



What's Happening

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# Teacher retention, mobility, and attrition in Kentucky public schools from 2008 to 2012

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## Key findings

- On average, 85.6 percent of classroom teachers in the Kentucky public school system during four recent school years stayed in the same school from one year to the next, 6.0 percent moved to a different school in the system, and 8.4 percent left the system.
- Teachers age 31 or younger and teachers age 50 or older left the Kentucky public school system at higher rates (13.0 percent and 9.1 percent) than teachers ages 32–49 (5.0–6.7 percent).
- Teachers in public schools serving a larger proportion of students eligible for the school lunch program moved to a different school at a higher rate (7.9 percent) than teachers in schools where a smaller proportion of students were eligible (4.8–5.6 percent).
- Teachers left the Kentucky public school system at a similar rate regardless of the characteristics of the schools in which they were employed.

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## Summary

In response to growing concerns about declining teacher retention rates in Kentucky public schools, members of the Kentucky College and Career Readiness Alliance worked in partnership with Regional Educational Laboratory (REL) Appalachia to study average rates of retention (stayers), mobility (movers), and attrition (leavers) for classroom teachers. The interests of alliance members reflect national interest in the effects of low teacher retention rates on students' education experiences. This interest is likely related to previous findings that low teacher retention rates adversely affect student academic outcomes, particularly in reading and math (Kane & Staiger, 2008; Ronfeldt, Loeb, & Wyckoff, 2013). Thus, Kentucky policymakers and educators have expressed interest in increasing teacher retention rates as a strategy to improve student achievement.

This study analyzed state-level data provided by the Kentucky Center for Education & Workforce Statistics for school years 2008/09, 2009/10, 2010/11, and 2011/12. The report provides descriptive information about teachers, schools, and teacher retention rates that can inform policy and program decisionmaking in Kentucky. The study did not address student achievement or teachers' reasons for staying, moving, or leaving.

The study's primary findings include the following:

- On average, 85.6 percent of classroom teachers in the Kentucky public school system stayed in the same school from one year to the next, 6.0 percent moved to a different school in the Kentucky public school system, and 8.4 percent left the Kentucky public school system.
- A lower percentage of Asian (76.9 percent), Hispanic (77.9 percent), and Black teachers (81.8 percent) stayed in the same school than did White teachers (86.0 percent).
- Teachers with a master's degree stayed in the same school at a higher rate (87.8 percent) than teachers with other degrees (82.2–82.6 percent).
- Teachers in middle schools stayed in the same school at a lower rate (84.0 percent) than teachers in elementary schools (87.0 percent).
- Teachers age 31 or younger moved to a different school at a higher rate (8.7 percent) than teachers age 32 or older (4.0–6.4 percent).
- Teachers age 31 or younger and teachers age 50 or older left the Kentucky public school system at higher rates (13.0 percent and 9.1 percent) than teachers ages 32–49 (5.0–6.7 percent).
- Teachers in schools serving a larger proportion of students eligible for the school lunch program (a proxy for low-income status) moved to a different school at a higher rate (7.9 percent) than teachers in schools with a smaller proportion of eligible students (4.8–5.6 percent).
- Teachers with 3 or fewer years of experience and teachers with 20 or more years of experience left the public school system at a higher rate (10.4 percent and 12.5 percent) than teachers with 4–19 years of experience (5.5–7.0 percent).
- Teachers left the public school system at a similar rate regardless of the characteristics of the school where they were employed (7.4–9.9 percent).

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## **Why this study?**

Policymakers and educators are interested in identifying ways to increase teacher retention rates (that is, retaining teachers in the same school from year to year) given concerns that lower retention rates are associated with lower student achievement. Schools that experienced high mobility (teachers moving to different schools) or high attrition (teachers leaving the public school system), particularly urban schools and schools with a high share of students eligible for the school lunch program, appear to have lower student achievement in reading and math (Kane & Staiger, 2008; Levy, Jablonski, & Fields, 2006; Levy, Joy, Ellis, Jablonski, & Karelitz, 2012; Rivkin, Hanushek, & Kain, 2005; Ronfeldt et al., 2013). Furthermore, some teacher and school characteristics are associated with different rates of retention, mobility, and attrition (Guin, 2004; Ingersoll, 2001).

Stakeholders in Kentucky, like their counterparts in other states, are seeking to improve teacher retention. The Southeast/Southcentral Education Cooperative, the primary member of the Kentucky College and Career Readiness Alliance when this study was initiated, expressed concern about the ability of rural Appalachian schools and school districts to retain teachers with the knowledge and skills to teach the Common Core Standards. In response, Regional Educational Laboratory (REL) Appalachia conducted this descriptive study to provide alliance members with information about teacher retention, mobility, and attrition and other teacher and school characteristics that may inform policy and program decisions related to teacher retention. This report also can be used as a basis for comparing rates of retention, mobility, and attrition in Kentucky with those in other states.

***This study provides information about teacher retention, mobility, and attrition and other teacher and school characteristics in Kentucky public schools that may inform policy and program decisions related to teacher retention***

## **What the study examined**

The study examined average rates of retention, mobility, and attrition in Kentucky for three cohorts of teachers in prekindergarten–12 public schools during school years 2008/09, 2009/10, 2010/11, and 2011/12. For the purposes of this study, teachers who remained in a school from one year to the next are called stayers, those who moved from one school to another in the Kentucky public school system are called movers, and those who left the public school system are called leavers. The study answers the following questions:

1. What percentage of teachers in the Kentucky public school system stay in the same school, move to a different school in the Kentucky public school system, or leave the Kentucky public school system from one school year to the next, on average?
2. How do rates of teachers who are classified as stayers, movers, and leavers vary based on various personal and professional characteristics?
3. How do rates of teachers who are classified as stayers, movers, and leavers vary based on various school characteristics?
4. Do the rates of stayers, movers, and leavers differ between Appalachian and non-Appalachian districts in Kentucky?

Key terms used in this report are defined in box 1. The methods used to conduct this study are described in box 2.

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## Box 1. Key terms

**Appalachian region.** This report distinguishes between schools located in Appalachia (that is, “Appalachian region” and “Appalachian schools”) versus those in other parts of the state. Appalachian region schools are located in the eastern portion of the state, as defined by the Appalachian Regional Commission (2010). This area is of particular analytic interest to members of the Kentucky College and Career Readiness Alliance given the region’s historically low educational attainment and high poverty.

**Baseline years.** 2008/09, 2009/10, and 2010/11.

**Comparison years.** 2009/10, 2010/11, and 2011/12.

**School characteristics.** School characteristics considered in the analysis include school level, locale, percentage of students eligible for the school lunch program, and percentage of students of a racial/ethnic minority.

**Teacher characteristics.** Teacher characteristics considered in the analysis include gender, age, race/ethnicity, highest degree earned, and years of teaching experience.

**Teacher status.** Teachers’ status is based on their school assignment in school years 2008/09, 2009/10, and 2010/11. Teacher status was determined by changes in school assignment from a prior school year. In this study *teacher status* includes the following three categories:

- **Leavers.** Teachers who left the Kentucky public school system. *Attrition rate* is the percentage of teachers who were leavers.
- **Movers.** Teachers who changed schools within the Kentucky public school system. *Mobility rate* is the percentage of teachers who were movers.
- **Stayers.** Teachers who remained in their school from one year to the next. *Retention rate* is the percentage of teachers who were stayers.

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## What we already know about teacher retention, mobility, and attrition

The rate at which teachers stay in the same school from one year to the next is of interest to policymakers seeking to improve student achievement.<sup>1</sup> The rates of teacher retention, mobility, and attrition vary across state, school, and teacher characteristics (Goldring, Taie, & Riddles, 2014). For example, teachers with fewer years of experience generally leave the public school system at a higher rate than those with more years of experience (Aud et al., 2011; Hanushek, Kain, & Rivkin, 2004; Luekens, Lyter, & Fox, 2004). In addition, some school characteristics (for example, locale and percentage of students eligible for the school lunch program) appear to be related to teacher retention, mobility, and attrition (Guin, 2004; Hanushek & Rivkin, 2010; Ingersoll, 2001; Ingersoll & Ross, 1995). Thus, a particular interest for state policymakers is to understand how these rates vary according to teacher and school characteristics within their state.

Previous research has found that more than 90 percent of teachers in Kentucky stay in the same school from one year to the next (Alliance for Excellent Education, 2005). However, the rates of teacher retention, mobility, and attrition differ across schools (Cowen, Butler, Fowles, Streams, & Toma, 2012). In particular, teachers in Appalachian schools are more likely to leave their schools than teachers in non-Appalachian schools (Cowen et al., 2012). This finding is important because Kentucky’s Appalachia region has historically been economically disadvantaged, and its higher rates of teacher mobility and attrition may

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## Box 2. Data and methods

This descriptive study used data collected by the Kentucky Center for Education & Workforce Statistics, which maintains a statewide longitudinal data system about staff and students from prekindergarten through graduate school. Data for every teacher employed in a prekindergarten–12 public school in school years 2008/09, 2009/10, 2010/11, and 2011/12 were obtained. This period was selected because it captures all relevant data that were available when this study was designed. The data on teachers included information about their education levels, current employment status, and teaching assignments. In addition, Kentucky school data were obtained from the National Center for Education Statistics Common Core of Data. (See appendix A for further methodological details.)

Each teacher was assigned a single school location in each school year. This assignment then was compared from one year to the next to determine whether the teacher stayed in the same school, moved to a different school in the Kentucky public school system, or left the Kentucky public school system. The total number of teachers who stayed, moved, or left was divided by the total number of teachers employed to calculate a percentage for each year-to-year comparison. This percentage was then averaged across the three comparisons. Individuals who were employed at nonschool locations (such as a central office) were not included in the analyses.

Cross-tabulations were created to compare retention, mobility, and attrition for teachers with different characteristics (including gender, age, race/ethnicity, highest degree earned, and years of teaching experience). Similar cross-tabulations compared retention, mobility, and attrition based on school characteristics (including level, locale, percentage of students eligible for the school lunch program, and percentage of students of a racial/ethnic minority).

For this study a 3 percentage point difference was used as the threshold for identifying (and discussing) substantive differences between comparison groups. Differences of less than 3 percentage points are not highlighted.

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contribute to adverse student academic outcomes (Appalachian Regional Commission, 2010; Jacobsen, Lee, & Pollard, 2013). Because research on teacher retention, mobility, and attrition in Kentucky has not been conducted since 2005, REL Appalachia conducted this study to update information for members of the alliance.

### What the study found

The Kentucky teacher workforce was largely stable across the study period (2008–12). Most of Kentucky’s classroom teachers (85.6 percent, on average) stayed in the same school from one year to the next, 6.0 percent moved to a different school in the Kentucky public school system, and 8.4 percent left the public school system. The rates of teacher retention, mobility, and attrition differed based on certain teacher and school characteristics.

#### **Teachers stayed in the same school at different rates depending on their age, race/ethnicity, highest degree earned, and experience range**

Teachers stayed in their school at different rates based on their age, race/ethnicity, highest degree earned, and experience range (table 1). Teachers ages 32–49 stayed in the same school at a higher rate (86.9–89.8 percent) than teachers age 31 or younger (82.2 percent) or age 50 or older (82.9 percent). White teachers stayed in the same school at a higher

rate (86.0 percent) than Asian teachers (76.9 percent), Hispanic teachers (77.9 percent), and Black teachers (81.8 percent). Teachers with a master's degree stayed at a higher rate (87.8 percent) than teachers with other degrees (bachelor's, doctoral, or professional). Teachers with 4–19 years of experience stayed at a higher rate (86.7–90.0 percent, depending on experience range) than teachers with 3 or fewer years of experience (80.3 percent) or teachers with 20 or more years of experience (84.3 percent).

#### **Teachers moved to a different school at different rates depending on their age, race/ethnicity, and experience range**

Teachers age 31 or younger moved to a different school in the Kentucky public school system at a higher rate (8.7 percent) than teachers age 40 or older (4.0–5.1 percent; see table 1). White teachers (5.7 percent) moved to a different school at a lower rate than Asian teachers (8.8 percent). Finally, teachers with 3 or fewer years of experience moved to a different school at a higher rate (9.3 percent) than teachers with 4 or more years of experience (3.1–6.3 percent).

**Teachers age 50 years or older and teachers age 31 or younger left the Kentucky public school system at a higher rate than teachers ages 32–49**

#### **Teachers left the public school system at different rates depending on their age, race/ethnicity, highest degree earned, and experience range**

Teachers age 50 years or older (13.0 percent) and teachers age 31 or younger (9.1 percent) left the Kentucky public school system at a higher rate than teachers ages 32–49 (5.0–6.7 percent; see table 1). Asian teachers (14.3 percent) and Hispanic teachers (14.5 percent) left the public school system at a higher rate than White teachers (8.3 percent) and Black teachers (10.9 percent). Teachers with a master's degree left the system at a lower rate (7.8 percent) than teachers with a bachelor's degree (11.5 percent) or doctoral degree (12.3 percent). Teachers with 3 or fewer years of experience left the public school system at a higher rate (10.4 percent) than teachers with 4–19 years of experience (5.5–7.0 percent). Teachers with 20 or more years of experience left the public schools system at the highest rate (12.5 percent).

#### **Teachers stayed in the same school at different rates depending on characteristics of the schools and students served**

Teachers in middle schools stayed at a lower rate (84.0 percent) than teachers in elementary schools (87.0 percent; table 2). Teachers in urban schools stayed at a lower rate (83.4 percent) than teachers in rural schools (86.5 percent). Teachers in schools where 69–100 percent of students were eligible for the school lunch program stayed at a lower rate (83.0 percent) than teachers in schools where 0–42 percent of students were (87.3 percent). Teachers in schools serving more racially/ethnically diverse student populations, where at least 30 percent of students were from a racial/ethnicity minority, stayed at a lower rate (82.7 percent) than teachers working in the least diverse schools (87.0 percent), where less than 3 percent of students were from a racial/ethnic minority.

#### **Teachers in schools serving a larger proportion of students eligible for the school lunch program moved to a different school at higher rates than teachers in schools serving a smaller proportion**

Teachers in schools where more than 69 percent of students were eligible for the school lunch program moved to a different school at a higher rate (7.9 percent) than teachers in schools where 42 percent of students or less were eligible (4.8 percent; see table 2).



**Table 1. Average retention, mobility, and attrition rates of Kentucky public school teachers, by teacher characteristics, 2008/09–2011/12**

Characteristic	Number	Stayed in the same school		Moved to a different school		Left the Kentucky public school system	
		Number	Percent	Number	Percent	Number	Percent
Total	40,354	34,538	85.6	2,408	6.0	3,409	8.4
<b>Gender</b>							
Female	31,621	27,264	86.2	1,764	5.6	2,592	8.2
Male	8,733	7,274	83.3	643	7.4	816	9.3
<b>Age</b>							
31 or younger	9,258	7,610	82.2	805	8.7	843	9.1
32–39	9,817	8,530	86.9	628	6.4	659	6.7
40–49	10,785	9,687	89.8	554	5.1	543	5.0
50 or older	10,462	8,677	82.9	421	4.0	1,364	13.0
<b>Race/ethnicity<sup>a</sup></b>							
Asian	<sup>c</sup>	<sup>d</sup>	76.9	<sup>d</sup>	8.8	<sup>d</sup>	14.3
Hispanic	172	134	77.9	13	7.6	25	14.5
Black	1,364	1,116	81.8	100	7.3	148	10.9
Two or more	<sup>c</sup>	<sup>d</sup>	75.0	<sup>d</sup>	0.0	<sup>d</sup>	25.0
White, non-Hispanic	35,948	30,931	86.0	2,041	5.7	2,976	8.3
Unknown	2,746	2,261	82.3	243	8.8	242	8.8
<b>Highest degree<sup>b</sup></b>							
Bachelor's	7,821	6,460	82.6	459	5.9	902	11.5
Master's	31,801	27,926	87.8	1,392	4.4	2,484	7.8
Doctoral or professional	<sup>c</sup>	<sup>d</sup>	82.2	<sup>d</sup>	5.5	<sup>d</sup>	12.3
<b>Experience range</b>							
0–3 years	9,861	7,918	80.3	914	9.3	1,029	10.4
4–9 years	10,017	8,681	86.7	632	6.3	704	7.0
10–14 years	7,316	6,537	89.4	376	5.1	403	5.5
15–19 years	5,322	4,791	90.0	240	4.5	291	5.5
20 or more years	7,832	6,606	84.3	246	3.1	981	12.5

**Note:** Percentages may not sum to 100 percent across a row because of rounding. Numbers of teachers staying, moving, or leaving may not sum to overall numbers due to averaging across years. Teacher characteristics were assigned in each baseline year (2008/09, 2009/10, or 2010/11).

**a.** Asian includes Native Hawaiian and other Pacific Islander, Hispanic includes Latino, and Black includes African American.

**b.** For some teachers, the highest degree earned was recorded as “Unknown”; these data were treated as missing.

**c.** Value suppressed to prevent calculation of subgroup numbers.

**d.** Value suppressed to comply with privacy requirements due to very small numbers.

**Source:** Authors' analysis of teacher data provided by the Kentucky Center for Education & Workforce Statistics.

**Table 2. Average retention, mobility, and attrition rates of Kentucky public school teachers, by school characteristics, 2008/09–2011/12**

Characteristic	Number	Stayed in the same school		Moved to a different school		Left the Kentucky public school system	
		Number	Percent	Number	Percent	Number	Percent
Total	40,354	34,538	85.6	2,408	6.0	3,409	8.4
<b>Region</b>							
Appalachia	12,064	10,545	87.4	619	5.1	900	7.5
Non-Appalachia	28,291	23,993	84.8	1,789	6.3	2,509	8.9
<b>School level</b>							
Elementary school (grades K–5)	15,580	13,549	87.0	824	5.3	1,208	7.8
Middle school (grades 6–8)	7,329	6,156	84.0	503	6.9	670	9.1
High school (grades 9–12)	10,534	8,917	84.6	638	6.1	978	9.3
Other/alternative (K–12)	6,912	5,916	85.6	443	6.4	553	8.0
<b>School locale</b>							
Urban	8,359	6,973	83.4	623	7.5	762	9.1
Suburban	5,653	4,848	85.8	322	5.7	483	8.5
Town	8,838	7,573	85.7	499	5.6	766	8.7
Rural	17,504	15,143	86.5	962	5.5	1,398	8.0
<b>School enrollment</b>							
Less than 434	10,148	8,609	84.8	670	6.6	869	8.6
434–584	10,039	8,657	86.2	568	5.7	814	8.1
585–822	10,055	8,633	85.9	593	5.9	830	8.3
More than 822	10,074	8,613	85.5	570	5.7	891	8.8
<b>Students who are eligible for the school lunch program</b>							
0–42 percent	10,081	8,797	87.3	480	4.8	803	8.0
43–55 percent	10,089	8,669	85.9	564	5.6	856	8.5
56–68 percent	10,096	8,705	86.2	561	5.6	830	8.2
69–100 percent	10,079	8,365	83.0	801	7.9	913	9.1
<b>Students who are racial/ethnic minority (non-White)</b>							
0–3 percent	10,085	8,773	87.0	530	5.3	782	7.8
4–8 percent	10,085	8,810	87.4	524	5.2	749	7.4
9–29 percent	10,081	8,608	85.4	597	5.9	876	8.7
30–100 percent	10,103	8,356	82.7	750	7.4	996	9.9

**Note:** Percentages may not sum to 100 percent across a row because of rounding. Numbers of teachers staying, moving, or leaving may not sum to overall numbers due to averaging across years. Teacher characteristics were assigned in each baseline year (2008/09, 2009/10, or 2010/11). Ranges are quartiles based on data from the Kentucky Center for Education & Workforce Statistics.

**Source:** Authors' analysis based on teacher data from the Kentucky Center for Education & Workforce Statistics and the National Center for Education Statistics Common Core of Data.

## Teachers left the public school system at similar rates regardless of school characteristics

Teachers left the Kentucky public school system at similar rates, from 7.4 percent to 9.9 percent, across school characteristics (see table 2).

## Teachers in Appalachian and non-Appalachian schools were retained at similar rates

Teachers were retained at a similar rate in Appalachian schools (87.4 percent) and non-Appalachian schools (84.8 percent), and rates of mobility and attrition also were similar between regions (see table 2).

### Implications of the study findings

This study provides information about the average rates of teacher retention, mobility, and attrition in three cohorts across four school years (2008/09–2011/12) and so reflects changes in the Kentucky teacher workforce during a period of major economic recession. The analyses presented here are descriptive and cannot explain why teachers leave particular schools. Results indicate that the Kentucky teacher workforce is relatively stable—85.6 percent of Kentucky teachers stayed in the same school from one year to the next, on average. The results of this study are similar to those of national research conducted during the same time period, which reports that 84.0 percent of teachers remain in the same school from one year to the next (Goldring et al., 2014). Kentucky’s teacher workforce appears to be about as stable as Tennessee’s (attrition rate of 8.0 percent) but less stable than Illinois’s, Indiana’s, Missouri’s, Ohio’s, Virginia’s, and West Virginia’s, where attrition rates range from 4.9 percent to 7.0 percent (Alliance for Excellent Education, 2005).<sup>2</sup>

**Results indicate that the Kentucky teacher workforce is relatively stable—85.6 percent of Kentucky teachers stayed in the same school from one year to the next, on average**

This study revealed substantial variation in teacher retention depending on certain teacher and school characteristics that may be of interest to policymakers in Kentucky and other stakeholders. Teachers with the fewest years of experience, teachers in urban schools, and teachers in schools where a higher share of students are eligible for the school lunch program were retained at the lowest rates. Kentucky policymakers may be encouraged by the higher rates of retention among teachers in rural schools and in Appalachian schools, both of which have traditionally been sources of concern. Indeed, a surprising finding of this study was that teachers in Appalachian and non-Appalachian schools were retained at a similar rate.

The study’s description of retention, mobility, and attrition among Kentucky’s public school teachers provides a foundation on which education leaders may consider policies and program strategies to promote a stable public school teaching force.

### Limitations of the study

This study was limited in three important respects. First, the dataset provided by the Kentucky Center for Education & Workforce Statistics did not include the number of years of experience possessed by each teacher. Thus, an experience range was derived for each classroom teacher by comparing the teacher’s base salary with the five experience ranges listed on the state’s uniform salary schedule: 0–3 years, 4–9 years, 10–14 years, 15–19 years, and 20 or more years. To illustrate, a teacher who earned \$33,500 per year was considered to have 0–3 years of experience based on the experience range in the salary schedule. The

second limitation is that the most recent data available from the Kentucky Center for Education & Workforce Statistics are for the 2011/12 school year, so the analyses do not reflect more recent changes in the teacher workforce in Kentucky. Third, the school-level focus of the study does not allow differences in district-level mobility to be examined. The results thus cannot inform discussions about different types of teacher mobility (such as transfers to schools within the same district versus transfers to different school districts), which may be useful to state and district stakeholders.

## Appendix A. Data sources and methods

This appendix provides further details about the data sources and methods used in this study.

### Variables and sources

Teacher-, school-, and district-level variables and their data sources are presented in table A1. All variables were assigned to classroom teachers in each baseline year (the baseline years were 2008/09, 2009/10, and 2010/11).

**Description of the study population.** The study used the teacher as the unit of analysis. The study population included all teachers employed in public elementary, middle, and high schools in Kentucky. The dataset for this analysis included 40,102 classroom teachers employed in 2008/09, 40,444 teachers employed in 2009/10, and 40,517 teachers employed in 2010/11. The teachers were employed in 1,565 schools in 174 school districts.

**Limitations of the dataset.** The primary limitation of the dataset used in this study is that it did not provide teachers' actual number of years of experience nor an initial hiring date that would allow teacher experience to be calculated. To address this limitation, experience ranges were approximated using the Uniform Salary Schedule for each Kentucky school district. Each teacher's annual base salary was matched to the district's schedule. Experience was thus reported as 0–3 years, 4–9 years, 10–14 years, 15–19 years, or 20 or more years to match the ranges on the salary schedule. To illustrate, a teacher who earned \$33,500 per year was assigned to the 0–3 year range, as that salary fell within that range on the salary schedule. Similarly, a teacher earning \$68,500 per year was assigned to the 15–19 year range, as that salary fell within that range on the salary schedule. These categories provide an estimate of teacher experience but may not fully reflect the number of years of experience a teacher might have.

Furthermore, the most recent data available were for the 2011/12 school year, allowing identification of stayers, movers, or leavers among those employed in the baseline 2010/11 school year. Thus, analyses may not fully reflect more recent retention, mobility, and attrition patterns.

### Methods for descriptive analyses

Before analysis began, the quality of the data received from the Kentucky Center for Education & Workforce Statistics was assessed, including the extent of missing or invalid values. Microsoft Excel and IBM SPSS were used to create frequency counts of values for each key variable in the dataset. These frequencies included the number of nonmissing values, the number of values outside the valid range, and the number and percentage of missing values. The information on missing data was used to identify incomplete records for removal. Less than 5 percent of values were missing within and across all variables. Teacher records containing missing data were excluded only from analyses where applicable data were missing (that is, pairwise deletion was used).

Next, individual classroom teachers were identified. The dataset included duplicate personnel records reflecting teachers assigned to multiple schools. Duplicate records posed

**Table A1. Variables used in retention, mobility, and attrition analyses**

Variable description	Variable source
<b>Teacher variables</b>	
Teacher ID	Kentucky Center for Education & Workforce Statistics
Gender	Kentucky Center for Education & Workforce Statistics
Date of birth	Kentucky Center for Education & Workforce Statistics
Race/ethnicity	Kentucky Center for Education & Workforce Statistics
Highest degree earned	Kentucky Center for Education & Workforce Statistics
District ID	Kentucky Center for Education & Workforce Statistics
School ID	Kentucky Center for Education & Workforce Statistics
Grade(s) taught	Kentucky Center for Education & Workforce Statistics
Subject(s) taught	Kentucky Center for Education & Workforce Statistics
Job code	Kentucky Center for Education & Workforce Statistics
Full-time equivalent (full-time or part-time)	Kentucky Center for Education & Workforce Statistics
Annual salary	Kentucky Center for Education & Workforce Statistics
<b>School variables</b>	
District ID	National Center for Education Statistics
School ID	National Center for Education Statistics
Locale (urban, suburban, town, or rural)	National Center for Education Statistics
Grades served	National Center for Education Statistics
Total number of students	National Center for Education Statistics
Total number of full-time teachers	National Center for Education Statistics
Percentage of students by race/ethnicity	National Center for Education Statistics
Percentage of students eligible for the school lunch program	National Center for Education Statistics
<b>District variables</b>	
District ID	National Center for Education Statistics
Designation as an Appalachian school district	Kentucky Center for Education & Workforce Statistics

**Sources:** Kentucky Center for Education & Workforce Statistics and the National Center for Education Statistics' Common Core of Data.

a challenge for this study, as teachers who appear in more than one school record can inflate attrition and retention estimates. To eliminate duplicate records and ensure accurate counts of classroom teachers, teachers were assigned to a single school based on their full-time equivalent assignment during that baseline year. The school where the plurality of the teacher's time was assigned was considered his or her primary school assignment and used to determine whether the teacher was a stayer, mover, or leaver in the comparison year. In the event that a teacher's assignment was equally divided between two schools, the school to which the largest proportion of salary could be attributed was assigned as the teacher's primary assignment. A similar approach has been used elsewhere in statewide analyses of teacher retention (Plecki, Elfers, Loeb, Zahir, & Knapp, 2005).

To further prevent duplicate entries, the job title field was used to exclude employees for whom a portion of their assignment did not involve classroom instruction. Job title was not used in the descriptive analyses, only as a filtering mechanism to identify classroom teachers. This helped to ensure that analysis focused on classroom teachers and not on staff working in other roles.

Next, the teacher dataset was merged with school- and district-level information from the National Center for Education Statistics. Unique identification numbers for both schools and districts were used to link individual teacher information with school and district information. The merge resulted in a single teacher-level dataset that included teacher, school, and district characteristics.

After data were merged, analyses involved calculating frequencies and percentages for teachers—those who stayed in the same school, moved to a different school in the Kentucky public school system, or left the Kentucky public school system—from one baseline year to the next comparison year. Retention, mobility, and attrition statistics were calculated for three baseline-to-comparison periods: from 2008/09 to 2009/10, from 2009/10 to 2010/11, and from 2010/11 to 2011/12. Average annual rates represent the mean of these three separate one-year rates.

## **Notes**

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1. This report focuses on school-level teacher attrition rather than other options such as district-level attrition for two key reasons. First, the school represents the most immediate conditions in which teachers work. Second, focusing exclusively on schools helps clarify the unit of analysis.
2. The methodology for calculating turnover in Alliance for Excellent Education (2005) was slightly different from that used in this study, and this comparison is across two different time periods.



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