

Executive Summary

Examining Teacher Supply, Demand, and Shortages in Pennsylvania

By: Edward J. Fuller, The Pennsylvania State University

There have been numerous stories in the media about the teacher shortage in Pennsylvania over the last five years. This study examines teacher shortages, supply, and demand in Pennsylvania using available state administrative data that span various years between the years 2011 through 2025. Using the definition of rural provided by the Center for Rural Pennsylvania (CRP), this study examines these issues for rural and urban districts. Below is a high-level overview of the findings for teacher shortages, teacher supply, and teacher demand.

Throughout this report, districts refers to public school districts, charter schools, and Career and Technical Centers (CTCs) as well as Intermediate Units (IUs). Some analyses focus on only public school districts which exclude all other types of districts listed above. In some analyses, the study also compares outcomes between rural fringe, rural distant, and rural remote districts. Rural fringe districts are closest to an urban area while remote rural districts are the farthest away from an urban area.

Methods

This study relies on the definition of rural used by CRP. However, CRP identifies only public school districts as rural or urban. This study also includes charter schools, CTCs, and IUs. This study primarily relies on the entire universe of data—that is, every single member of the population being studied. When the universe of data is available, only descriptive statistics are needed because there is no uncertainty about the population. Teacher quality was assessed by the creation of a composite Teacher Quality Index (TQI) score based on six research-based measures of teacher quality. These are the standard definitions used by researchers when examining attrition (National Research Council, 1992).

Results

Teacher Shortages

This study estimates teacher shortages in four ways: (1) teacher vacancies reported by districts, (2) teachers employed on an emergency permit as reported by the Pennsylvania Department of Education (PDE), (3) percentage of teachers

assigned out-of-field, and (4) an overall Teacher Quality Index (TQI). TQI is a composite estimate of the teacher quality in each district relative to other districts in the Commonwealth.

For teacher vacancies, a lower number of rural districts than urban districts reported at least one vacancy in the two years for which data are available. From 2024 to 2025, both the percentage of districts with vacant positions and the district vacancy rates declined.

Over the last decade, a slightly greater percentage of rural districts than urban districts reported having at least one teacher on an emergency permit. In 2016, the percentage of teachers holding an emergency permit was an estimated 1.4 percent for both urban and rural districts. By 2024, the percentages were substantially greater for both, but the increase was much greater for urban districts than for rural districts; the estimated percentage of teachers on an emergency permit peaked at 7.3 percent in 2024 for urban districts and 4.4 percent for rural districts.

There was a substantial increase in the number of teachers employed on emergency permits for both rural and urban districts. Taken together, the sharp increase in emergency permits and the persistent use of out-of-field teaching assignments indicate that many rural and urban districts continue to face significant teacher shortages, which may affect instructional quality.

Finally, rural districts had higher teacher quality scores than urban districts with rural districts having higher teacher quality for five of the six elements of the TQI. In rural districts, the farther the distance from an urban district, the lower the teacher quality scores. Public school districts had much more positive measures of teacher quality than either charter schools or CTCs for the overall TQI and for five of the six measures. Charter schools, by far, had the lowest measures of teacher quality.

Overall, both rural and urban districts employ a substantial number of teachers on emergency permits and assign teachers to out-of-field positions. Thus, many rural and urban districts experience a shortage of teachers. This is especially evident in vacancies in specific subject areas like special education, math, and science. While an aggregate measure of teacher quality shows higher scores in all rural districts compared to urban, the lower quality of teachers in rural CTCs is a clear distinction.

Teacher Supply

The supply of teachers in Pennsylvania, as measured by the number of initially certified teachers in Pennsylvania teacher preparation programs (TPPs), declined substantially between 2013 and 2017 and has never recovered. From 2012-13 to 2016-17, there was a 66-percent decline in the number of initial in-state certifications. In most years between 2014 and 2020, the number of newly certified teachers was about the same as the number of teachers leaving. However, since that time, the number of teachers leaving has increased fairly dramatically

while the number of newly certified teachers has remained stagnant.

The supply of teachers has declined at similar rates for both urban and rural counties. However, many rural counties have no TPP, thus have a restricted supply of teachers regardless of the overall level of initially certified teachers.

Teacher Demand

The primary factors in driving demand can include changes in student enrollment, changes in student characteristics, and teacher attrition.

Student enrollment has declined across Pennsylvania over the last decade and will continue to decline for much of the Commonwealth in the coming decade. The decline in students has been most pronounced in rural districts in Pennsylvania. Specifically, the number of rural students has declined by 13 percent while student enrollment in urban districts has declined just over two percent.

Student characteristics and the needs of students have changed as well over the last decade. Indeed, the number and percentage of economically disadvantaged and special education students have increased in both rural and urban districts. Moreover, research has shown that the mental health needs of students, including those in rural areas (Gajanan, 2023), have increased over time. These changes in student characteristics may increase the demand for teachers. Further, as the number of special education students increases, the demand for special education teachers increases. Moreover, special education classes have class size limits imposed by the General Assembly that are generally lower than student-teacher ratios in other classes.

Attrition

Past studies have found teacher attrition to be the most important factor explaining the demand for teachers (Sutcher et al., 2019). Attrition in rural districts overall from 2021 onward has remained at 6 to 7 percent; in urban districts,

attrition is at 9 percent or higher. Comparing 2020 to 2024, an additional 400 teachers left the teaching profession in rural Pennsylvania and almost 1,900 left urban districts. If data are examined in more detail, they show issues with teacher attrition are greater for charter schools and CTCs than for public school districts.

This study also includes an analysis that examined the likelihood of an individual teacher in a rural public school district leaving the teaching profession after one year relative to an individual in an urban public school district. After excluding charter schools and CTCs and adjusting the results for teacher characteristics and district characteristics, this study found that rural teachers in public school districts are slightly more likely than teachers in urban public school districts to leave the teaching profession in Pennsylvania. Consistent with prior research, newly hired teachers are more likely to leave teaching after one year than teachers who were not newly hired; this finding was statistically significant. Black and multi-race teachers had the highest odds of leaving their teaching jobs. Finally, attrition was shown to be related to lower salaries. The higher the average teacher salary in a district (after adjusting for the wages of other college educated workers in the same labor market), the less likely a teacher was to leave the teaching profession. Since teacher shortages and high attrition have a negative effect on student outcomes (Fuller, 2026; Sutch et al., 2019) policymakers should take action to address these concerns.

Policy Recommendations

Expand and Strengthen the Teacher Preparation Pipeline

This report shows that Pennsylvania's supply of teachers is insufficient to meet the demand for teachers, especially in specific subject areas and in specific areas of the state such as remote rural areas which have no or limited access to TPPs. Expanding the teacher pipeline can include several different policies.

Based on the available research, Pennsylvania could first expand Grow Your Own (GYO) teacher apprenticeship pathways that recruit high school students, paraprofessionals, and other community members into the teaching profession (Blazar et al., 2024).

Second, the Commonwealth could financially support teacher residency models which have been shown to drastically reduce attrition of teachers in their first years of teaching (Guha et al., 2017).

Finally, the General Assembly could provide targeted funds to universities throughout the Commonwealth that must be used to support teacher preparation given the recent consolidation and closures of some campuses.

Strengthen Financial Incentives for Entering the Profession

The need for additional teachers is more acute in specific subject areas such as special education and mathematics. Programs that provide tuition assistance or loan forgiveness in exchange for teaching service have strong evidence of increasing the number of individuals entering and completing preparation programs (Podolsky and Kini, 2016). The Student Teacher Stipend Program (STS) is an example of this type of program. With limited funds, targeting the most high-demand subject areas could have the biggest return on investment. Currently, the state could prioritize teachers of special education, math, and science. The prioritization list could be adapted in response to additional data over time.

Improve Teacher Compensation

Average teacher salaries have actually declined over the last 20 years and continue to decline. Increasing teacher salaries creates incentives for individuals to enter the teaching profession as well as stay in the teaching profession (Hanushek et al., 2004). Mississippi and Arkansas both increased teacher salaries and have experienced substantial declines in teacher attrition, thus reducing the shortage of teachers (Saunders and Skinner, 2025). Therefore, one strategy to reduce

the shortage of teachers is to provide a salary increase for all teachers.

There are also more targeted strategies to improve teacher salaries. One strategy is to support pay increases for teachers to advance into formal Teacher Leader positions. Teacher Leaders can serve as expert mentors which can help reduce teacher attrition and increase teacher effectiveness (Ingersoll and Strong, 2011). PDE has already created a certificate for such positions, but not all districts have adopted this strategy.

Another research-based strategy to increase teacher salaries where an increase is needed the most is to adopt a comprehensive performance pay program for teachers in high-need schools located in both rural and urban areas. Recent research has found that such programs can save money in the long run by reducing teacher attrition (Dee and Wyckoff, 2015; Hanushek, et al., 2019).

Create a Retain Your Own Program

PDE now provides teacher attrition data; we can determine which specific districts struggle most with teacher retention. While rural districts have overall lower attrition rates than urban districts, a greater percentage of rural than urban public school districts or CTCs have attrition rates greater than 10 percent from 2021 through 2024. The underlying causes of high attrition and the potential solutions are likely to differ by local contexts. This program would provide financial support and technical assistance to districts identified as eligible for support based on their average yearly attrition and turnover rate. Technical assistance could be provided through a university-state partnership to assist districts in developing, implementing, and evaluating their efforts to reduce teacher attrition.

Importantly, reducing attrition in high-need districts has a spillover effect that increases the supply of teachers overall and, thus, reduces the demand for teachers statewide.

Adopt and Implement a Statewide Teacher Working Conditions Survey

Findings from the multivariate analysis of teacher attrition demonstrated that multiple variables in a school district influenced the odds of leaving teaching. Therefore, Pennsylvania should adopt a survey used by other states to assess teacher working conditions. Importantly, the purpose of such an effort must be to provide tools and assistance to schools and districts; such efforts must be distinct from processes of evaluation and accountability.

Enhance State Data Collection and Analysis

While PDE has increased and improved the collection of data, there are still issues with data collection, documentation of details, and timeliness of data production. Thus, the Commonwealth should:

- Build and/or enhance pre-kindergarten through postsecondary statewide longitudinal data systems that allow researchers to follow individual teachers longitudinally through the entire career pipeline.
- Track enrollment, completion, licensure, placement, and retention outcomes across TPPs by individual characteristics and subject area.
- Publish annual teacher workforce dashboards highlighting shortages by region and subject.

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