rates, this analysis used pass rates on the subtest that had the lowest state average passing rate, based on the assumption that the subtest represented the greatest challenge to test takers.

48 Educators for Excellence. (2020). *Voices from the classroom: A survey of America's educators.* Retrieved from https://e4e.org/sites/default/files/voices_from_the_classroom_2020.pdf

49 First-time pass rates in most other professions are much higher than in education. For example, the first-time pass rate for nurses is 85%, and for nuclear engineers it is 71%. Putman, H., & Walsh, K. (2019). *A Fair Chance: Simple steps to strengthen and diversify the teacher workforce.* National Council on Teacher Quality. Retrieved from https://www.nctq.org/publications/A-Fair-Chance.