REL MID-ATLANTIC — Regional Educational Laboratory at Mathematica

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From:	Allison McKie and Elizabeth Blesson
Date:	12/30/20
Subject:	Feasibility of Cross-State Teacher Mobility Study in the Mid-Atlantic Region

Introduction

Members of the Regional Educational Laboratory (REL) Mid-Atlantic training and supporting excellent educators alliance indicated they do not have critical information about cross-state teacher movements and other specifics they need to understand and address teacher mobility in their states. In response to their request, REL Mid-Atlantic assessed the feasibility of obtaining teacher data from relevant state education data agencies, linking those data across states, and using those data to answer stakeholders' questions about teacher mobility. A feasibility assessment will help stakeholders understand which questions about regional teacher mobility can and cannot be answered using existing administrative data and prioritize the questions that are of most interest to those stakeholders. This feasibility assessment aimed to help stakeholders understand which questions about regional teacher mobility can and cannot be answered using existing administrative data and better prioritize the questions that were of most interest to those stakeholders.

Research questions

Together with training and supporting excellent educators alliance members, we developed the following set of research questions to guide the feasibility study:

1. Are there apparent legal restrictions on collecting and linking teacher data across states in the mid-Atlantic region?

2. Are teacher data available and comparable across states regarding:

   a. Years of teaching experience?

   b. Grade and subject taught?

   c. Demographics?

   d. Educational and certification background (including route to certification [traditional versus alternative] and state in which the teacher was trained)?

   e. Reported reasons for teaching in a state different from the state in which the teacher was trained, moving from one school to another school in a different district or state, or leaving the teaching profession?

3. Are there any issues regarding the availability and comparability of data on school and district characteristics across states?

4. To what extent can data for teachers in public schools (traditional and charter) be linked across states in the mid-Atlantic region using available teacher identifiers? For example, can teachers be identified in records in multiple states by teacher name and date of birth?

Main findings

- No legal restrictions preclude collecting and linking data between states, but states' willingness to participate could be prohibitive.

- The data necessary to track cross-state teacher movements and analyze school and district characteristics of interest to stakeholders are available and roughly comparable across Delaware, New Jersey, and Pennsylvania, but reasons for teacher mobility and the state in which a teacher was trained are generally not available.

- Data for public school teachers can be linked among the three study states.

- Only 315 teachers who taught in one of three study states in 2016–2017 was teaching in a different study state in 2017–2018, indicating cross-state mobility of one-tenth of 1 percent.

Methods

We began by identifying and seeking to obtain relevant information for the mid-Atlantic states: Delaware, District of Columbia (DC), Maryland, New Jersey, and Pennsylvania. We first scanned state department of education websites to determine which data states describe on their websites, what relevant state-level laws might influence the feasibility of studying regional mobility, and how each state processes data requests. Next, we used our existing relationships with the training and supporting excellent educators alliance and REL Mid-Atlantic Governing Board members to identify appropriate contacts in data offices from each state. Using the information from the website scans, we developed state-specific protocols to guide conversations with our state data office contacts about data availability, legal or regulatory considerations, processes for requesting data, and willingness to participate in the study. Based on the information we learned from the conversations with our state contacts, we entered into data use agreements, memoranda of understanding, or both with participating state agencies to obtain relevant data and data handbooks.

After we obtained the relevant data sets, we addressed the second, third, and fourth research questions by analyzing the data to assess the extent to which data elements of interest were available in each state, the comparability of those data elements across states, and our ability to link the different state data sets to track cross-state teacher mobility. We reviewed the data and the definitions provided in the data handbooks to determine data availability and comparability. To

assess linkability, we used a statistical program to attempt to match teacher records across states based on name and date of birth.

Apparent legal restrictions on collecting and linking data[1]

We found data collection and linking to be limited not by legal restrictions but by the willingness of the relevant education agencies to participate in the study. Neither our search of state websites nor our conversations with data contacts identified any laws or regulations specifically addressing linking data across states. Most of the state education agencies we contacted required establishing a data sharing agreement that stipulated conditions of data use and safeguards before releasing personally identifiable information. The process of requesting and obtaining relevant data from participating state agencies ranged from simply submitting an Open Public Record Act request to the New Jersey Department of Education to a multistep application and approval process in Pennsylvania, which included the Pennsylvania Department of Education Institutional Review Board reviewing our letter of intent and our research application and then establishment of a data use agreement between the department and Mathematica. Our success using these processes to obtain records led us to conclude that there are no legal restrictions that preclude sharing and linking data between states to assess cross-state mobility.

The willingness of states to participate, however, could prove prohibitive, as state education agencies generally have no legal obligation to provide the necessary data. Of the five mid-Atlantic states we approached about the feasibility study, only three agreed to participate: Delaware, New Jersey, and Pennsylvania. Reasons for nonparticipation reported by Maryland included agency leadership deciding not to prioritize the study and various agency officials being concerned about their inability to validate the district-provided information in their employee and administrator data system. DC's state education agency also declined to participate, saying that their current focal areas did not include cross-state teacher mobility and that the study would be of limited value to them without Maryland's participation. We also had conversations with REL Appalachia about the Virginia Department of Education possibly participating in the study. After Maryland and DC opted out, however, talks ended with REL Appalachia, because Virginia would not be interested in a mobility study that did not include Maryland and DC. Although Pennsylvania agreed to participate in the feasibility assessment, our contact stressed that Pennsylvania would not necessarily participate in a full cross-state mobility study, explaining that such a study would be of limited value without the participation of border states Maryland, Ohio, and New York. Securing the participation of not only a given state but also its border states appears critical to the success of a cross-state mobility study.

Availability and comparability of data elements

The study team assessed the availability and comparability across states of data elements of interest that fell into the following categories: (1) teacher identifiers and demographic characteristics, (2) teacher educational and employment background, (3) teaching position, (4) school and district characteristics, and (5) reported reason for teacher mobility. Teacher identifiers

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[1] The study team does not include legal experts and cannot make definitive determinations regarding legal restrictions. These findings do not constitute legal advice.

(for example, name, date of birth, and state teacher identification number) served as our primary means of linking teachers within states over time and across states each year.[2] Data on teacher demographics (for example, gender, race), employment background (for example, years of teaching experience), and teaching position (for example, subject taught) helped to improve the quality of teacher matches, particularly when either teacher ID or date of birth was not available. We also sought information on teacher demographics, teacher education and employment background, teaching position, school characteristics, and reason for mobility; stakeholders wanted to know why teachers move within or across states and whether cross-state mobility is associated with various teacher and school characteristics.

We obtained data from Delaware, New Jersey, and Pennsylvania for the 2016–2017 and 2017–2018 school years, the two most recent years available across all three states at the time of data collection. We summarize our availability and comparability findings for in Table 1 and describe the findings in more detail here.

Teacher identifiers and demographic characteristics. All three states had data on first and last names of teachers, but the availability of other teacher identifiers and demographic characteristics varies. Only Delaware data had a maiden name field, and only Delaware data did not have a middle name field. Name fields often differed in how they recorded names (for example, middle initial versus middle name, compound last names with or without hyphens, names with or without accent symbols). Misspellings could also cause inconsistencies in names across states.

New Jersey had the most limited data in this category. Delaware and Pennsylvania provided unique employee IDs that could serve to match teachers across years within a state (but could not serve to match teachers across states) as well as date of birth, race and ethnicity, and gender/sex. Because New Jersey provided only year of birth in 2016–2017, we could not match across states using this information as precisely as we could with the full date of birth. New Jersey did not provide any date of birth information for 2017–2018. Race and ethnicity and gender were available in the New Jersey data for 2016–2017 but not for 2017–2018. When available, the race and ethnicity and gender data were comparable across all three states. Slight differences existed in the reporting of race, but the data could be recoded to create consistent race and ethnicity categories.

Teacher education and employment background. All three states had data on years of experience in a given local educational agency and purportedly overall as well as highest degree attained.[3] Only New Jersey had data on years of experience in the state. Delaware provided more detailed education background data, including subject of highest degree attained and state in which the highest degree was conferred. Data for Delaware and New Jersey included information on

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[2] A member of the REL Midwest team that conducted a cross-state mobility study of Iowa, Minnesota, and Wisconsin shared with us that the state education agencies involved in the REL Midwest study objected to providing teacher Social Security numbers but willingly provided teacher names and dates of birth after the study team dropped its request for Social Security numbers. Consequently, we did not pursue Social Security numbers in our feasibility study.

[3] For Delaware and Pennsylvania, we could not confirm that the years of overall teaching experience variable indicated total years of experience in the teaching profession and not just years of experience teaching in the respective state. Because New Jersey had three distinct years of experience variables—years of prior experience, years in New Jersey, and years in local educational agency—years of prior experience might, indeed, indicate total years in the profession.

route to certification (alternative versus traditional) and the type of certificate or license received, but the details of the latter differed in accordance with each state's certification and licensure systems. Pennsylvania did not provide information about teacher certification for this study, though the contact we spoke with indicated that certification data exist.

Teaching position. Data elements available in all three states included district name, school name, grade span taught, and subject taught. No state provided data on the specific grade taught by the teacher. Grade span and subject taught data differed substantially across states. Delaware data included separate fields for grade span (elementary, middle, or secondary, further distinguished by regular versus special education) and subject (for example, foreign language, general elementary, mathematics). Pennsylvania provided a position variable that enables users to distinguish between elementary and secondary teachers and between general and special education teachers as well as an assignment variable that gave details about subject taught (for example, Art, Secondary (7-12); Elementary, Intermediate Grades 4-6; Physical Education). New Jersey data featured a single job code field that had separate codes for elementary teachers (for example, Elementary School Teacher K-5, English/Elementary), grade 5 to 8 teachers (for example, Science Grades 5-8, Spanish Grades 5-8), and other (presumably high school) teachers (for example, Math Non-Elementary, Science Chemistry).

School and district characteristics. We assessed data availability and comparability for school characteristics using publicly available data from the states' websites. Relevant data elements were available but not always comparable across the three states. Regarding standardized achievement data, all three states reported the percentage of students who were proficient by subject. Delaware also reported scale score means and standard deviations, New Jersey reported only median scale scores, and Pennsylvania did not publicly report any scale score information. All three states provided data on the number of students who were economically disadvantaged using a federal definition. Publicly available information about high-need schools, however, varied. Pennsylvania identified low-income schools based on the percentage of federally defined low-income families that enroll their children in that school. Delaware offered a high-need school designation that considered the number of low-income families and the percentages of English learners, students with disabilities, and minority students enrolled at the school. We did not locate a list of high-need schools on the New Jersey website, but the state categorizes school districts into district factor groups based on six indicators of socioeconomic status from the decennial census (percentage of adults with no high school diploma, percentage of adults with some college education, occupational status, unemployment rate, percentage of people in poverty, and median family income). We also noted that information on the geographic location of all public schools was available in the Common Core of Data.

Reason for mobility. None of the three states provided information on reasons for teacher mobility.

Table 1. Summary of data availability and comparability

Data element	Availability			Comparability Issues
	New Jersey	Delaware	Pennsylvania	
Teacher identifiers and demographic characteristics				
First name	✓	✓	✓	Possible spelling inconsistencies, variation in how name was recorded
Middle name	✓		✓	Mostly reported as middle initial but full middle name sometimes provided
Last name	✓	✓	✓	Possible spelling inconsistencies, variation in how name was recorded
Maiden name		✓		
Unique employee ID		✓	✓	Employee ID could not be used to match across states
Date of birth	✓ 2016–2017 only	✓	✓	New Jersey provided only year of birth in 2016–2017
Gender/sex	✓ 2016–2017 only	✓	✓	
Race and ethnicity	✓ 2016–2017 only	✓	✓	Race categories differed somewhat but could be recoded to be comparable
Teacher education and employment background				
Years of experience in local educational agency	✓	✓	✓	
Years of experience in state	✓			
Years of experience overall	✓	✓	✓	
Highest degree attained	✓	✓	✓	
Subject area of highest degree attained		✓		
State in which highest degree conferred		✓		
Certification or licensure type	✓	✓	a	Differed in accordance with each state's certification or licensure system
Route to certification	✓	✓	a	
Teaching position				
District name	✓	✓	✓	
School name	✓	✓	✓	
Grade taught				
Grade span taught	✓	✓	✓	Categories used varied
Subject taught	✓	✓	✓	Categories used varied

Data element	Availability			Comparability Issues
	New Jersey	Delaware	Pennsylvania	
School and district characteristics				
Achievement test scores	✓	✓	✓	All states provided percentage proficient, but availability of scale scores varied
Indicators of economic disadvantage and high need	✓	✓	✓	Identification of high-need differed
Geographic location	✓	✓	✓	
Reasons for mobility				
Reason for mobility				

Note: White space (that is, the absence of a ✓) in the availability columns indicates the data element is not available.

[a] Pennsylvania did not provide certification data for this feasibility study, but our state data contact indicated that certification data exist.

Linking data across states

We used linking software called dtalink to match teachers within and across the three participating states from 2016–2017 to 2017–2018. Specifically, we first matched teachers within Delaware and Pennsylvania separately across years using each state's unique employee ID (that is, we identified teachers whose 2016–2017 employee ID appeared in the same state in 2017–2018 as staying in the same state). For remaining teachers in Delaware and Pennsylvania and all New Jersey teachers, we then used information on names and date of birth, if available, to look for possible matches across state lines and within New Jersey. We considered an exact first and last name match sufficient to identify a teacher match unless available year of birth information did not match. When multiple exact name matches across years occurred, we implemented a series of rules to identify the potential match most likely to be the true match. Because exact date of birth was available in Delaware and Pennsylvania, a match on date of birth and simplified versions of the first and last name trumped a match based only on exact name. To determine which remaining variables would serve to break ties, we compared known matches in Delaware and Pennsylvania (based on teacher ID) and calculated how often each of the remaining variables differed for a given teacher between 2016–2017 and 2017–2018. We prioritized the variables least likely to change across years (gender, race, subject taught) as tie-breakers over variables that more frequently changed over time for a given teacher (district ID, school ID, years of experience). Although this memo presents mobility findings estimated using only one linking model, we tested a variety of models that applied various combinations of weights to the variables used to identify matches. All of the models tested yielded similar mobility results.

The results of our matching suggested that data for public school teachers can be linked among Delaware, New Jersey, and Pennsylvania, but only 315 teachers who taught in one of these three study states in 2016–2017 taught in a different study state in 2017–2018 (Table 2). The number of teachers leaving one state for another study state ranged from 6 to 142.

The estimated number of teachers moving between New Jersey and Pennsylvania (in either direction) exceeded the number of teachers moving between either state and Delaware. This result is to be expected given the greater number of teachers in New Jersey and Pennsylvania relative to

Delaware. Even between New Jersey and Pennsylvania, however, only 0.1 percent of 2016–2017 teachers moved to the other state in 2017–2018.

Table 2. 2017–2018 teacher location by 2016–2017 state

2016–2017 state	Number of 2016–2017 teachers	Number (percentage) of 2016–2017 teachers by 2017–2018 location			
		Delaware	New Jersey	Pennsylvania	Unmatched
Delaware	8,965	8,224 (91.7%)	19 (0.2%)	23 (0.3%)	699 (7.8%)
New Jersey	138,986	6 (0.004%)	126,246 (90.8%)	104 (0.1%)	12,630 (9.1%)
Pennsylvania	147,708	21 (0.01%)	142 (0.1%)	139,973 (94.8%)	7,572 (5.1%)

Notes: Unmatched means we did not find the 2016–2017 teacher in Delaware, New Jersey, or Pennsylvania in 2017–2018. Percentages across rows might not sum to 100 because of rounding.

The cross-state movers account for 0.1 percent of 2016–2017 teachers across the three states and 0.5 percent or less of the 2016–2017 teachers in each state (Figure 1). These cross-state mobility rates are roughly comparable to the cross-state mobility rates found in the REL Midwest 2016 study examining mobility among Iowa, Minnesota, and Wisconsin and in the Goldhaber et al. (2015) study examining mobility between Oregon and Washington.[4]

Figure 1 also shows that the percentage of unmatched teachers dwarfs the percentage of teachers who crossed state lines among the three participating states. We estimated that unmatched teachers account for 7.1 percent of 2016–2017 teachers across the three states and range from 5.1 to 9.1 percent of 2016–2017 teachers in each state. Unmatched teachers likely either left the teaching profession or moved to a state other than Delaware, New Jersey, and Pennsylvania. Although some of the unmatched rate might be because of matching errors, the robustness of our results to various matching models suggests that matching errors likely account for a relatively small percentage of the unmatched teachers.

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[4] Goldhaber, D., Grout, C., Holden, K. L., & Brown, N. (2015). Crossing the border? Exploring the cross-state mobility of the teacher workforce. *Educational Researcher, 44*(8), 421–431.

Podgursky, M., Ehlert, M., Lindsay, J., & Wan, Y. (2016). *An examination of the movement of educators within and across three Midwest region states* (REL 2017–185). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest. https://files.eric.ed.gov/fulltext/ED570453.pdf

Figure 1. Percentage of 2016–2017 teachers by 2017–2018 status
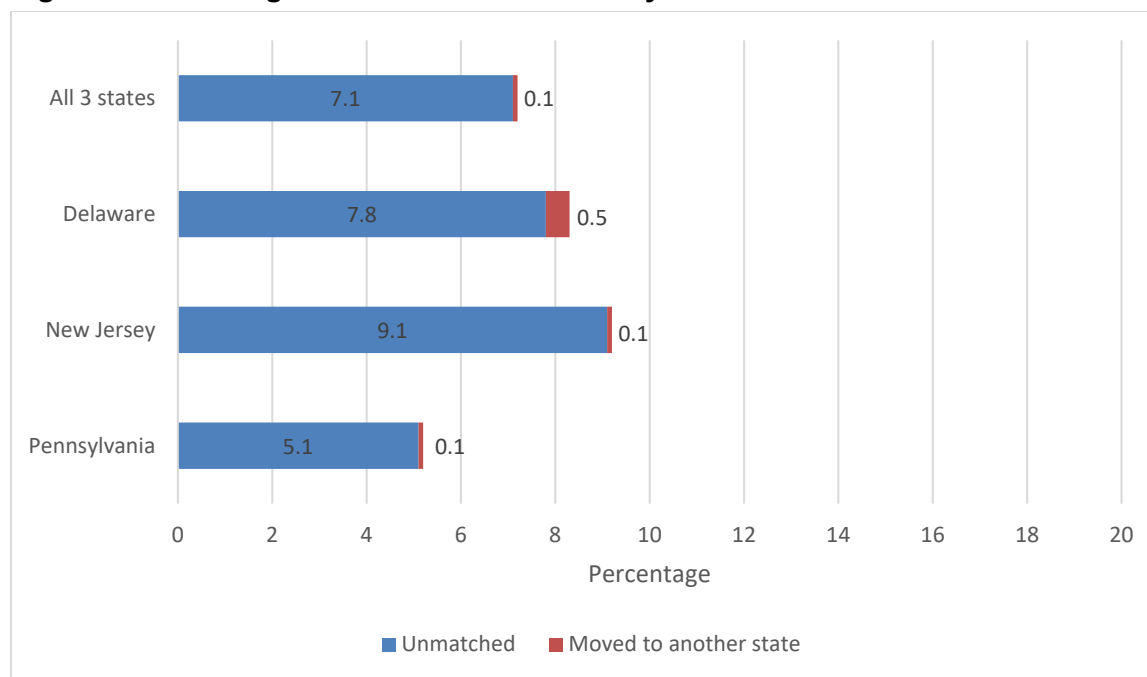
Notes: Unmatched means we did not find the 2016–2017 teacher in Delaware, New Jersey, or Pennsylvania in 2017–2018. N = 295,659 teachers in (8,965 in Delaware, 138,986 in New Jersey, and 147,708 in Pennsylvania).

Conclusion

Although we can obtain pertinent, roughly comparable teacher and school data from Delaware, New Jersey, and Pennsylvania and use the data to track teachers' movement across these states, we believe the extent of cross-state teacher mobility is too low to warrant a full mobility study. The flows of teachers across states are not sufficient to analyze whether cross-state mobility is associated with characteristics of interest to stakeholders (for example, years of teaching experience, student and teacher demographics, school or district high-need status, teacher salaries). Furthermore, reasons for mobility are not currently available for any of the participating states, which means that a full study could not illumine why teachers move. Our conversations with our state agency contacts also suggest that a failure to include all mid-Atlantic states and the states with which they share borders limits the study's usefulness. Securing the participation of all of those states seems unlikely, as only three of the five mid-Atlantic states agreed to provide data for this feasibility assessment. For these reasons, we recommend against studying cross-state mobility in the mid-Atlantic region.

Even in the absence of a full study of cross-state mobility, however, the findings from this feasibility assessment suggest that cross-state teacher movements likely do not play a major role in teacher mobility in the mid-Atlantic states. We found cross-state mobility of one-tenth of 1 percent among the three participating states. Furthermore, our finding that about 7 percent of 2016–2017 teachers in Delaware, New Jersey, and Pennsylvania did not appear as teachers in any of these states in 2017–2018 is consistent with the finding from the most recently available Teacher Follow-up Survey: about 8 percent of public school teachers in the United States left the teaching

profession from 2011–2012 to 2012–2013.[5] The vast majority of the 7 percent unmatched teacher rate likely reflects teachers exiting public school teaching by retiring or working in another profession, rather than teachers moving to teach in a state that did not participate in this feasibility assessment.

The concerns about cross-state teacher movements that motivated this feasibility assessment appear to be largely unfounded. Although their precise concerns about cross-state mobility varied, many training and supporting excellent educators alliance members believed teachers might be leaving their states for higher salaries or better working conditions in other states. Yet the evidence from this examination of mid-Atlantic states, together with studies of northwestern (Goldhaber et al., 2015) and midwestern states (Podgursky et al., 2016), suggests that cross-state teacher mobility is relatively low and unlikely to factor significantly into teacher attrition from stakeholders' states.[6]

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[5] Goldring, R., Taie, S., & Riddles, M. (2014). *Teacher attrition and mobility: Results from the 2012-13 Teacher Follow-Up Survey* (NCES 2014-077). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.

[6] Goldhaber, D., Grout, C., Holden, K. L., & Brown, N. (2015). Crossing the border? Exploring the cross-state mobility of the teacher workforce. *Educational Researcher, 44*(8), 421–431.

Podgursky, M., Ehlert, M., Lindsay, J., & Wan, Y. (2016). *An examination of the movement of educators within and across three Midwest region states* (REL 2017–185). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest. https://files.eric.ed.gov/fulltext/ED570453.pdf