

Research Report

Factors Associated with the Retention of Rural Secondary Science and Mathematics Teachers in Illinois

Part of the Series: Science and Mathematics Teacher Retention in Rural Illinois

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External Review

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Executive Summary

Recruiting and retaining high-quality science and mathematics teachers in rural districts is critical for student learning. In this report, we examine why rural teachers remain teaching in their districts so that policymakers and practitioners can better understand the factors that help retain science and mathematics teachers in their schools.

Strong science and mathematics teaching improves student learning in cumulative and lasting ways.¹ Unfortunately, many school districts across the country are struggling with recruiting and retaining science and mathematics teachers (SMTs),² especially in middle and high schools and schools serving low-income students and students of color.³ When teachers leave, districts often end up filling vacancies with less-experienced and less-credentialed teachers, resulting in negative impacts on student learning.⁴ Rural school districts⁵ across the country on average, including in the state of Illinois, face the biggest teacher staffing challenges.⁶ Given these issues, it is important for research and policy to work in tandem on addressing how to recruit and retain high-quality SMTs in rural areas.

Previous research has shown that supportive working conditions play a key role in attracting and retaining high-quality SMTs.⁷ Specific features of working conditions that are associated with higher rates of teacher retention include strong support from school and district administrative leaders.⁸ Teachers also point to the importance of positive and supportive relationships with their fellow teachers as well as collaborative peer engagement opportunities as reasons why they stay.⁹ Many prior studies also cite access to professional development as drivers of teacher retention, especially professional learning that is directly related to content specific subject-areas and classroom management.¹⁰ Alternatively, SMTs teaching in rural schools with poor working conditions are more likely to leave their districts to work in higher-paying, non-rural districts.¹¹

In addition to working conditions, other studies found that a strong rural school-community relationship is associated with retaining rural teachers, emphasizing the importance of community connections and support.¹² Given this, previous research found that teachers from rural backgrounds are more likely to take jobs in rural schools and stay longer than teachers who take such jobs, but are not from rural backgrounds.¹³ This finding holds true even when pay is low or stagnant.¹⁴

In this report, we identify key factors that influence SMT retention in rural Illinois. In this study, an SMT is defined as an educator who teaches at least one science or mathematics course in grades 6-12. The findings in this report are intended to inform policies and practices designed to reduce turnover of rural SMTs and strengthen staffing in these critical subject areas.

Using teacher survey data, this report addresses two primary research questions:

1. What are rural SMTs' perceptions of their current working conditions? How do teachers' perceptions of their working conditions vary based on individual and district level characteristics?
2. What working conditions, including district, school, and community level factors, are most associated with rural SMTs' likelihood of planning to stay in their district/schools? How do the reasons why teachers stay vary based on their individual and district characteristics?

This report is part of a larger series of studies examining the rural SMT workforce in Illinois. For a descriptive landscape of Illinois' rural districts and a description of the characteristics of the SMT

workforce, see <https://dpi.illinois.edu/applied-research/iwerc/current-projects/teacher-workforce-portfolio>.¹⁵ Applying an exploratory convergent mixed-methods research design¹⁶, this project has three main strands: A quantitative component that examines the organizational and community characteristics associated with rural SMT retention using secondary administrative data; a survey of rural SMTs that analyzes the working conditions of SMTs in rural districts, primary reasons why SMTs stay, and associations between these reasons and SMT backgrounds and teaching circumstances; and a qualitative component that assesses the school and district policies, strategies, and practices that contribute to rural SMT retention using case study data.

Educational Context in Illinois

Illinois provides a unique context for examining rural SMT retention. During the 2022-23 school year, the state had a total of 865 school districts; 426 (49.2%) of those districts are classified as rural¹⁷ based on population size and proximity to populated areas, and 306 of the rural districts are classified as *high-need*, which serve greater percentages of students from low-income families and sustain lower rates of teacher recruitment and retention.¹⁸ While these numbers do change slightly year-to-year and the state faces ongoing teacher shortages,¹⁹ the distribution of unfilled teaching positions is not equally distributed across the state.²⁰ Rural areas in the state have higher teacher vacancy rates compared to other areas, particularly in middle and high schools, where filling science and mathematics positions remains especially difficult.²¹ More recent data from the 2024-25 school year show that educator shortages in Illinois are starting to ease, but it is important to continue this trend by learning more about what helps keep teachers in their positions.²² This report is intended to provide useful information to rural Illinois districts and other rural districts across the country to help retain SMTs. It is also intended as a resource to inform Illinois' broader teacher retention efforts.

Methods

Data was obtained through an online survey administered to rural SMTs in grades 6-12 across the state of Illinois between October 2024 and February 2025 (N=362). We developed new items and adapted survey items from previously validated survey instruments that focused on teacher working conditions and retention. The survey was designed to take approximately 20 minutes to complete. The survey included questions related to SMTs' current teaching roles, backgrounds, working conditions, and satisfaction with teaching. To view the full survey instrument, see Appendix B.

Survey items asked teachers to report on their perceptions of their working conditions, their likelihood of staying in their main school/district over the next three years, and their background characteristics and experiences. We explored differences in teachers' perceptions of their working conditions and in the reasons why they stay by their different background characteristics and teaching circumstances (i.e., whether teachers perceive that their teacher preparation program prepared them to teach in a rural setting, whether they come from a rural background, their years teaching in their current school/district, the district proportion of low-income students enrolled, etc.)

To administer the survey, our research team sent a link to all rural superintendents across the state so they could share it with their SMTs in grades 6-12. To boost response rates, our team sent an email to every Regional Office of Education (ROE) superintendent who oversees rural school districts, to ask them to remind their rural school superintendents to share the survey link with their SMTs. Lastly, we sent postcards with a QR code for the survey to all rural schools that employ SMTs in grades 6-12. The survey link was active from October 16, 2024 to February 3, 2025.

To analyze the survey, we conducted weighted univariate and bivariate analyses as well as Exploratory Factor Analysis (EFA) on all Likert-scale items. For the EFA, we examined the optimal number of factors and identified which items loaded onto each factor. We conducted pairwise chi-square tests to look for significant differences in perceptions of school working conditions by various teacher characteristics. For a more detailed technical overview of the methods used in this report, see Appendix A.

Key Findings

- Overall, rural Illinois SMTs in grades 6-12 who responded to the survey were positive about their working conditions. Over sixty percent of teachers strongly agreed that they have autonomy/control for class planning, feel accepted in their schools, and have positive relationships with their teaching peers. However, fewer than half of rural teacher respondents agreed that they have time to collaborate with their peers and have adequate salaries and benefits.
- Rural SMTs who perceived that their teacher preparation programs helped to prepare them for rural-centric teaching positions were significantly more positive about several aspects of their working conditions. For example, they were significantly more positive about their access to community services and amenities, relationships with their peers, and their compensation and benefits, compared to their peers who reported that their preparation program did not prepare them to work in a rural setting. Feeling that their preparation program prepared them to teach in a rural setting also predicted a higher likelihood of planning to stay in their main school/district for the next three years.
- Rural SMTs who reported having strong school and district level support and having alignment between their personal values and the values of their school communities were significantly more likely to plan to stay in their school/district over the next three years. Furthermore, teachers who reported having adequate compensation and benefits were significantly more likely to report planning to stay in their schools.

These results highlight a number of implications for both policymakers and practitioners. To help increase the retention of rural SMTs in grades 6-12, school and district leaders can focus more on creating and maintaining positive working environments. They can also ensure that SMTs feel adequately supported, and that they have desirable benefits and pay packages. In addition, state policymakers, along with teacher preparation program faculty and staff, can make teaching in rural settings an important part of teacher education training. Teacher preparation program faculty and staff can highlight the unique circumstances and benefits of teaching in rural settings. They can also intentionally focus on building teachers' skills to best tackle the challenges they may face in rural school districts.

Introduction

Strong science and mathematics teaching boosts student learning in cumulative and lasting ways.²³ Unfortunately, many districts across the country are facing challenges with recruiting and retaining high quality teachers, including science and mathematics teachers (SMTs).²⁴ Scholars have been sounding an alarm about teacher shortages nationally, regardless of subject area. For example, recent national analysis from the 2024-25 school year shows that nearly 1 in 8 teaching positions are left unfilled or are filled by an underqualified teacher (e.g., a teacher who is teaching with a temporary, emergency, or provisional certification or teaching outside of the subject area or grade level that was covered by their credential).²⁵ While shortages exist across many subject areas, state level teacher shortages are most commonly reported in the areas of special education (45 states), science (41 states), and mathematics (40 states).²⁶ Middle and high schools, as well as schools that serve high proportions of low-income students and students of color, face the greatest challenges in recruiting and retaining teachers.²⁷ These schools often cannot hire enough qualified teachers and experience high rates of teacher turnover.²⁸

When high-quality teachers leave, some districts end up replacing them with less-experienced and less-credentialed teachers, resulting in negative impacts on student learning. For instance, a recent study in Texas found that uncertified teachers made up over 80% of new hires in 40 counties across the state. Students who have an uncertified teacher without any classroom experience suffered 3 months of learning losses in mathematics and 4 months in reading, compared to their peers.²⁹ On average, younger and less experienced teachers are more likely to move to different schools and more likely to leave the profession entirely compared to mid- or later-career teachers, adding to district staffing issues.³⁰

Rural school districts often face the biggest staffing challenges.³¹ The Texas study cited above, for example, found that rural districts hired uncertified teachers at four times the rate of non-rural districts.³² Similarly in Illinois, past studies have shown that the most severe teacher shortages appear in rural schools.³³ When rural teachers leave, schools frequently cancel classes or assign core subjects to non-licensed staff.³⁴ Rural school teachers who remain are often responsible for teaching multiple classes, including ones that fall outside of their main content areas, adding burden.³⁵ In addition, rural teachers frequently work alone in their subject area and need to juggle multiple grade levels, requiring deep content knowledge and pedagogical/instructional flexibility. This setup can lead to frustration and burnout.³⁶ Furthermore, rural educators take on many roles in their districts due to small staff sizes and limited resources, adding to the strain.³⁷ Studies have shown that SMTs teaching in rural schools with poor working conditions are more likely to leave their districts to work in higher-paying, non-rural districts.³⁸ Given these challenges, it is important for research and policy to work in tandem on addressing how to recruit and retain high-quality teachers in rural areas.

Supportive working conditions play a key role in attracting and retaining high-quality SMTs.³⁹ Specific features of working conditions that are associated with higher rates of teacher retention include strong support from school and district leaders.⁴⁰ Administrative supports that are associated with teacher retention include providing teachers autonomy over their classrooms, making sure teachers are included in decision making, and helping teachers build relationships and trust with families.⁴¹ Teachers who remain committed to teaching also point to the importance of positive and supportive relationships with their fellow teachers as well as collaborative peer engagement opportunities as reasons why they stay in the profession.⁴² Many studies also cite access to professional development as drivers of teacher retention, especially professional learning that is directly related to content specific subject-areas and classroom management.⁴³

In addition to working conditions, community relationships, as well as the economic and cultural strength of rural communities affects the viability and sustainability of rural schools.⁴⁴ For example, a strong rural school-community relationship is associated with retaining rural teachers, emphasizing the importance of community connections and support.⁴⁵ A study on rural teachers in Wisconsin, for example, cited teachers' "dual role" as respected community members in addition to being local teachers as a key reason why they stayed in rural teaching positions.⁴⁶ Another systemic review of the literature on rural teaching pointed to the characteristics of rural communities—namely, geographic remoteness and small population size, in helping to foster rural school advantages, such as smaller class sizes and close school-community connections.⁴⁷ Given this, previous research found that teachers from rural backgrounds are more likely to take jobs in rural schools and stay longer than teachers who take such jobs, but are not from rural backgrounds.⁴⁸ This finding holds true even when pay is low or stagnant.⁴⁹

Rural schools across the country, including in Illinois, continue to face SMT shortages due to limited supply and the ongoing effects of COVID-19.⁵⁰ Concerns about burnout, insufficient compensation, and turnover persist – especially in schools with too few staff, where teachers carry heavier workloads. This study identifies key factors that influence SMT retention in rural Illinois. The findings in this report are intended to inform policies and practices designed to reduce turnover of rural SMTs and strengthen staffing in these critical subject areas.

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districts are classified as rural or town, and over half serve 600 students or fewer.⁵⁷ These numbers highlight how teacher vacancies disproportionately affect rural students across the state.

To address chronic teacher shortages, Governor JB Pritzker and the Illinois State Board of Education (ISBE) launched the Teacher Vacancy Grant Pilot Program (TVGPP) in understaffed districts.⁵⁸ This three-year initiative, which began in fiscal year 2024, provided grants to support school districts with the greatest teacher staffing challenges. Rural districts received 60% of the new awards. The flexible nature of grant funding support allows school districts to determine which strategies may be best for recruiting and retaining teachers in their school communities. During the first year of the grant, participating districts hired 5,387 new teachers – 10% of their full-time teaching staff.⁵⁹ Rural districts hired 643 new teachers for 2023-24 school year but also lost 737 teachers. Updated data from the 2024-25 school year show that educator shortages in Illinois are easing.⁶⁰ Overall, across rural schools, the number of unfilled teaching positions decreased by 7%, while increasing by 171% in non-participating districts.⁶¹ Given that educator shortages are easing, it is important for policymakers to focus on stemming teacher turnover by learning more about what helps keep teachers in their positions.

While this report is focused on Illinois schools, findings also point to ways in which other rural districts across the U.S. can support and retain their SMTs. This report is intended to provide useful information to rural Illinois districts and other rural districts across the country to boost SMT recruitment and retention efforts. It is also intended as a resource to inform Illinois' broader teacher retention efforts.

Overview of This Report

In this report, we utilize survey data to examine rural SMT perceptions of their working conditions and the primary reasons driving teacher retention. We focus on rural teachers in grades 6-12 given the unique challenges that middle and high schools face in recruiting and retaining high-quality SMTs. Using survey data, we look at the district, school, and community level factors that are most associated with the retention of rural SMTs. Throughout the report, we examine whether there are any differences in teachers' perceptions of their working conditions or differences in their reported reasons why they stay by their backgrounds and teaching circumstances, such as:

- Whether teachers perceive that their teacher preparation program prepared them to teach in a rural setting
- Whether teachers indicated that they come from a rural background
- The number of years teachers have been teaching in their current school
- Whether teachers are teaching in a high-need district (as defined by the National Science Foundation)⁶²
- Whether teachers are teaching in a district with high proportions of low-income students⁶³

Data Sources

Data was obtained through an online survey administered to rural SMTs in grades 6-12 across the state of Illinois between October 2024 and February 2025 (N=362). We developed new items and adapted survey items from previously validated survey instruments that focused on teacher working conditions and retention. The survey was designed to take approximately 20 minutes to complete.

The survey included questions related to teachers':

- Current Teaching Role(s) (i.e., subject areas taught; name of school and district; total number of years teaching in their current main school; total years teaching overall; whether teaching on an emergency or short-term license; and typical commute times)
- Background (i.e., major areas of study; credentials/permits; perception of whether teacher preparation program prepared them for teaching in rural districts; coming from a rural background)
- Working Conditions (i.e., perceptions of school and district working conditions; access to professional development; community connections and supports)
- Job Satisfaction (i.e., how long teachers plan to remain teaching overall and within their schools/districts; factors influencing why they accepted the position and why they plan to stay in the position).
- Demographic Information (i.e., gender; race/ethnicity; highest level of education completed)

To view the full survey instrument, see Appendix B.

Methods

Sampling and Administration. Our research team sent a link to the survey and instructions for administration to all rural superintendents across the state. Superintendents were instructed to send the link to all of their SMTs in grades 6-12. Our team also sent an email to every Regional Office of Education (ROE) superintendent who oversees rural school districts asking them to remind their rural school superintendents to share the survey link with their teachers. NORC sent batches of ten postcards to each rural school that employs SMTs in grades 6-12 ($N = 709$). The postcards were packaged in an envelope with an instruction sheet that requested these postcards be placed in eligible teachers' school mailboxes. These postcards provided information directly to teachers about the study and included the survey QR code for accessibility. The survey link was active from October 16, 2024 to February 3, 2025.

Analysis. We conducted weighted univariate and bivariate analyses on select survey items that directly address our primary research questions. We also conducted an Exploratory Factor Analysis (EFA) on all Likert-scale items. For the EFA, we examined the optimal number of factors and identified which items loaded onto each factor. Throughout the process, we checked assumptions, including looking at the correlations among items to check for multicollinearity, the eigen value of the factors, the cumulative variables explained by each of the factors, and made sure that all items met the factor loading threshold (0.4 or higher).⁶⁴ We found that each of the identified factors had *at least* three variables with high factor loadings and each variable loaded highly on only one factor. We conducted pairwise chi-square tests to look for significant differences in perceptions of school working conditions by various teacher and district characteristics. To mitigate the risk of inflated Type I error from multiple comparisons, p-values were adjusted using the Benjamini-Hochberg (1995) procedure.

For a more detailed technical overview of the methods used in this report, see Appendix A.

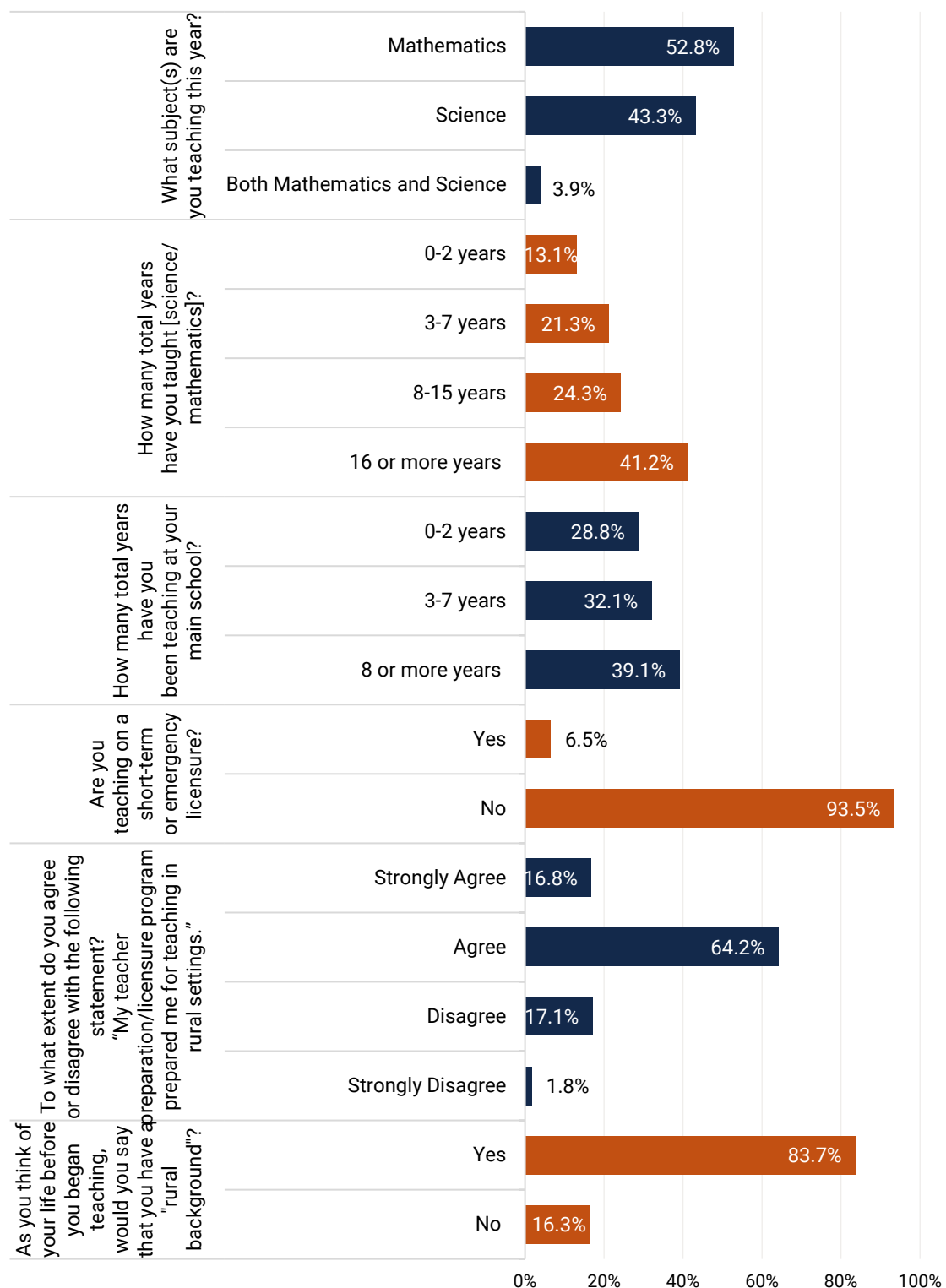
Characteristics of the Weighted Science and Mathematics Teacher Survey Sample

Overall, 362 rural SMTs in grades 6-12 completed the survey. Figure 1 highlights the characteristics of the teachers in our sample, including subject area(s) taught, total years teaching at their main school (i.e., school where they teach and spend the majority of their time), total years teaching their subject area, as well as the percentage of the sample teaching with a short-term or emergency licensure. In addition to these metrics, we also asked teachers to tell us about their backgrounds and experiences related to their educator preparation program and familiarity with rural communities.

Teachers in the weighted sample are almost evenly split between those who teach science (43.3%) and those who teach mathematics (52.8%), while a much smaller proportion reported that they teach both subject areas (3.9%). Only 6.5% of teachers who took the survey reported that they were teaching with a provisional, short-term, or emergency licensure. While our survey captured perspectives from teachers who have varying levels of experience, it overrepresents experienced teachers. For example, the largest proportion of survey respondents have been teaching within their subject area for 16 or more years (41.2%). The highest proportion of teachers in our sample have been teaching at their main school between 8-15 years (39.1%). Just under 29% of respondents are new to their main schools (0-2 years of experience). Given this over-representation of more experienced principals, we want to caution readers that these results may have looked different if we had obtained a more representative sample of teachers across the career span.

Lastly, four out of five teachers agreed that their teacher preparation program prepared them to teach in a rural setting. Furthermore, the majority of respondents (83.7%), reported that they have a rural background.

Figure 1: Characteristics of Statewide Rural Science and Mathematics Teacher Survey Sample (Weighted)



NOTE: All percentages and standard errors are weighted to adjust for the complex survey design. This figure excludes non-responses. N = 362

Survey respondents also work in a variety of school district settings and are geographically dispersed throughout the state (Table 1). For example, a little over a quarter of respondents work in schools located in the East Central part of the state. Roughly 15-20% each work in the Northeast, West Central, Southeast, and Southwestern portions of Illinois.⁶⁵

Table 1: Percentage of Science and Mathematics Teacher Survey Respondents Working in Different Geographic Locations Across Illinois (Weighted)

Geographic Location	N	% OF TOTAL	SE
East Central	97	28.6%	2.65
Northwest	76	21.0%	2.36
West Central	70	17.8%	2.15
Southeast	66	16.8%	2.05
Southwest	52	15.4%	2.14

NOTE: We omitted geographic areas with less than 10 respondents, which includes the Northeast region of the state where the city of Chicago is located.

In addition to geographic diversity, we also examined characteristics of the school districts in which rural SMTs are working, including the percentage of low-income students enrolled within districts and the percentage of teachers working in *high-need* districts (Table 2). A little less than half of survey respondents teach in districts that fall into the first (14.6%) or second (29.1%) lowest quartiles in terms of the percentage of low-income students enrolled in the district. Over half work in higher poverty districts – in the third (33.7%) and fourth (22.7%) highest quartiles. A little over three-fifths (65.2%) of respondents work in *high-need* districts, which serve greater percentages of students from low-income families and sustain lower rates of teacher recruitment and retention.

Table 2: Characteristics of the Rural Districts in Which Science and Mathematics Teacher Survey Respondents are Working

	N	% OF TOTAL	SE
Low-Income Student Enrollment (Quartiles)			
Quartile 1 (lowest quartile of low-income students enrolled; <38.2%)	68	14.6%	1.79
Quartile 2 (38.21% - 46.3%)	108	29.1%	2.61
Quartile 3 (46.31% - 53.15%)	112	33.7%	2.78
Quartile 4 (highest quartile of low-income students enrolled: > 53.15%)	71	22.7%	2.52
Teaching in a High-Need District			
Teaching in a High-Need District	246	65.2%	2.79
Not Teaching in a High-Need District	116	34.8%	2.79

NOTE: All percentages and standard errors are weighted to adjust for the complex survey design.

To better understand how our survey sample may differ from the full population of rural SMTs in grades 6-12 across the state of Illinois, see our companion landscape report <https://dpi.illinois.edu/applied-research/iwerc/current-projects/teacher-workforce-portfolio>.

What are Science and Mathematics Teachers' Perceptions of Their Current Working Conditions?

To better understand how rural SMTs in grades 6-12 are experiencing their working conditions, we asked them a series of questions related to their districts, schools, and school communities. Teachers could select their level of agreement or disagreement on a four-point scale from strongly disagree to strongly agree for each statement. We used factor analysis, a statistical method which groups survey items to uncover patterns or underlying “factors” that help explain how those variables relate to one another. Through factor analysis, we identified five main “factors” of teacher working conditions, including:

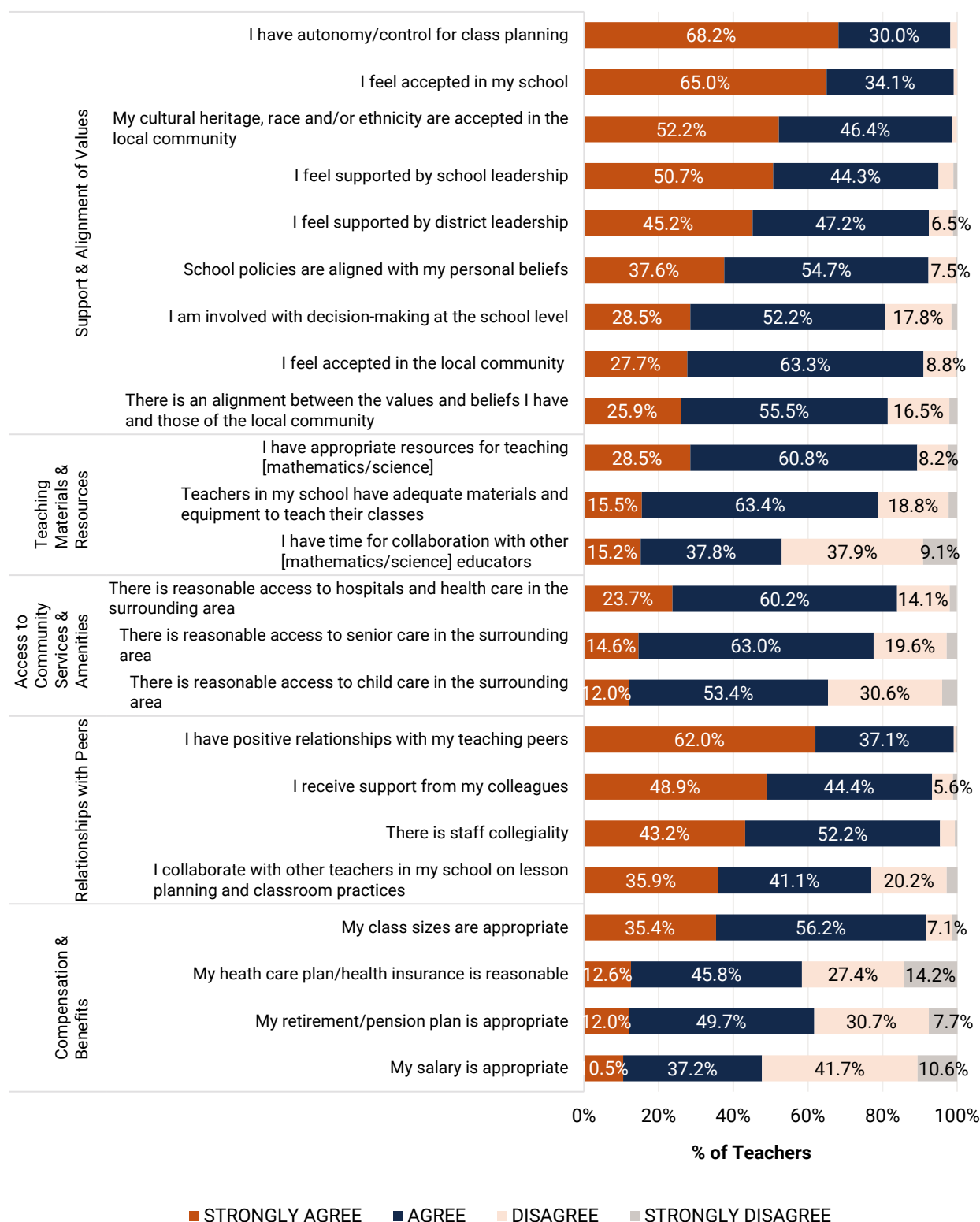
- *Support and Alignment of Values.* This factor includes both support from district and school leaders as well as alignment between teachers’ values and district/school/community values (e.g., School policies are aligned with my personal beliefs; I feel accepted in my school; I feel support from school leadership)
- *Teaching Materials and Resources.* This factor includes items related to access to school equipment, materials and resources, as well as time for collaboration with other teachers (e.g., Teachers in my school have adequate materials and equipment to teach their classes; I have time for collaboration with other [science/mathematics] teachers)
- *Access to Community Services and Amenities.* This factor includes items related to access to community resources and services (e.g., There is reasonable access to child care in the surrounding area; There is reasonable access to senior care in the surrounding area)
- *Relationships with Peers.* This factor includes items related to colleague support and having positive relationships with peers (e.g., I have positive relationships with my teaching peers; I receive support from my colleagues through induction, mentoring, and/or community of practice)
- *Compensation and Benefits.* This factor includes items related to pay and compensation (e.g., My salary is appropriate; My retirement/pension plan is appropriate)

Figure 2 shows the level of agreement on each survey item organized by the five main factors. Overall, teachers who responded to the survey were positive about their working conditions. For example, respondents level of agreement (combining agree and strongly agree categories) on items related to their working conditions was consistently high, ranging from 47.7% for “My salary is appropriate” to 99.1% for “I feel accepted in my school”. Among the 23 working condition survey items, 15 were above 80% agreement (strongly agree/agree), indicating that teachers overall were very positive about their working conditions.

Items with the highest level of agreement (strongly agree) include: I have autonomy/control for class planning (68.2%), I feel accepted in my school (65%), and I have positive relationships with my teaching peers (62.0%). Teachers also reported feeling supported by their school leaders (50.7% strongly agree and 46.4% agree) and district leaders (45.2% strongly agree and 47.2% agree) at high rates. However, teachers were split on survey items related to having time for collaboration with other teachers and whether they feel their salary and benefits are adequate. For example, 37.9% disagreed and 9.1% strongly

disagreed with the statement, “I have time for collaboration with other science/mathematics educators”. In addition, 41.7% disagreed, and 10.6% strongly disagreed with the statement, “My salary is appropriate”.

Figure 2: Teachers’ Perceptions of Their Working Conditions by Factor



To better understand teachers' perceptions of their working conditions, we further explored whether teachers felt differently about their working conditions depending on their personal and teaching circumstances as well as their backgrounds, including:

- The subject areas and grade levels within which they teach
- The number of years they have been teaching at their main schools
- Whether they are working in a *high-need* district
- Whether they are teaching with a short-term or emergency licensure
- Whether they believe their preparation program prepared them to teach in rural schools
- Whether they have a rural background

To do this, we explored teachers' level of agreement on a four-point scale from strongly disagree to strongly agree on survey items related to their current working conditions. We found a few significant differences in teachers' perceptions of their working conditions by their personal and teaching circumstances. Figure 3 shows derived percentages – values that represent the percentage of teachers whose average factor scores fall within the top two quartiles (Q3 and Q4). These quartiles correspond to higher levels of agreement on the underlying construct and approximate “agree” and “strongly agree” on the original Likert scale. For example, teachers who teach both science and mathematics show significantly higher levels of agreement with items related to *Support and Alignment of Values* (79.4%) than teachers who only teach science classes (46.9%; $p=0.011$). The majority of teachers who teach both subject areas are teaching in middle school grades (77%). While our sample size for this group of teachers is small ($N=16$), this finding may indicate something about teaching in a middle school environment compared to teaching in a secondary school environment.

Teachers who reported that their teacher certification program prepared them to teach in a rural setting and teachers who self-identified as having a rural background show a significantly higher level of agreement with items related to having adequate *Teaching Materials and Resources* (54.1% and 54.3% respectively) compared with their peers (40.3%; $p=0.027$ and 36.6%; $p=0.045$ respectively). This finding may indicate that teachers who felt they were adequately prepared to teach in rural settings, or had familiarity with rural settings, have different experiences of and/or expectations for the types of teaching materials and resources they would have access to in rural schools.

We found several differences in teachers' perceptions of their *Access to Community Services and Amenities*. For example, teachers who teach in one of the *high-need* districts had significantly higher levels of agreement with items related to having *Access to Community Services and Amenities* (53.4%) than teachers who do not work in a *high-need* district (51.4%; $p=0.034$). Similar to the above, this finding may indicate something about teachers' expectations about the types of services and amenities that may exist in *high-need* district communities. More research is needed to understand whether the differences in perceptions of community services and amenities in *high-need* district communities reflect real differences in state and local investments across different communities.

In addition, teachers teaching with a short-term or emergency licensure had significantly higher levels of agreement with items related to *Access to Community Services and Amenities* (70.0%) compared to their peers (51.4%; $p=0.042$). Among teachers on a short-term or emergency licensure, 80.8% of them are teaching in one of the *high-need* districts. Therefore, similar potential patterns in perceptions of community resources may apply.

Lastly, teachers who reported that their preparation program prepared them to teach in a rural school had significantly higher levels of agreement with items related to *Access to Community Services and Amenities* (54.6%) than teachers who did not think their preparation programs prepared them to teach in rural schools (44.4%; $p=0.016$). This finding may indicate that teachers who felt they were well prepared to teach in a rural setting had more knowledge of and/or more managed expectations for the types of services and amenities that may be available in rural communities.

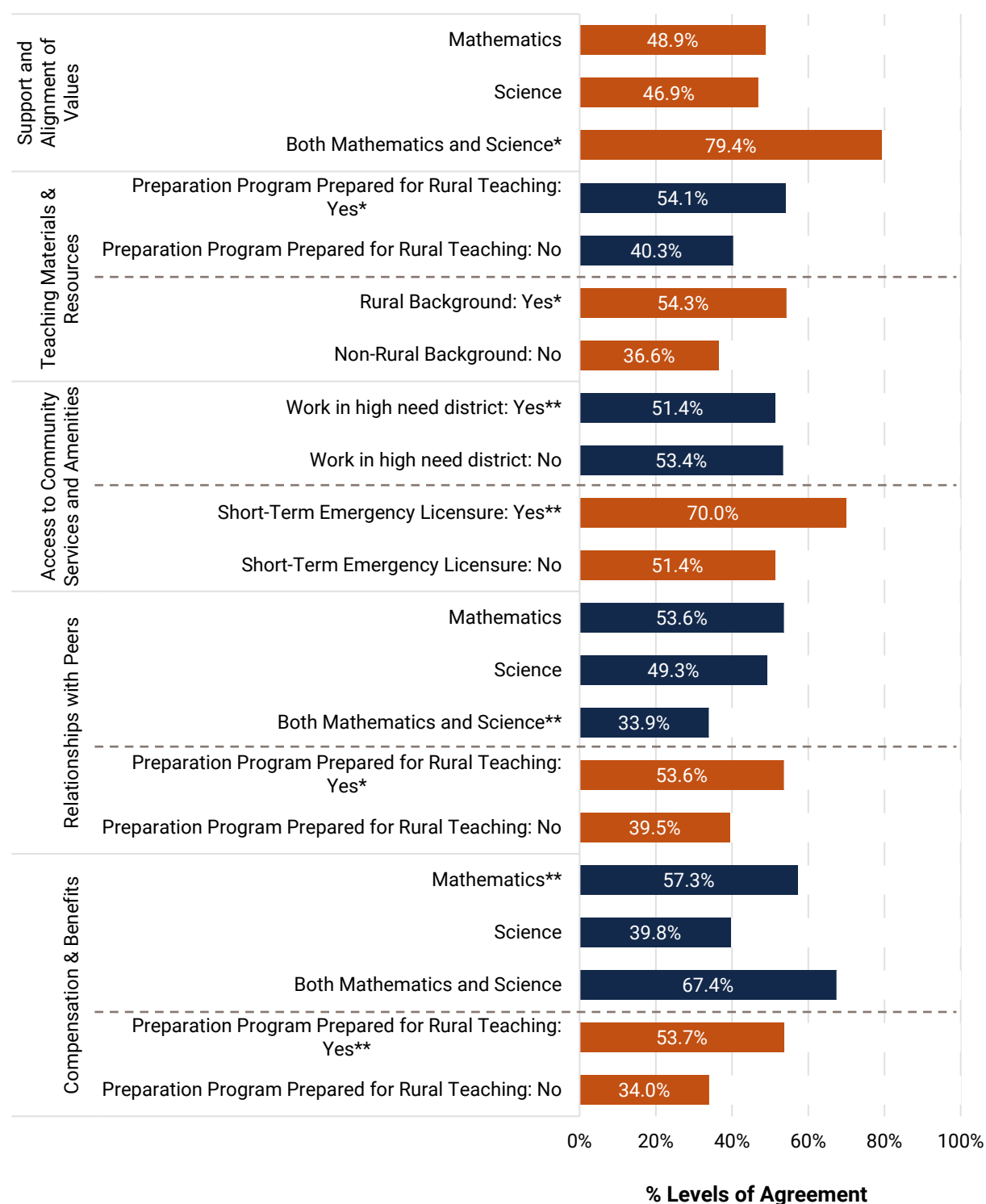
Teachers' perceptions of their *Relationships with Peers* also varied depending on some of their personal characteristics and working conditions. For example, teachers who teach both science and mathematics classes had significantly lower levels of agreement with items related to having positive *Relationships with Peers* (33.9%) compared with teachers who only teach mathematics classes (53.6%; $p=0.001$). Although this is a small group, this finding may point to a lack of time that teachers who teach both subject areas may have for making personal connections with other teachers, compared to mathematics teachers. As noted above, teachers who teach both subject areas were significantly more likely to be teaching in the middle grades and in *high-need* districts.

In addition, teachers who agreed or strongly agreed that their teacher preparation program prepared them to teach in rural schools had significantly higher levels of agreement with items related to having positive *Relationships with Peers* (53.6%) than teachers who did not believe their preparation program prepared them to teach in rural schools (39.5%; $p=0.047$). Similarly to the above, this finding may indicate that feeling better prepared to teach in a rural setting may open the door to creating more positive lasting relationships among peers than for teachers who feel inadequately prepared. It may also point to other factors related to the overall climate of the district and/or school.

Lastly, we found a couple of differences in teachers' perception of *Compensation and Benefits* depending on the subject areas they teach and whether or not they felt adequately prepared to teach in rural schools. For example, mathematics teachers had significantly higher levels of agreement with items related to adequate *Compensation and Benefits* (57.3%) compared with science teachers (39.8%; $p=0.007$). This finding may point to some pay disparities for teachers teaching different subject areas – even hard to staff subject areas such as science and mathematics. It may also point to differences between science and mathematics teachers' perceptions about what they could potentially make relative to other subject specific careers outside of public education.⁶⁶

Furthermore, teachers who reported that their teacher preparation program prepared them to teach in rural schools had significantly higher levels of agreement with items related to *Compensation and Benefits* (53.7%) compared with teachers who did not report that (34.0%; $p=0.035$). One potential explanation may be that teachers who feel prepared to teach in rural settings may have a better understanding of the pay structures and benefits provided in rural schools. Further studies should investigate the link between teacher preparation for teaching in rural schools and higher satisfaction with salary and benefits, as well as other working conditions.

Figure 3: Working Conditions Factors by Teacher and District Characteristics



NOTE: * $p < .01$; ** $p < .05$; *** $p < .001$. Values represent the percentage of teachers whose average factor scores fall within the top two quartiles (Q3 and Q4). These quartiles correspond to higher levels of agreement on the underlying construct and approximate “agree” and “strongly agree” on the original Likert scale. Support and Alignment of Values is significant for teachers who teach both mathematics and science at the 0.01 level compared to teachers who only

teach science. Compensation and Benefits is significant for mathematics teachers at the 0.05 level compared to science teachers.

What are the School, District, and Community Level Characteristics That are Associated with Rural SMT Retention in Illinois?

In this section, we explore the different working conditions that may be associated with why rural SMTs want to stay in their schools and districts. When asked how likely is it that you will be working at your current district/school in the next three years (on a four-point scale from very unlikely to very likely), a little over three-fifths of survey respondents said that they are “very likely” (61.2%) and a little over a fourth reported that they are “somewhat likely” (27.9%) to still be working in their schools in three years (Table 3).

Table 3: Likelihood of Remaining in District/School in Three Years

How likely is it that you will still be working in your current district/school in three years?			
	N	% OF TOTAL	SE
Very Unlikely	26	6.6%	1.39
Somewhat Unlikely	16	4.4%	1.15
Somewhat Likely	92	27.9%	2.71
Very Likely	204	61.1%	2.90

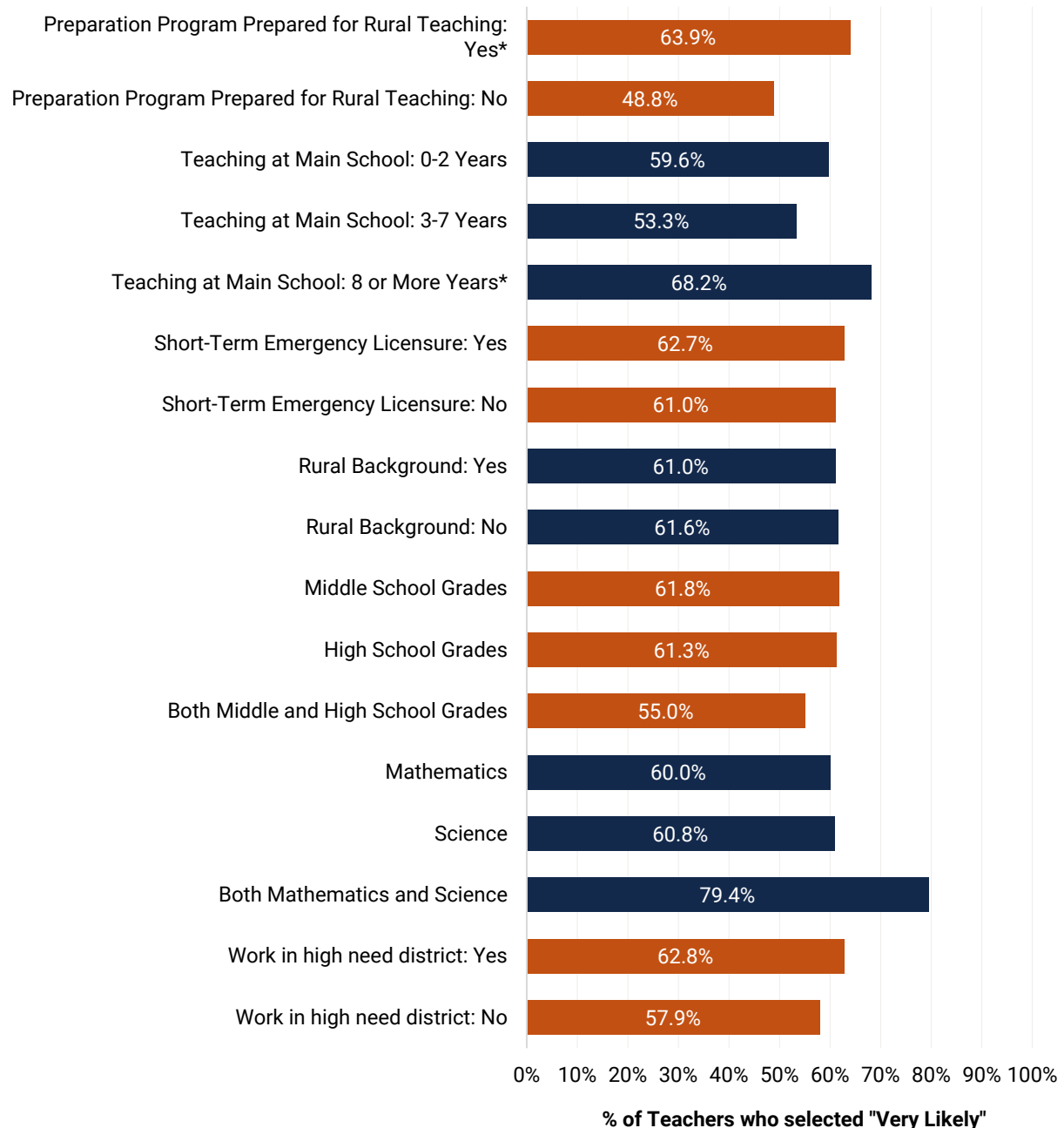
NOTE: All percentages and standard errors are weighted to adjust for the complex survey design. This table excludes non-response. N = 338

We explored whether there are any differences in teachers’ likelihood of planning to remain in their districts/schools over the next three years based on individual and district level characteristics. The following results are based on the percentage of teachers reporting “very likely” that they will still be working in their main district/school in three years. We found a few significant differences in the likelihood of teachers saying they “very likely” plan to remain in their districts/schools by individual teacher characteristics (Figure 4). For example, teachers who reported that their preparation program prepared them to teach in a rural setting were significantly more likely to report that they “very likely” will still be working in their district/school in the next three years (63.9%), compared to their peers (48.8%; $p=0.013$). This finding shows the importance of having high-quality and context relevant preparation programs for retaining teachers.

In addition, teachers who have been working in their schools for 8 or more years, were significantly more likely to report that they “very likely” will still be in their district/school in three years (68.2%) compared with teachers who are very new to their schools (0-2 years teaching in their schools; 59.6%; $p=0.027$) and teachers who have taught between 3-7 years in their schools (53.3; $p=0.024$). This finding may indicate that teachers who are newer to teaching in their schools may not be as tied to their school or school districts or as established within their school communities compared to teachers who have worked at their schools for 8 or more years.

We did not find any other differences in the likelihood of teachers reporting that they will remain teaching in their districts/schools in three years by other individual or background characteristics.

Figure 4: Percent of Teachers' "Very Likely" Working in Their District/School in Three Years by Teacher Characteristics



NOTE: * $p < .05$; All percentages are weighted to adjust for the complex survey design. This figure excludes non-response. Teachers teaching at their school for 8 or more years is significant at the 0.05 level compared to teachers who have been teaching at their schools for 0-2 and 3-7 years.

To further explore which of the five working condition factors are most associated with teachers wanting to remain in their districts/schools for the next three years, we used regression analyses.⁶⁷ Findings show that *Support and Alignment of Values* and *Compensation and Benefits* are statistically associated with teachers wanting to remain teaching in their districts/schools in the next three years (Table 4). The results represent the odds that the average teacher reported very likely to be working in their current district/school in three years compared to the odds that they reported somewhat likely, somewhat unlikely, or very unlikely that they will still be working in their current district/school in three years. An odds ratio greater than 1 indicates an increased likelihood of teachers remaining in their district/school in the next three years. The other factors are not statistically significant. These findings show the importance of having strong school and district level support, and alignment between teachers' personal values with the values of their school communities and committing to teaching in their rural schools. Compensation and benefits are also an important factor as findings indicate that teachers who feel they are adequately compensated and have strong benefits packages are more likely to remain in their schools.

Table 4: Relationship between Working Conditions and Teacher Retention (Odds Ratio)

Outcome	Support and Alignment of Values	Teaching Materials and Resources	Access to Community Services and Amenities	Relationships with Peers	Compensation and Benefits
Teacher Retention	2.619*	0.756	1.016	1.271	1.963*

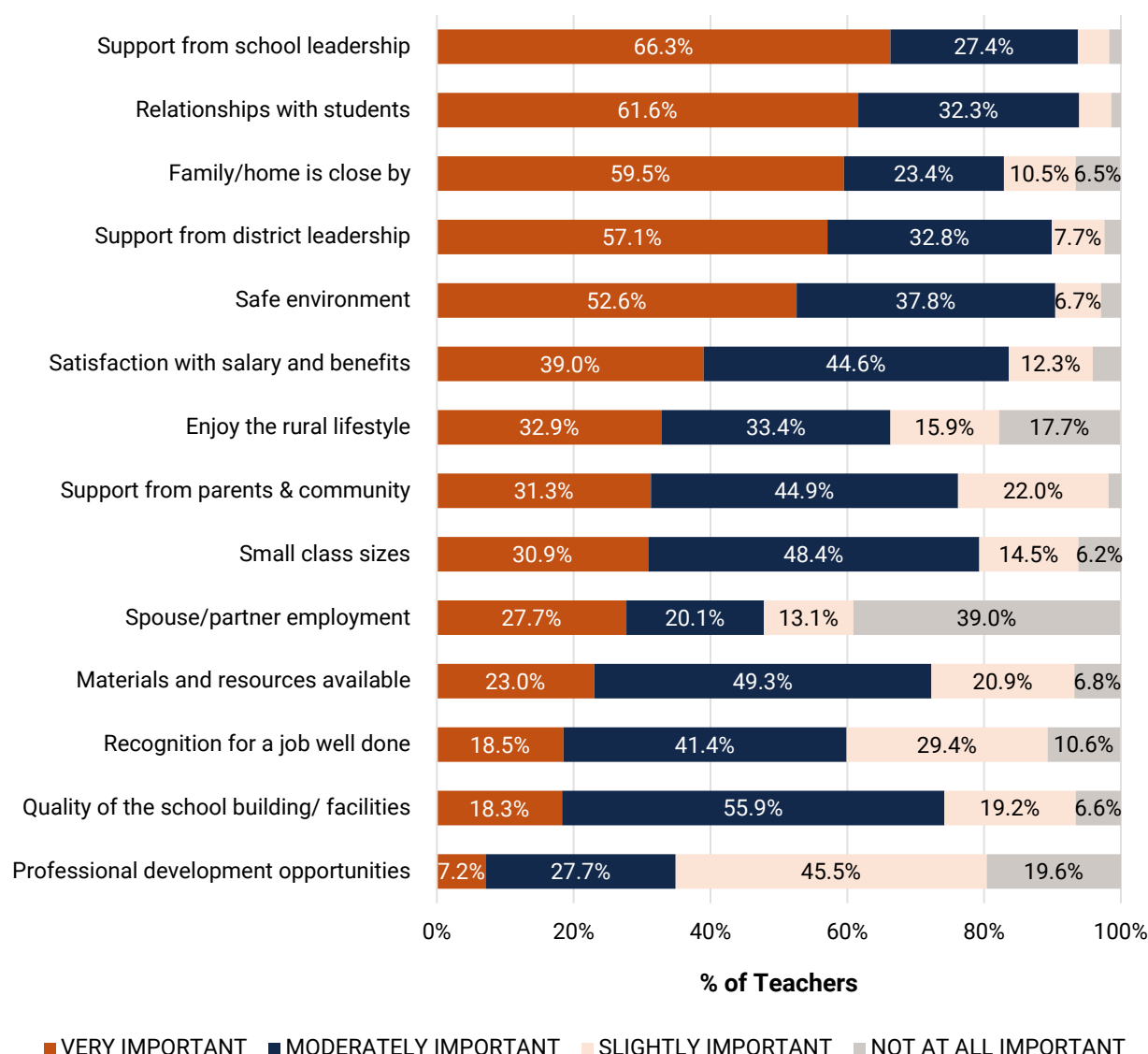
Note: * $p < 0.05$. Results are dependent on teachers' perceptions of their working conditions and control for teacher, school, and district-level characteristics (e.g., grades and subject areas taught, years teaching in current school, education level, race/ethnicity and gender. See the Appendix A for a more detailed description of the analyses).

Our regression results align closely with teachers' self-reported reasons for wanting to stay in their schools. On the survey, we asked teachers: "To what extent is or will your decision to remain teaching science and/or mathematics in your main district/school(s) be influenced by each of the following?" (Figure 5). Teachers could choose an option on a four-point scale ranging from "Not at All Important" to "Very Important". In line with our regression results, among the most important reported reasons was support from school and district leadership. Notably, 66.3% of teachers said that support from school leadership and 57.1% of teachers said that support from district leadership are very important reasons why they remain teaching in their main districts/schools. Having strong relationships with students was also an important factor for why teachers said they remain teaching in their districts/schools (61.6% very important reason). Teachers also noted some personal and practical reasons for remaining in their districts/schools including that their family and home is close by the school (59.5% very important reason) and that the environment is safe (52.6% very important reason). Also in line with the regression results and the broader literature⁶⁸, teachers noted that satisfaction with their salaries and benefits was a top reason for staying (39.9% very important reason).

A few key things stood out as only being moderately important reasons why teachers are staying in their districts/schools. For example, 55.9% of teachers said that the quality of school buildings is moderately important and 49.3% said the quality of material and resources available is moderately important for staying in their districts/schools. In addition, a little under half of teachers reported that small class sizes (48.4%) and support from parents and the community (44.9%) are moderately important reasons for staying in their districts/schools. About a third of teachers indicated that enjoying the rural lifestyle (33.4%) is a moderately important reason to stay.

Less important reasons for staying in their districts/schools included professional development opportunities (19.6% said not important at all while 45.5% said slightly important), and whether a spouse or partner was employed in the area (39.9% said not important at all while 13.1% said slightly important). The former finding is surprising given that prior research has shown a strong positive association between teacher professional development and learning opportunities and teacher retention.⁶⁹

Figure 5: Level of Importance of Reasons for Remaining in Teaching Within Their Schools/Districts

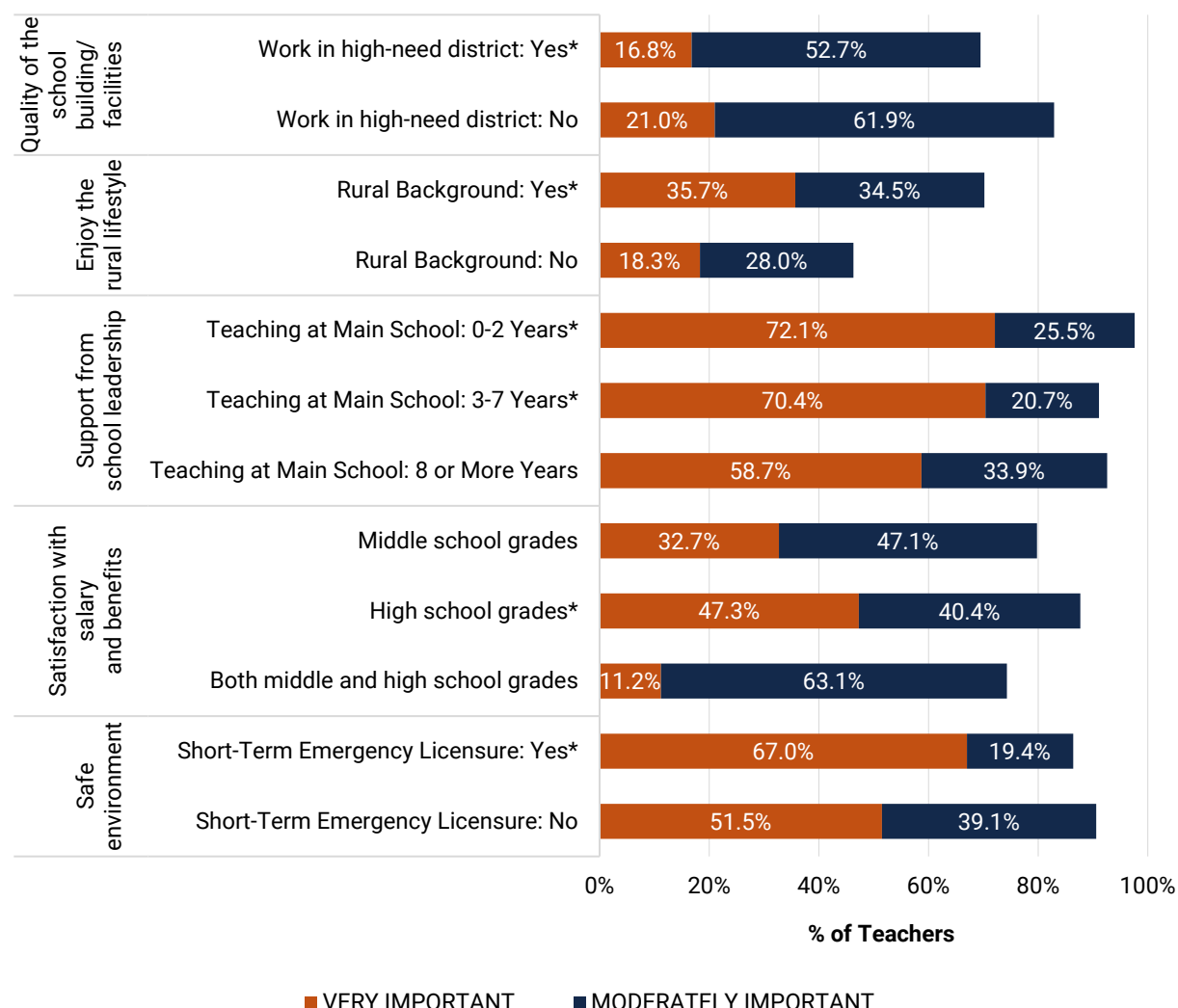


NOTE: All percentages are weighted to adjust for the complex survey design. This figure excludes non-response.

We found a few significant differences in the importance teachers placed on various reasons for remaining in their schools depending upon the types of school districts they work in and their personal and teaching circumstances (Figure 6). For example, teachers working in *high-need* districts placed significantly *less* importance on the quality of school buildings and facilities (16.8% very important reason; 52.7% moderately important reason) compared to teachers who are not working in a high need district (21.0% very important reason; 61.9% moderately important reason ($p=0.044$)). Whereas teachers

who reported they have a rural background placed significantly *more* importance on enjoying the rural lifestyle (35.7% very important reason and 34.5% moderately important reason) compared to teachers who reported they do not have a rural background (18.3% very important reason and 28.0% moderately important reason; $p=0.003$). In addition, teachers who are newer to their schools (0-2 years; 71.2% very important reason) and teachers who have been teaching in their schools for 3-7 years (70.4% very important reason) placed significantly *more* importance on having support from their school leaders as reasons for remaining in their district/schools compared to their peers who have been teaching in their schools longer than 8 years (58.7% very important reason; $p=0.045$ each respectively). Furthermore, high school teachers were significantly *more* likely to report satisfaction with their salary and benefits as an important reason for staying in their schools (47.3% very important reason) compared to teachers who taught at both middle and high schools (11.2% very important reason) ($p=0.012$). Lastly, teachers teaching with a short-term or emergency licensure placed significantly *more* importance on a safe environment as a reason for staying in their schools (67.0% very important and 19.4% moderately important reason) compared to teachers who are not teaching with a short-term or emergency licensure (51.5% very important and 39.1% moderately important reason; $p=0.014$).

Figure 6: Level of Importance of Reasons for Remaining in Teaching Within Their Districts/Schools by Teacher Characteristics



NOTE: * $p < .05$; All percentages are weighted to adjust for the complex survey design. Teachers teaching at main school for 0-2 years and 3-7 years is significant at the 0.05 level compared to teachers teaching at main school for 8 or more years. Satisfaction with Salary and Benefits for high school teachers is significant at the 0.05 level compared to teachers teaching in both middle and high school grades.

We did not find any significant differences in teachers' self-reported reasons for staying in their districts/schools by the subject area they teach. While we found that teachers who reported that their preparation program prepared them to teach in rural schools had significantly more positive perceptions of their working conditions compared with teachers who did not feel this way, we did not see any significant differences between the two groups in terms of their future plans to remain teaching in their districts/schools.

Limitations

This study has a few important limitations to note. First, because we did not have individual teacher email addresses for all the SMTs in rural school districts across the state, we were unable to draw a representative sample prior to administering the survey. Instead, we relied on regional and district superintendents to share the survey link with their SMTs in grades 6-12. We sent the survey link to all rural superintendents across the state and asked regional superintendents to encourage administrators to share the link with their SMTs. Some superintendents shared the survey link, but others may have decided not to participate in the study and therefore did not share the link. We also sent postcards to all rural schools with a QR code to the survey, asking that they be placed in the mailboxes of SMTs in grades 6-12. Some schools may have done so, while others did not. We used survey weighting techniques so that the survey is more representative of the target population, but we caution against making broad generalizations to the larger rural SMT population based on these findings.

Second, our survey findings overrepresent teachers who have been teaching for 16 or more years, and those who have taught in their schools for more than 8 years. This means that our study findings are more representative of teachers who have stayed in the profession longer and stayed teaching within their districts/schools longer than others. Therefore, our survey does not capture the perspectives of teachers who decided to leave the profession entirely and overrepresents teachers who have stayed teaching within their schools longer. More research is needed to understand the perspectives of teachers who decided to leave rural school districts for other types of districts and perspectives from those who decided to leave the profession entirely.

Policy and Practice Implications

In this report, we set out to understand what conditions and factors contribute to the retention of rural SMTs in grades 6-12 in Illinois. Why do some SMTs remain in their schools and what can we learn from their perspectives and experiences? This question is important, given the challenges some rural school districts in Illinois, and other states across the country, are facing with chronic teacher shortages. As districts and policymakers invest resources into recruiting and hiring teachers to fill open teaching positions, it is critical to learn what factors will help ensure that teachers want to remain in their positions. This report highlights several implications for policymakers and practitioners.

- *Overall, School and District Leaders Can Focus on Creating and Maintaining Positive Working Environments.* We found that rural SMTs are more likely to want to remain teaching in their districts/schools if they have strong positive working conditions. While each of the working conditions we identified showed a positive relationship with teachers wanting to remain in their districts/schools, the following factors stood out as being statistically related to retention, after controlling for teacher characteristics: The supports they receive from their district and school administrators; alignment between teacher-district-school-community values and beliefs; and adequate compensation and benefits. These findings are consistent with other studies that have examined teacher retention.⁷⁰
- *District and School Leaders Can Ensure That SMTs Are Adequately Supported.* We found that when teachers feel supported by their school and district leaders, they are more likely to want to stay in their schools. Extra administrative support is needed for teachers who are new to their schools given that they are more likely to report wanting to leave compared with teachers who have been at their schools longer. As part of a supportive working environment, teachers place a high level of importance on having autonomy and flexibility to innovate in their classrooms. Leaders can provide guidance and support for teachers to try new things without fear of being penalized if new innovations do not result

in desired outcomes. District and school leaders can also include teachers in decision-making, which empowers and validates their professionalism. SMTs also place a great level of importance on feeling accepted in their schools and school communities. District and school leaders can incorporate and institutionalize community building activities that help create strong colleague connections and boost positive working experiences, both of which can improve feelings of belonging and acceptance.

Lastly, while other studies on teacher retention have highlighted the importance of professional development as a key component of strong working conditions, our study did not find a strong relationship between professional development opportunities and SMTs wanting to remain in their school. This does not mean that professional development in rural school districts is unimportant. In fact, close to 35% of teachers said that professional development had a moderate to very large impact on why they remain in their schools. Rather, this finding may indicate something about the quality of professional development offered in/for some of the school districts. It may also be an indication that professional development may be an insufficient strategy for long term rural SMT retention, especially if the professional development opportunities are not high-quality.

- *District and School Leaders Can Focus on Aligning Teaching and Learning Policies with Teachers' Values and Beliefs.* When teachers feel connected and aligned with their district, school, and community values, they are more likely to want to stay. District and school leaders can make sure teachers are included in policy and decision making, so that their values and beliefs are represented in the policies they are tasked with implementing. Leaders can also ensure that they are checking in with teachers when they are implementing or carrying out new policies, practices, or programs to identify misalignment early and make adjustments to improve alignment. This may involve checking in with teachers regularly to identify how their teaching and learning beliefs and values play out in their classrooms, administering short questionnaires or hosting listening sessions to better understand teachers' values and beliefs, and identifying where there might be misalignment, including barriers or challenges, so that leaders can provide more targeted support.
- *State and District Policymakers Can Increase Pay and Benefit Packages for SMTs in Rural School Districts.* Teachers are more likely to stay if they feel they have adequate compensation and benefits. Teachers in rural districts across the state who are not happy may leave their schools for higher paying jobs in nearby rural communities or even move to urban areas that have higher pay. This is also consistent with prior studies that show that teachers tend to leave their schools if they are unsatisfied with their salary and retirement benefits. Our findings show that mathematics teachers are significantly more satisfied with their salaries and benefits than science teachers, which may point to a difference in pay parity compared with field-specific positions outside of education. Policymakers can factor pay parity as well as equity into their pay package equations. Districts who are benefiting from the extra resources provided by the state to tackle teacher shortages may find it beneficial to use some of the resources to boost teacher pay and find strategies to sustain increases to improve retention.
- *State Policymakers, Along with Teacher Preparation Program Faculty and Staff, Can Make Teaching in Rural Settings an Important Part of Teacher Education Training.* We found that when teachers perceive that their credentialing program prepares them for rural-specific teaching positions they feel more efficacious in rural teaching positions. Therefore, faculty and staff working in teacher preparation programs can provide targeted support and make rural focused lessons and classes mandatory for teacher candidates. Teachers who felt that they were adequately prepared to teach in rural schools were more likely to report that they had adequate teaching materials and resources, greater access to community services and amenities, stronger relationships with their peers, and were happier with their compensation and benefits. Teacher preparation program faculty and staff can highlight the unique circumstances and benefits of teaching in rural settings. They can also add a rural-focused "strand"

that spans across teacher preparation coursework, to help build teachers' skills to best tackle the challenges they may face in rural school districts.

- *States and School Districts Can Strategically Focus on Building Internal Teacher Pipelines That Identify Potential Teacher Candidates From Within Communities.* We found that most of our survey respondents have a rural background. Teachers with a rural background were more likely to agree that they had adequate teaching materials and resources. Although rural-specific examples of Grow Your Own programs are limited, there are early indications that both precollegiate and community-based approaches may mitigate common challenges with recruiting and retaining teachers in rural schools (e.g., lower salaries, limited community amenities).⁷¹ As illustrated in our survey, rural teachers with prior connections to rural communities and/or schools may be more likely to perceive the values and lifestyle inherent in geographically remote and smaller communities as more familiar or similar to their own than teachers new to rural contexts. Similarly, these teachers may perceive the challenges related to working in rural areas as more manageable given a certain level of familiarity.

Given the challenges with teacher shortages across the state, policy makers can consider spending their efforts and resources on ways to recruit new teachers from within their own communities. Part of this strategy could also be helping teachers who are teaching with a short-term or emergency licensure to become fully licensed teachers. We found that teachers in rural communities with short-term and emergency licensure want to remain in their schools – meaning that they are dedicated to their teaching positions and therefore worth investing in long term. State and district level targeted investments could involve partnerships with local teacher credentialing programs, creating new pathways, as well as offering incentives and stipends for teachers to complete their licensure.

All students deserve to be taught by highly qualified SMTs, so putting efforts into supporting these under-licensed, but dedicated teaching staff, could be a highly beneficial policy strategy.

Technical Appendix A

Data

Data in this brief come from an online survey administered to rural science and mathematics teachers (SMTs) across the state of Illinois (N=362). The survey captured SMTs' perceptions of their school and district working conditions, their connections to their rural communities, as well as factors that influenced their applications to the position, how long they planned to stay in the position, and school, district, and community-level factors that were influencing whether they planned to stay in the position over the next three years. In addition, the survey captured the background and demographic characteristics of respondents.

Survey Development

To develop the survey, our team drew from a number of existing survey instruments, some of which were previously validated, that measured educator working conditions and rural school teacher experiences. For example, we adapted several working condition items and measures from the [2022 Educator Working Conditions Survey](#), which is administered in Illinois. To view the survey factor loadings and other survey properties, see [Appendix A-D](#). In addition, we used and adapted some items from the [Teaching In Montana's Small Rural Schools Survey](#) (See Appendix E), administered in 2001-2002. In particular, we used and adapted items that measured the degree of influence certain factors had on teachers accepting their positions and remaining in their positions. We also adapted one item from the [Rural Teacher Intention Survey](#). Lastly, we created new items to fill in any gaps in constructs that we aimed to capture based on input and feedback from our IWERC partners and study advisory board members.

The survey was designed to take approximately 20 minutes to complete. Teachers who indicated that they teach both science and mathematics were randomized to answer the survey about one subject area.

The final survey instrument included 5 different sections capturing information about teachers':

1. Current Teaching Role(s) (i.e., subject areas taught; name of school and district; total number of years teaching in their current main school; total years teaching; whether teaching on an emergency or short-term license; and typical commute times)
2. Background (i.e., major areas of study; credentials/permits; perception of whether teacher preparation program prepared for teaching in rural districts; rural background)
3. Working Conditions (i.e., 4-point Likert-scale questions to measure perceptions of school and district working conditions using a scale from strongly disagree to strongly agree; access to professional development; 4-point Likert-scale questions to measure community connections and supports using a scale from strongly disagree to strongly agree)
4. Satisfaction With Their Jobs (i.e., how long teachers plan to remain teaching overall and within their schools/districts; 4-point Likert-scale questions to measure factors influencing why they accepted the position and why they plan to stay in the position using a scale from not at all important to very important.)
5. Demographic Information (i.e., gender; race/ethnicity; highest level of education completed)

To view the full survey instrument, see Appendix B.

Survey Sample and Administration

Our study team did not have access to the individual email addresses of all rural SMTs in grades 6-12 in the state of Illinois, which prevented us from creating a sampling frame. Therefore, we were unable to draw a representative sample. Instead, to reach our target population, we sent a link to the online survey and instructions for administration to all rural superintendents across the state. Superintendents were instructed to send the link to all in grades 6-12 currently teaching in their rural schools. At the same time, our team sent an email to all Regional Office of Education (ROE) superintendents who oversee rural school districts asking them to remind their rural school superintendents to share the survey link with their teachers. NORC also sent batches of ten postcards to each rural school that employs SMTs in grades 6-12 ($N = 709$). The postcards were packaged in an envelope with an instruction sheet that requested these postcards be placed in eligible teachers' school mailboxes. These postcards provided information directly to teachers about the study and included the survey QR code for accessibility. The survey link was active from October 16, 2024 to February 3, 2025. To boost survey completion rates, we sent follow up reminder emails to superintendents on November 18, 2024 and January 7, 2025 and to ROE superintendents on November 18, 2024 and January 21, 2025.

Because our survey relied on regional and district superintendents to distribute the link to SMTs in grades 6–12, this method introduced potential sampling bias as it relied on superintendent engagement. Consequently, the raw sample may not fully reflect the demographic composition of rural SMTs in Illinois. More specifically, while we were able to capture perspectives of SMTs in 158 rural districts, we missed survey responses from 268 rural districts.

Data Cleaning

Prior to conducting analyses, our team cleaned the datafile by screening out invalid responses in two phases. Our first phase included screening out any teachers who only taught grade levels and/or subject areas that were outside of our target population (grades 6-12, science and mathematics teachers). We also screened out teachers who only taught Career/Technical Education classes or who only taught Computer Science classes. Any teachers who taught in non-rural districts (districts designated as rural by NCES and in which all of the schools served by the agency are designated with a locale code of 32, 33, 41, 42, or 43) were also screened out. Our second screening phase consisted of removing any responses from teachers who skipped answering the majority of the survey items. We included teachers with partial completions if they met our partial completion cutoff criteria, which was completing the majority of survey items up through the first survey item in Section C "About your Working Conditions." We did have some missingness for partial survey completers for the last section of the survey, Section E "About You". Because we were missing some demographic information on survey respondents, we used imputation methods to combat the missingness using state data on subject area, service area, and district type. Our final cleaned sample includes 362 valid survey responses. At the time of survey administration, there were approximately 4,200 rural SMTs in grades 6-12 so our final response rate was 8.6%.

Survey Weighting

To mitigate our limitations with sampling and administration, we applied survey weighting techniques. Specifically, we applied post-stratification weighting via raking (iterative proportional fitting) over gender, race and ethnicity, education level, and locale codes to align the sample more closely with known population benchmarks (including locale codes, gender, race/ethnicity, and education level) for rural teachers. To preserve sample size and enable raking, hot-deck imputation was used for missing gender and race and ethnicity. Weighting ensures that groups underrepresented in the sample contribute proportionally to the overall estimates, improving the generalizability of findings.

Analysis

Weighted Univariate and Bivariate Analysis

We performed weighted univariate and bivariate analyses on selected survey items aligned with our primary research questions. For bivariate comparisons, we applied pairwise chi-square tests to assess differences in weighted response distributions across groups. Although chi-square tests do not fully exploit the ordinal nature of some items, they were chosen because our primary objective was to compare overall distribution patterns rather than model ordered relationships. Pairwise testing enabled direct comparison between two groups at a time. To address the increased risk of Type I error from multiple comparisons, we adjusted p-values using the Benjamini–Hochberg procedure (1995), which controls for the false discovery rate.

Exploratory Factor Analysis (EFA)

We also conducted an Exploratory Factor Analysis (EFA) on four-point Likert-scale items using R. This analysis was performed for two sets of items: 37 items about working conditions and 14 items about reasons for remaining in teaching. EFA was conducted to identify the underlying latent constructs measured by the survey items and to assess whether observed variables cluster into interpretable factors. Because we combined scales from several different surveys in a new way, EFA was appropriate for evaluating dimensionality.

Before analysis, records with values of -97 (“Breakoff”) and -98 (“Web skip”) were removed, and the item “Challenge of teaching position” was excluded due to potential for mixed and inconsistent interpretation. We then checked assumptions for factor analysis. Sample adequacy was evaluated using the Kaiser–Meyer–Olkin (KMO) measure, which was 0.70, indicating acceptable sampling adequacy. Bartlett’s test of sphericity was significant ($p = 0.05$), confirming that the correlation matrix was suitable for factor analysis. Items were screened for low inter-item correlations and multicollinearity, and when two or more items were highly correlated (0.80 or higher), only one variable from the group was retained. Eight items were excluded due to exhibiting high correlations with other variables. Factors were extracted using Principal Axis Factoring (PAF), which is recommended for non-normally distributed data and ordinal items. We used weighted polychoric correlations to account for the ordinal nature of Likert-scale responses and survey design.

To determine the optimal number of factors, we used parallel analysis, the Kaiser criterion (eigenvalues greater than one), and scree plot inspection. An oblique rotation method (Promax) was applied because factors were expected to be correlated, which is common in attitudinal and behavioral constructs. Items with factor loadings of 0.40 or higher were considered meaningful contributors.

For each EFA, we examined different solutions based on cumulative variance explained, communalities with a threshold of 0.30, and factor loadings of 0.40 or higher. Cross-loadings were reviewed, and items with substantial loadings on multiple factors were flagged for further consideration. Inter-factor correlations were also assessed. Internal consistency for each factor was evaluated using Cronbach’s alpha, with a threshold of 0.70 or higher. Due to the use of oblique rotation methods, some loadings can exceed 1, whose model was disqualified from the final solution. Our EFA resulted in 5 factors presenting themes in perception of working conditions and 2 factors presenting themes in reasons for remaining in teaching. Each identified factor containing at least three variables with high factor loadings, and each variable loading highly on only one factor.

Appendix Table 1: Factor Loadings

Prompt	Support & Alignment of Values	Access to Community Services & Amenities	Relationship with Peers	Teaching Materials & Resources	Compensation & Benefits	Uniqueness
I feel supported by school leadership	0.858					0.349
School policies are aligned with my personal beliefs	0.858					0.356
I feel supported by district leadership	0.745					0.422
I have autonomy/control for class planning	0.698					0.576
I am involved with decision-making at the school level	0.694					0.551
I feel accepted in my school	0.677					0.306
I feel accepted in the local community	0.636					0.341
My cultural heritage, race and/or ethnicity are accepted in the local community	0.568					0.462
There is an alignment between the values and beliefs I have and those of the local community	0.544					0.471
There is reasonable access to senior care in the surrounding area		0.924				0.235
There is reasonable access to childcare in the surrounding area		0.859				0.332
There is reasonable access to hospitals and health care in the surrounding area		0.808				0.416
I have positive relationships with my teaching peers			0.875			0.199
I receive support from my colleagues			0.799			0.269
There is staff collegiality			0.713			0.294
I collaborate with other teachers in my school on lesson planning and classroom practices			0.608			0.488

Prompt	Support & Alignment of Values	Access to Community Services & Amenities	Relationship with Peers	Teaching Materials & Resources	Compensation & Benefits	Uniqueness
Teachers in my school have adequate materials and equipment to teach their classes				0.841		0.299
I have appropriate resources for teaching [math/sci]				0.716		0.35
I have time for collaboration with other [math/sci] educators				0.531		0.522
My retirement/pension plan is appropriate					0.875	0.429
My salary is appropriate					0.775	0.432
My health care plan/health insurance is reasonable					0.571	0.637
My class sizes are appropriate					0.405	0.616

Note: All factor loadings greater than 0.4 are displayed in the table. Six items were removed from the analysis due to the absence of factor loadings above the 0.40 threshold.

Appendix Table 2: Factor Statistics

Factor	SS loadings	% of Variance	Cumulative %
Support & Alignment of Values	5.24	18%	18%
Access to Community Services & Amenities	2.9	10%	28%
Relationship with Peers	2.89	10%	38%
Teach Materials & Resources	2.69	9%	47%
Compensation & Benefits	2.23	8%	55%

To represent each factor, we computed average scores across the items associated with that factor. Although all items were measured using the same Likert scale, averaging was still important because the number of items contributing to each factor differed. Using mean scores ensures that the resulting factor scores remain on the original response scale and are therefore directly comparable across factors, without introducing bias related to differing item counts. This approach also improves interpretability, as the factor scores can be understood using the same response metric as the individual items. For the bivariate analyses, the continuous average factor scores were further divided into quartiles. Categorizing the scores in this way facilitated clearer interpretation across levels of each construct and maintained consistency with the underlying Likert response format. Specifically, the lowest quartile approximates a response pattern similar to “strongly disagree,” whereas the highest quartile approximates “strongly agree,” allowing the categorized factor scores to be interpreted in a manner consistent with the original scale.

Regression Analysis

We conducted a logistic regression analysis to examine the relationship between teachers’ working conditions and their likelihood of remaining in their current district or school over the next three years. The response variable was based on item D5, coded as 1 for teachers who reported being “very likely” (on a 4-point scale from very unlikely to very likely) to continue working in their current district or school within three years, and 0 otherwise (very unlikely, somewhat unlikely, somewhat likely). Records with values of -97 (“Breakoff”) and -98 (“Web skip”) were excluded.

The primary predictors of interest were the average scores of the five factors representing working conditions, derived from the exploratory factor analysis. In addition to these factors, we included several control variables to account for teacher and contextual characteristics: grades taught, subject taught, high-need status, years in the current school, short-term license status, completion of a teacher preparation program, rural background, gender, and education level. Race (White vs. non-White) was excluded from the model due to insufficient variability in the sample.

To assess the robustness of the estimates, we also conducted stepwise regression, which allowed us to evaluate the stability of variable selection and confirm that Support and Alignment of Values and Compensation and Benefits factors remained significant predictors across different model specifications.

Survey Limitations

The survey results may reflect “survivorship bias”, as the sample only consists of teachers who have remained in the system. This means the data is more representative of individuals with longer tenure, while the perspectives of those who left earlier are not captured.

Appendix B: Survey Instrument

Survey on Rural Science and Mathematics Teaching in Illinois

SC: SCREENER

1. What grade(s) are you teaching this year? Please select all that apply.
 - a. 6th
 - b. 7th
 - c. 8th
 - d. 9th
 - e. 10th
 - f. 11th
 - g. 12th
 - h. Other (Please specify): _____ [If this is the only answer selected à screen out]

2. What subject(s) are you currently teaching? Please select all that apply.
 - a. Mathematics
 - b. Science
 - c. Other (Please specify): _____ [If this is the only answer selected à screen out]

IF SELECTED BOTH Mathematics AND Science, RANDOMLY ASSIGN RESPONDENT TO SEE EITHER:

[Mathematics: PLEASE THINK ABOUT ONLY YOUR MATHEMATICS CLASSES WHEN ANSWERING THE REST OF THE SUBJECT SPECIFIC QUESTIONS.]

[Science: PLEASE THINK ABOUT ONLY YOUR SCIENCE CLASSES WHEN ANSWERING THE REST OF THE SUBJECT SPECIFIC QUESTIONS.]

3. [If selected Mathematics; OR if selected both Mathematics and Science, see only if randomly assigned Mathematics] Which best describes the mathematics course(s) you are teaching? Please select all that apply.
 - a. Basic or general math (not algebra or pre-algebra)
 - b. Pre-algebra or introduction to algebra
 - c. Algebra I
 - d. Geometry
 - e. Algebra II
 - f. Integrated or sequential math
 - g. Trigonometry
 - h. Precalculus
 - i. Calculus
 - j. Career/Technical education (CTE) [If this is the only answer selected à screen out]
 - k. Other mathematics class (Please specify): _____

4. [If selected Science; OR if selected both Mathematics and Science, see only if randomly assigned Science] Which best describes the science course(s) you are teaching? Please select all that apply. [Check all that apply]
- a. General science (several content areas of science taught separately)
 - b. Integrated science (several content areas of science combined and taught together throughout the year)
 - c. Life science (e.g., biology, ecosystems, human health)
 - d. Physical science (e.g., physics or chemistry)
 - e. Earth science (e.g., geology, Earth and the solar system, fossils)
 - f. Computer science [If this is the only answer selected à screen out]
 - g. Career/Technical education (CTE) [If this is the only answer selected à screen out]
 - h. Other science class (Please specify): _____

[END SCREEN FOR PEOPLE SCREENED OUT OF SURVEY:] We thank you for your time spent taking this survey. Your response has been recorded. You may now close this window.

A: About Your Current Teaching Role

Please answer the following questions about your current teaching role.

5. What is the name of the school district where you currently teach? If you teach in more than one school district, please name the **main school district** where you currently teach the most hours.
- _____
6. What is the name of the school where you currently teach in your *main school district*? If you teach in more than one school, please name the **main school** where you currently teach the most hours.
- _____
7. Do you teach at any other school in this district?
- a. Yes
 - b. No
8. [ASK ONLY IF YES TO Q7] Please name each school where you currently teach in your main school district.
- Main School: _____
- Second School (if applicable): _____
- Third School (if applicable): _____

[IF SELECTED YES IN Q7 INDICATING MORE THAN ONE SCHOOL]:

PLEASE THINK ABOUT YOUR *MAIN SCHOOL* WHEN ANSWERING THE REST OF THE QUESTIONNAIRE. BY *MAIN SCHOOL*, WE MEAN THE SCHOOL WHERE YOU TEACH AND SPEND THE MAJORITY OF YOUR TIME.

9. How many total years have you been teaching at your main school?
 - a. Less than 1 year
 - b. 1-2 years
 - c. 3-4 years
 - d. 5-7 years
 - e. 8-10 years
 - f. 11-15 years
 - g. 16-20 years
 - h. Over 20 years

10. How many total years have you taught **[insert subject area Mathematics or Science]**?
 - a. Less than 1 year
 - b. 1-2 years
 - c. 3-4 years
 - d. 5-7 years
 - e. 8-10 years
 - f. 11-15 years
 - g. 16-20 years
 - h. Over 20 years

11. Are you teaching on a short-term or emergency licensure?
 - a. Yes
 - b. No

12. What is your typical commute time between your home and your school (round trip)? If you work at more than one school, please report only on your main school.
 - a. 0- 15 minutes
 - b. 16-30 minutes
 - c. 31-59 minutes
 - d. 60-89 minutes
 - e. 90 minutes or more

13. What is the zip code of your home address? _____

14. What is the zip code of the address where you currently teach? _____

B. About your Background

Please answer the following questions about your background.

15. During your post-secondary education, what was your major or main area(s) of study? Please select all that apply.
- a. Education – Primary
 - b. Education – Secondary
 - c. Mathematics
 - d. Science
 - e. English
 - f. Other (Please specify): _____
16. [If selected Q15: Education – Primary or Q15: Education - Secondary] Did you have a specialization in any of the following? Please select all that apply.
- a. Mathematics
 - b. Science
 - c. Language/reading
 - d. No specialization [Exclusive]
 - e. Other (Please specify): _____
17. Which of the following credential/permits do you have? Please select all that apply.
- a. Elementary Education Grades 1-6
 - b. Middle Grades 5-8
 - c. Secondary Grades 9-12
 - d. Bilingual credential
 - e. Special education credential
 - f. Other teaching credential or permit (Please specify): _____
 - g. None of the above [Exclusive]
18. Which of the following types of teaching licenses do you currently hold? Select all that apply.
- a. Short term substitute or substitute
 - b. Paraprofessional
 - c. Professional Educator License (PEL)
 - d. Visiting International Teacher
 - e. Provisional or alternative provisional
 - f. None of the above [Exclusive]
 - g. Other (Please specify): _____
19. Are any of the classes you are currently teaching at your main school outside of your educator licensure(s)/endorsement(s)?
- a. Yes
 - b. No
 - c. Not Applicable
 - d. Other (Please specify): _____

20. Would you consider teaching to be your second career?

- a. Yes
- b. No

21. [If selected Q20 = Yes] In what field was your prior career? _____

22. To what extent do you agree or disagree with the following statement?

“My teacher preparation/licensure program prepared me for teaching in rural settings.”

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree

23. Are you a current or an alumni National Science Foundation (NSF) Robert Noyce Teacher Scholar or Fellow?

- a. Yes
- b. No

24. As you think of your life before you began teaching, would you say that you have a “rural background”?

- a. Yes
- b. No

25. What does “rural background” mean to you?

C. About your Working Conditions

26. To what extent do you agree or disagree with the following statements about your **main school**?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I feel accepted in my school				
b. School policies are aligned with my personal beliefs (e.g., teaching philosophy)				
c. I feel supported by school leadership				
d. I have autonomy/control for class planning (e.g., in my instructional practice, in my selection of curriculum)				
e. I am involved with decision-making at the school level (e.g., that influences school policy and practice)				
f. I have positive relationships with school leaders				

27. To what extent do you agree or disagree with the following statements about your **main district**?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I feel accepted in my district				
b. District policies are aligned with my personal beliefs (e.g., teaching philosophy)				
c. I feel supported by district leadership				
d. I am involved with decision-making at the district level (e.g., that influences school policy and practice)				
e. I have positive relationships with district leaders				

28. To what extent do you agree or disagree with the following statements about **staff relations** at your main school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I receive support from my colleagues (through induction, mentoring, and/or community of practice)				
b. I have positive relationships with my teaching peers				
c. There is staff collegiality				
d. I collaborate with other teachers in my school on lesson planning and classroom practices				

29. To what extent do you agree or disagree with the following statements about your main district/school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The workload is reasonable				
b. My class sizes are appropriate				
c. My salary is appropriate				
d. My retirement/pension plan is appropriate				
e. My health care plan/health insurance is reasonable				

30. To what extent do you agree or disagree with the following statements about your **professional growth** at your main district/school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I have access to professional development that is meaningful to me				
b. I have appropriate resources for teaching [insert subject area Mathematics or Science]				
c. I have time for collaboration with other [insert subject area Mathematics or Science] educators				

31. [If Q30a = Agree or Strongly agree] I have access to [insert subject area Mathematics or Science] specific professional development from (Please select all that apply.):

- a. My main school
- b. My main district
- c. Local or regional colleges or universities
- d. Regional Offices of Education (ROE)
- e. Intermediate Service Center (ISC)
- f. Other local or regional organizations
- g. Other (Please specify): _____
- h. I do not have access to [insert subject area Mathematics or Science] specific professional development [Exclusive]

32. [If Mathematics and Q30a = Agree or Strongly agree] In the past two years, have you participated in professional development in any of the following? Please select all that apply.

- a. Mathematics content
- b. Mathematics pedagogy/instruction
- c. Mathematics curriculum
- d. Integrating technology into mathematics instruction
- e. Improving students' critical thinking or problem-solving skills in mathematics
- f. Mathematics assessment
- g. Addressing individual students' needs
- h. Improving student achievement in mathematics

33. [If Science and Q30a = Agree or Strongly agree] In the past two years, have you participated in professional development in any of the following? Please select all that apply.

- a. Science content
- b. Science pedagogy/instruction
- c. Science curriculum
- d. Integrating technology into science instruction
- e. Improving students' critical thinking or inquiry skills in science
- f. Science assessment
- g. Addressing individual students' needs
- h. Improving student achievement in science

Please answer the following questions about your community.

34. To what extent do you agree or disagree with the following statements about **community support of your main district?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The local community supports the [insert subject area Mathematics or Science] curriculum in my district				
b. The local community supports district policy				

35. To what extent do you agree or disagree with the following statements about your **feelings of acceptance in the community** served by your main school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I feel accepted (e.g., respected, valued as a professional/expert) in the local community				
b. My cultural heritage, race and/or ethnicity are accepted in the local community				
c. The community members are generally accepting of me and/or my family				
d. There is an alignment between the values and beliefs I have and those of the local community				

36. To what extent do you agree or disagree with the following statements about **access in the community** served by your main school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. There is reasonable access to hospitals and health care in the surrounding area				
b. There is reasonable access to child care in the surrounding area				
c. There is reasonable access to senior care in the surrounding area				

37. To what extent do you agree or disagree with the following statements about the **alignment between your teaching and the community** served by your main school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The local community is in sync with my perspectives on how to teach my [insert subject area Mathematics or Science] classes				
b. The local community is in sync with my perceptions of teaching as a profession				

38. We would like to learn more about the specific connections you have in your community served by your main district/school. To what extent do you have access to teaching and/or student learning supports that are focused on science or math from the following community groups? Please select all that apply.

- a. Community colleges or local universities that train science and math teachers
- b. Science and/or math industries or businesses
- c. Community library
- d. Church groups
- e. Philanthropic foundations
- f. Museums
- g. Other community organizations (Please specify): _____

39. To what extent do you agree or disagree with the following statements about your main district/school?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. Teachers in my district can receive monetary support from local or regional organizations to enhance student classroom experiences				
b. Students in my school have access to local math and/or science-related enrichment programs				
c. Teachers in my school have adequate materials and equipment to teach their classes				

40. Out of the items listed below, which had the greatest influence on your decision to apply to your main school/district? Please select all that apply.

- a. User-friendliness and quality of the district's website or application process
- b. Met recruitment staff at a job fair or other recruitment event
- c. The district's pay scale is higher than other alternatives
- d. A conversation/relationship with a school or district leader
- e. I completed my student teaching/clinical practice within the district
- f. Individuals from my personal or professional network teach there
- g. The geographic location worked best for me
- h. I attended school in this school or district
- i. Other (Please specify): _____

D. Your Satisfaction as a Teacher

Please answer the following questions about your satisfaction as a teacher.

41. How long do you plan to remain in teaching?

- a. As long as I am able
- b. Until I am eligible for retirement
- c. I'll continue teaching unless something better comes along
- d. I definitely plan to leave teaching
- e. Undecided

42. To what extent was your decision to accept a [insert subject area Mathematics or Science] teaching position in your main district/school influenced by each of the following:

	Not at All Important	Slightly Important	Moderately Important	Very Important
a. Best or only job offer				
b. Satisfaction with salary and benefits				
c. Access to recreational activities				
d. Family and/or home is close by				
e. Small class sizes				
f. Safe environment				
g. Challenge of teaching position				
h. Enjoy the rural lifestyle				
i. Good reputation of the school				
j. Spouse/partner employment				
k. District/school's recruiting program				
l. Materials & resources available				

43. To what extent is or will your decision to remain teaching [insert subject area Mathematics or Science] in your main district/school be influenced by each of the following:

	Not at All Important	Slightly Important	Moderately Important	Very Important
a. Small class sizes				
b. Support from district leadership				
c. Support from school leadership				
d. Support from parents & community				
e. Relationships with students				
f. Enjoy the rural lifestyle				
g. Spouse/partner employment				
h. Challenge of teaching position				
i. Professional development opportunities				
j. Recognition for a job well done				
k. Family/home is close by				
l. Satisfaction with salary and benefits				
m. Safe environment				
n. Quality of the school building/facilities				
o. Materials and resources available				

44. If you could go back to your college days would you choose teaching as a career again?
- a. Certainly Would
 - b. Probably Would
 - c. Chances About Even
 - d. Probably Would Not
 - e. Certainly Would Not
45. How likely is it that you will still be working in your main district/school in three years?
- a. Very Unlikely
 - b. Somewhat Unlikely
 - c. Somewhat Likely
 - d. Very Likely

E. About You

Please answer the following questions about yourself.

46. Please indicate your gender:
- a. Male
 - b. Female
 - c. Non-binary
 - d. Prefer to self-describe: _____
47. Please indicate your race/ethnicity (Please select all that apply.):
- a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African American
 - d. Hispanic or Latino/a/x
 - e. Middle Eastern and/or North African
 - f. Native Hawaiian or Pacific Islander
 - g. White
 - h. Prefer to self-describe: _____
48. Please indicate your highest level of education:
- a. High school diploma/GED
 - b. Some college (1-4 years, no degree)
 - c. Associate's degree
 - d. Bachelor's degree
 - e. Master's degree
 - f. Professional degree (MD, JD, etc.)
 - g. Doctoral degree (PhD, EdD, etc.)

NORC at the University of Chicago is an independent research institution with over 75 years of experience delivering reliable data and rigorous analysis to guide critical programmatic, business, and policy decisions. Since 1941, NORC has conducted groundbreaking studies, created and applied innovative methods and tools, and advanced principals of scientific integrity and collaboration. Today, government, corporate, and nonprofit clients around the world partner with NORC to transform increasingly complex information into useful knowledge. We provide comprehensive and integrated services that span the research cycle and offer solutions that anticipate and address critical needs in research and data science. We approach all work with deep technical expertise, a spirit of collaboration, and a commitment to scientific integrity. NORC's staff members come from a diversity of disciplines and have experience working in a variety of settings.

The Illinois Workforce and Education Research Collaborative (IWERC) is an education research-practice partnership with the state of Illinois. IWERC works with community partners across the state to research and co-construct solutions to the most pressing issues in the cradle-to-career, education-to-workforce pipeline. IWERC's research spans four sectors: early childhood, K-12, postsecondary, and workforce. Designed to be an independent, objective source of information for the state's education and policy leaders, IWERC is housed within the College of Education at the University of Illinois Urbana-Champaign.

Endnotes

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- ² Carver-Thomas, D., & Darling-Hammond, L. (2019). The trouble with teacher turnover: How teacher attrition affects students and schools. *Education Policy Analysis Archives*, 27(36).
- ³ Ingersoll, R. M., & Tran, H. (2023). Teacher shortages and turnover in rural schools in the US: An organizational analysis. *Educational Administration Quarterly*, 59(2), 396-431.; Boyd, D., Lankford, H., Loeb, S., Ronfeldt, M., & Wyckoff, J. (2010). The effect of school neighborhoods on teacher career decisions. Paper presented at the New Evidence on How Families, Neighborhoods and Labor Markets Affect Educational Opportunities for American Children, Washington, DC.; Boyd, D., Grossman, P., Ing, M., Lankford, H., Loeb, S., & Wyckoff, J. (2011). The influence of school administrators on teacher retention decisions. *American Educational Research Journal*, 48(2), 303-333.; Carver-Thomas, D., & Darling-Hammond, L. (2019). The trouble with teacher turnover: How teacher attrition affects students and schools. *Education Policy Analysis Archives*, 27(36); Guarino, C. M., Santibanez, L., & Daley, G. A. (2006). Teacher recruitment and retention: A review of the recent empirical literature. *Review of Educational Research*, 76(2), 173-208.; Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, 38(3), 499-534.
- ⁴ Kirksey, J. (2024). Amid rising number of uncertified teachers, previous classroom experience proves vital in Texas. <https://ttu-ir.tdl.org/bitstreams/e7e19f87-e065-4dc7-8210-153b989a5266/download>
- ⁵ We referred to the Rural and Low-Income School Program, a grant issued by the U.S. Department of Education (n.d.), and adopted the criteria used to determine which local education agencies (LEAs), or public school districts, are considered rural. According to the Rural and Low-Income School Program, for a LEA "to be considered rural, all schools comprising the LEA must have a school locale code of 32, 33, 41, 42, or 43 (assigned by the National Center for Education Statistics, or NCES)." The NCES locale classifications are based on population size and proximity to populated areas, and classifications are as follows: 32 is town distant, 33 town remote, 41 rural fringe, 42 rural distant, and 43 rural remote. Of the 865 districts in Illinois statewide for the 2022-23 school year (see Illinois State Board of Education, or ISBE, 2024a), 426 districts (or 49.2% of districts statewide) met this rural criterion (NCES, 2023).
- ⁶ Ingersoll, R. M., & Tran, H. (2023). Teacher shortages and turnover in rural schools in the US: An organizational analysis. *Educational Administration Quarterly*, 59(2), 396-43; Withee, T., Beilstein, S. O., Illinois Association of Regional Superintendents of Schools, Illinois State Board of Education, Goshen Education Consulting, Inc., Illinois Workforce and Education Research Collaborative (IWERC) at University of Illinois, & Office of the Governor JB Pritzker. (2023). *Districts with chronic shortages – Part 1: Characteristics of districts with ongoing shortages* [Report].
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