



Michigan Teacher Shortage Study: Initial Report

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DISCLAIMER

The Education Policy Innovation Collaborative (EPIC) at Michigan State University is an independent, non-partisan research center that operates as the strategic research partner to the Michigan Department of Education (MDE) and the Center for Educational Performance and Information (CEPI). EPIC conducts original research using a variety of methods that include advanced statistical modeling, representative surveys, interviews, and case study approaches. This research used data structured and maintained by the MERI-Michigan Education Data Center (MEDC). MEDC data are modified for analysis purposes using rules governed by MEDC and are not identical to those data collected and maintained by the MDE and/or CEPI. Results, information, and opinions solely represent the author(s) and are not endorsed by, nor reflect the views or positions of, grantors, MDE and CEPI, or any employee thereof.

Section One: Introduction

Michigan’s teacher shortage has been a topic of concern and discussion for many years (e.g., Chambers, 2018; Citizen’s Research Council of Michigan, 2019; Mills, Moore, & Keane, 2001; Shakrani, 2008). As in other states, the COVID-19 pandemic amplified concerns about teacher shortages amidst worries that educators would take early retirement or leave the profession during such strenuous times (e.g., Gecker, 2021; Hopkins, Kilbride & Strunk, 2021; Lowe, 2021; WXYZ Detroit, 2021). As state and local policymakers consider how to grow the supply of teachers and attract and retain teachers in their districts and in the state, it is critical that they are able to understand the scope of the shortage to guide actions that ensure schools and districts are fully staffed to best support their students.

PURPOSE OF THIS REPORT

This report is the first in a series of annual reports the Michigan legislature mandated in December 2020 ([2020 PA 316](#)). The Education Policy Innovation Collaborative (EPIC) at Michigan State University prepared this report in collaboration with the Michigan Department of Education (MDE) and the Center for Educational Performance and Information (CEPI). The purpose of this report is to summarize available state administrative data to begin to quantify the shortage, provide a baseline from which future comprehensive data analysis can begin, and most critically, to provide recommendations to policymakers about additional data and data-gathering activities that are necessary for future reports if the state would like to better understand the extent of the teacher shortage across Michigan ([2020 PA 316](#)). We do not provide policy recommendations about ways to address teacher shortages across the state.

In this initial report, we first provide an overview of existing state data that can inform our understanding of Michigan’s teacher shortage, along with the strengths and weaknesses of these data. We note at the outset that the available administrative data does not yet allow us to assess educator staffing in the current school year (2021-22) and in some cases in the prior year (2020-21). We then provide baseline analyses of reported teacher vacancies, teacher retention rates, and enrollment in and completion from approved Michigan teacher preparation programs over the past decade, based on the data available. As they are in many states across the country (see NCTQ [2021] for a complete discussion), these data are limited in scope, as we

will outline in the report. We also examine differences across geographic regions, subject areas, educational settings, demographic groups, and experience levels. Together, these data begin to paint a picture of the teacher shortage across Michigan and highlight where new or better data can help to flesh out details of the shortage and help policymakers target policies and programs in ways that can best help the state and local communities grow their teacher workforces. In the final section, we offer several recommendations for future data collection activities that would allow us to identify, measure, and monitor teacher shortages throughout the state more effectively.

Section Two: Summary of Available State Data

Reports from educators, school and district leaders, and the media provide in-depth evidence of widespread, longstanding teacher shortages throughout Michigan (e.g., Ashcroft, 2021; Barnum, 2021; Lieberman, 2021; Lowe, 2021; Mason, 2021; Rodriguez-Delgado et al., 2021; St. George & Strauss, 2021). However, state administrative datasets often do not capture these patterns, nor do they have the necessary information to identify and monitor shortages. A new report from the National Council on Teacher Quality (NCTQ) shows that Michigan is far from alone in this. While 33 states (including Michigan) report data about the supply of teachers, only 16 report similar data about the demand for teachers (Michigan is not one of the 16). Only two states, Colorado and Illinois, report on teacher shortages by connecting disaggregated supply and demand data (NCTQ, 2021). This makes it difficult if not impossible for a report such as this one to accurately measure the extent of a state's teacher shortage, which is at its core the purpose of the legislation behind this report: to assess what data would need to be collected in order to provide policymakers with a more complete understanding of Michigan's teacher shortage.

There are, however, several existing state administrative data sources that can contribute to the discussion about and understanding of teacher shortages in Michigan. Importantly, these data and the systems used to collect them are not specifically designed to identify or measure teacher shortages. As a result, they provide only a limited amount of information and utility for this purpose. This section provides an overview of currently available and relevant data sources as well as their limitations and identifies areas where expanding or improving an existing data collection process may help provide a deeper understanding of the shortage.

EXISTING DATA SOURCES

Most of the existing data related to Michigan's teacher shortage are collected and maintained by either the Center for Educational Performance and Information (CEPI), a bureau of the State Budget Office, within Michigan's Department of Technology, Management, and Budget, or the Office of Educator Excellence (OEE), an office within

the Michigan Department of Education (MDE). CEPI is the agency responsible for collecting, managing, and reporting education data in Michigan. OEE is tasked with ensuring that all credentialed school personnel have completed the quality preparation and professional development programs the State of Michigan requires. OEE also is responsible for creating and implementing programs that develop Michigan's educator workforce by ensuring that they have adequate tools, training, and support.

Data CEPI Collects and Maintains

CEPI collects data directly from schools and districts through secure online applications; several of the data elements collected through two of these applications, the [Registry of Educational Personnel \(REP\)](#) and the [Michigan Student Data System \(MSDS\)](#), may be useful for studying Michigan's teacher shortage.

Registry of Educational Personnel (REP)

The REP is designed to collect basic employment information about all individuals working in traditional public school (TPS) districts and public school academy (PSA, or charter) districts in Michigan. These datasets serve as the backbone to other State of Michigan agency functions, such as educational personnel background checks and educator appropriate placement auditing. All TPS and PSA districts are required to report these data during two reporting cycles each year in the fall and at the end of the school year. Districts may optionally update the REP data elements between the official fall and end-of-year cycles to reflect staffing changes.

These data include demographic information (e.g., race/ethnicity, gender, age), employment records (e.g., employment status, dates of employment), and details of employees' assignments (e.g., role, location of assignment, content area). Districts are also asked to report information about funded positions that are vacant. Nonpublic schools report a limited subset of these data elements each fall through the Nonpublic School Personnel Report (NPSPR), which is part of the REP system. Longitudinal datasets for researchers contain historical data from past REP collections as early as the 2003-04 school year through the end of the 2020-21 school year, however, some reporting fields and requirements have changed over time.

Michigan Student Data System (MSDS)

MSDS collects student-level data for state and federal reporting, and for funding allocations. Although these data pertain to students rather than teachers, they still may be helpful for studying the teacher shortage. We can use information from the MSDS General Collection to understand the size and characteristics of Michigan's student population, which can in some ways proxy the demand for teachers in particular areas or with particular credentials. Longitudinal student-level datasets

contain historical data from MSDS collections as early as the 2009-10 school year through the 2020-21 end-of-year collection, though some reporting fields and requirements have changed over time. Data from the 2021-22 school year are not yet available.

The Teacher Student Data Link (TSDL) collection within MSDS identifies the teacher of record for each of a student's courses. This level of granularity may allow us to better assess which types of students are most affected by shortages. Although the TSDL collection began in 2010-11, it was reduced to only a subset of students starting in 2015-16. As of 2020-21, it is now once again a required collection for all students. Finally, the Student Transcript and Academic Record Repository (STARR) in MSDS collects student academic records from Michigan community colleges and public universities, which may be useful in examining the teacher pipeline. These data are currently available through the 2020-21 end-of-year collection. Data from the 2021-22 school year are not yet available.

Data OEE Collects and Maintains

OEE collects information about Michigan credentialing and teacher preparation programs. Specifically, OEE maintains the Michigan Online Educator Certification System (MOECS), Michigan Tests for Teacher Certification (MTTC), teacher preparation student teacher rosters, and surveys of student teachers. Title II data are publicly available through the U.S. Department of Education but maintained and compiled through OEE, the MTTC vendor (Pearson), and teacher preparation providers.

Michigan Online Educator Certification System (MOECS)

[MOECS](#) is a secure web-based system that allows educators to apply for and renew their certificates/licenses as well as input and store professional learning hours necessary for certificate/licensure renewal. The system allows schools and districts to apply for temporary credentials, such as substitute teaching permits and special education approvals, for their educators. Additionally, it is used to collect demographic information (e.g., gender, ethnicity, age), educator preparation program records, general postsecondary degree history, and criminal conviction history supporting school safety legislation. MOECS is a rolling database, meaning that data are updated continuously throughout the year and not during specific collection periods. However, CEPI takes snapshots twice a year to coincide with when the REP is collected and includes these data within the datasets provided to researchers for approved studies. These snapshots are currently available for the 2011-12 end-of-year collection and all subsequent collection periods through the end of the 2020-21 school year. Data from the 2021-22 school year are not yet available.

Michigan Tests for Teacher Certification (MTTC)

The MTTC is the licensure test program designed to ensure that each certified teacher has the necessary baseline skills, pedagogical content knowledge, and knowledge of professional responsibilities to serve in Michigan schools, in accordance with preparation standards approved by the State Board of Education. All individuals seeking an initial teaching certificate in Michigan must pass the appropriate test(s) for the subject area(s) of preparation, except those obtaining a professional certificate as set forth in [MCL 380.1531\(6\)](#). MDE receives test scores directly from the Evaluation Systems group of Pearson, including whether the individual passed the test and their scaled scores for each test attempt.

Student Teacher Rosters and Surveys

OEE requires that all student teachers from approved traditional Michigan preparation programs complete a survey at the end of their student teaching experience. The survey asks student teachers questions about their perceptions of preparedness related to areas such as technology for instructional purposes, student learning/assessment literacy, data for instructional purposes and student learning, cultural competency, ethics, collaboration, soft skills, dispositions, and differentiated instruction. To ensure MDE has the correct information about student teachers, the teacher preparation providers provide MDE with a roster of individuals eligible to receive the survey and their corresponding university supervisors and pre-K-12 cooperating teachers.

Title II

Title II reports are publicly available through the U.S. Department of Education. The data file is a culmination of data submitted annually by each state department of education, as well as the teacher certification testing vendor, and state-approved teacher preparation providers. **Per the Higher Education Opportunity Act ([Public Law 110-315](#)), each state department of education and teacher preparation providers are required to provide annual data about the approved teacher preparation programs and identify programs that are low performing or at risk of becoming low performing.** To fulfill these requirements, MDE provides the following:

- narratives with summary information about Michigan-approved preparation programs and the systems in place for preparation and certification,
- overall initial certification within the reporting timeframe, and
- out-of-state initial certification within the reporting timeframe.

Teacher preparation providers are required to annually report data about their programs, including narratives, program enrollment and completion data by subject

area, major, and program area, as well as licensure test participation and results. These data are reported for each institution of higher education (IHE) for both their traditional and alternative routes, as well as for non-IHE-based alternative routes.

Other Data Sources

In addition to the data sources listed above, there are other state departments and national organizations that maintain data that might be useful to understand the scope of teacher shortages in the state. However, not all these data are currently available for research and analysis use.

For example, the Michigan Bureau of Labor Market Information and Strategic Initiatives tracks employment and labor market trends across sectors of the economy. These data would enable comparisons across industries and may allow for statewide identification of employment postings pertaining to the pre-K-12 education system, and more importantly to this body of work, specific teacher vacancies within the state. This is unlikely a complete data source, but it could enhance our understanding of recruiting patterns. Similarly, the Michigan Office of Retirement Services collects data on years of service, salary, retirement eligibility, and retirement rates for public school employees. Internally, MDE's Office of Career and Technical Education collects data about participation in programs for students who are exploring teaching as a future career path; these data may be helpful in examining an earlier stage of the teacher pipeline.

National sources like the U.S. Census Bureau and the National Center for Education Statistics (NCES) may also be helpful for filling in some gaps in our data-driven knowledge of the teacher shortage. For instance, these federal datasets include estimates of retirement rates by industry and comparable financial data across geographic areas.

STRENGTHS AND LIMITATIONS OF THE DATA

There are many strengths to these data, as they provide valuable insights into both the supply and demand of teachers in Michigan. However, there are several caveats about the data's usefulness that are worth noting. In this subsection, we briefly review the strengths and weaknesses of the available data for quantifying the supply and demand for teachers in Michigan. We also note that, although most of these datasets are available through the end of the 2020-21 school year, conditions can change very quickly within a district, and these data may not fully reflect the state of teacher shortages today. In particular, the COVID-19 pandemic has substantially challenged school and district staffing, as is evidenced by the many media reports and narratives

from school and district leaders decrying the lack of teachers and other school staff needed to provide school and district services. The available administrative data do not enable us to examine educator staffing during this highly impacted school year.

Supply of Teachers

The data from MOECS allow us to understand how many individuals are credentialed to teach in Michigan schools and the areas in which they can be legally employed. When paired with the REP data, it is possible to determine how many of these individuals are teaching in Michigan public schools. However, there is little understanding of how many of the remaining teachers are available to fill vacancies, as many of them may be employed in other contexts (e.g., teaching in a nonpublic school, employed as a school administrator, or out-of-state), or have chosen to pursue a different profession entirely.

Through the REP, we can examine employment patterns to identify teachers leaving the profession, but we lack information about why they are leaving or even where they go (i.e., teaching outside of the state, retiring, pursuing a different profession). Although districts are asked to indicate an exit reason for any individual who is no longer actively employed when the data are reported, districts do not always have accurate knowledge or documentation of these reasons. While districts likely know whether a teacher retires or their position is eliminated, teachers may not always disclose the exact reason why they are leaving, and it is difficult to validate this information.

Finally, we can study the future pool of potential teachers at various points in their path to becoming an educator, including: exploration of the teaching profession through a Career and Technical Education (CTE) program, enrollment in a postsecondary teacher preparation program, placement as a student teacher, receipt or renewal of a teaching credential, and finally, employment in the state public school system. Although there are ongoing efforts to create shared identifiers across the data systems that capture information from these different stages, it is not yet feasible to connect data about teachers to past data from their time as a student. This limits our ability to study the trajectories of potential teachers.

Demand for Teachers

The demand for teachers is substantially more difficult to capture from the data sources available. Although the REP allows districts to report vacant positions, the number of reported vacancies does not align with other evidence of vacant positions, suggesting that this reporting option is heavily underutilized. The reporting options in the REP are also limited to *funded* vacancies, and therefore do not capture any

information about unfilled positions that are not funded. Another complicating factor is the timeframe for reporting these data. The REP is designed to capture two point-in-time snapshots each year, which may result in missing information about positions that were vacant for part of the year but not vacant as of the collection date.

Long-term substitute teachers further muddle our understanding of the demand for K-12 public school teachers. We can use MOECS data to identify individuals with full-year teaching permits or other types of temporary credentials, and we can use REP data to identify the districts where these individuals were employed. However, EPIC researchers have found some evidence from educator surveys and qualitative work suggesting that districts might be misusing daily substitute teaching permits and misreporting daily substitute assignment codes for educators who are filling teaching assignments on a longer-term basis. We cannot distinguish between these educators and substitute teachers who are filling assignments on a more intermittent basis in the administrative data, nor can we determine the prevalence of this problem.

SUMMARY

There are multiple Michigan and national data sources that already provide some information about the extent of the current teacher shortages in the state and even in looking forward. However, there are gaps in these data that constrain state policymakers from painting a complete picture of Michigan's teacher shortage. This has long been the case, but is even more so during the current tumultuous school year. While some of these gaps are due to important data points that are not collected or only collected on a limited basis, many are due to underutilization and misuse or misrepresentation of current reporting mechanisms.

Section Three: Baseline Metrics

As we discussed in the previous section, the existing and available state data related to vacancies, teacher retention, and teacher preparation can provide only a limited picture of teacher shortages in Michigan both because of their scope and the lag in data availability. This section provides an overview of the trends we observe in these data, along with a discussion of the ways in which our analyses are limited by the type, coverage, and quality of data available.

These analyses are intended to serve as a baseline from which future comprehensive reports will begin. Future comprehensive reports, which are due to the Governor and chairs of the Senate and House of Representatives standing committees responsible for education legislation on January 1st of each year starting in 2023, include the following legislative requirements:

- a. *“The number of educator vacancies in this state, disaggregated by geographic region and by any broad subject areas and educational settings required for those vacancies.”*
- b. *“The educator retention rates in this state, disaggregated by geographic region, broad subject areas and educational settings, number of years in the profession, and educator demographics.”*
- c. *“The number of graduates from approved, in-state teacher preparation programs, disaggregated by the broad subject areas and educational settings of those graduates, if any.”*
- d. *“An analysis of the regions in this state that present the highest need for educators based on educator shortages in those regions, disaggregated by the broad subject areas and educational settings of the positions in which there are shortages in those regions.”*

To the extent possible with the data available, we address each of these same topics in this initial report. However, we stress that these analyses cannot show the full

picture. Moreover, these analyses focus mostly on pre-pandemic trends, and do not fully reflect all of the new and worsening challenges that schools and educators are facing today (Will, 2021). Thus, we do not consider this a complete or current assessment of Michigan's teacher shortage. In the final section of this report, we offer several recommendations to improve and expand on the available data that would allow us to analyze these topics more thoroughly in the future.

DATA SOURCES & DEFINITIONS

The analyses that follow draw primarily from REP and MOECS. For some calculations, we also use student enrollment data from annual fall MSDS collections, publicly available postsecondary teacher preparation program data from Title II reports, or [geographic region definitions](#) the state developed as part of the [Regional Prosperity Initiative](#). We identify categories of assignments, credential types, broad subject areas, and educational settings using definitions that MDE and/or CEPI developed and use for other reporting purposes.

Except where otherwise noted, we focus our analyses on teachers who were actively employed in the state public school system as of the official student count day for a particular reporting period (the 1st Wednesday of October for fall reporting and the 2nd Wednesday in February for spring reporting). We consider the "state public school system" to include all TPS districts, PSAs, intermediate school districts (ISDs), and state-run schools or unique education providers. We exclude teachers whose assignments are in a nonpublic school or non-instructional ancillary facility, as well as assignments in an early childhood, adult education, or summer-only migrant program setting. We include only those reported in the REP with a teaching assignment (as defined by MDE; this definition does not include daily substitute teaching assignments) with a reported Full Time Equivalency (FTE) greater than zero. In our analyses of teachers' credential data, we include all credentials that were valid at the time of reporting or expired within the reporting period.

Metrics of Interest

EPIC, MDE, and CEPI collaborated to identify a list of metrics of interest based on the requirements in the legislation for future comprehensive reports, the data readily available for the initial report, and a review of resources and reports from other states related to teacher shortage. EPIC researchers consulted with data experts from MDE and CEPI before determining the specific definitions, rules, and calculation methods for each of these metrics. Where appropriate, we align our definitions as closely as possible with similar calculations that MDE and/or CEPI have published in other reports. However, in some cases, EPIC developed slightly different definitions to tailor

our analyses to address the specific topics of interest for this report. As we discuss each metric throughout this section, we note any known differences between our definitions and those that appear in other state reports.

Vacancy Metrics

Although districts can report both filled and vacant positions in the REP, we do not believe that the vacant positions reported in this manner accurately reflect the true number of vacancies in the state. MDE and CEPI have previously identified discrepancies between media coverage and reporting of vacant positions. Similarly, EPIC examined these data for a set of high-profile districts across the state with reported vacancies in the media, and we find wide discrepancies between media reports and vacancy numbers reported in the REP. Because an accurate vacancy measure would be highly useful in quantifying the teacher shortage, we still present data on district-reported vacancies to highlight discrepancies. In addition, we examine other related metrics to provide a more nuanced assessment. These additional metrics include ratios of student enrollment to full-time equivalent teaching assignments filled by permanent employees, the number of unique educators employed in a teaching assignment with a temporary teaching credential, and alignment between teachers' subject area endorsements and teaching assignments.

1. **Filled and vacant full-time equivalent teaching assignments.** We use the funded position statuses that districts reported in the REP to categorize teaching assignments as “permanently filled” or “vacant,” and to identify subsets of vacancies as temporary or permanent, and as temporarily filled or unfilled. Specifically, we use the following definitions in our analyses of filled and vacant FTE teaching assignments:
 - **Permanently filled:** The position is filled by a permanently assigned employee.
 - **Temporary vacancy — temporarily filled:** The position is temporarily assigned to a substitute, temporary employee, or outside contractor while the permanent employee who is normally assigned to the position is on leave or on loan.
 - **Temporary vacancy — unfilled:** The position is normally assigned to a permanent employee who is on leave or on loan and no one has been assigned to fill their position until they return.
 - **Permanent vacancy — temporarily filled:** The position has been posted but has not been filled and a substitute, temporary employee, or outside contractor is assigned to fill it on a temporary basis.
 - **Permanent vacancy — unfilled:** The position has been posted but has not been filled and no one is assigned to fill it on a temporary basis.

We calculate the total teaching FTE by adding the district-reported FTE across all teaching assignments in a particular category. Because we weight these totals proportionally to the reported FTE for each assignment, our totals are lower than those based on counts of unique teachers (which give equal weight to full-time and part-time teaching assignments) or counts of unique teaching positions (which may count the same person multiple times if they have more than one assignment or work for more than one district).

- 2. Ratio of student enrollment to permanently filled, full-time equivalent teaching assignments.** To interpret trends in the size of Michigan's teaching workforce over time, we also need to consider how they correspond to trends in student enrollment. Trends in the ratio of students to teachers tell us whether these two metrics are changing at the same rate (i.e., are decreases in the size of the teaching workforce proportional to decreases in student enrollment?). These ratios should not be interpreted as average class sizes, as these ratios do not consider factors such as teachers' preparation periods, differences between classroom-based teachers and other types of specialists or interventionists, or classrooms with more than one teacher. Rather, we interpret these ratios as an indicator for whether the overall number of teachers is changing at a different rate than the number of students.

We calculate this ratio by dividing the statewide fall student enrollment for each year by the total FTE across permanently filled, full-time equivalent teaching assignments (as defined above). We focus on permanently filled assignments only, as this allows us to capture both situations where districts increasingly rely on temporary employees to fill teaching assignments, and situations where districts struggle to fill teaching assignments with any type of employee. Although our calculations are based on student headcounts, we arrive at very similar ratios to the pupil-to-teacher ratios reported on the [Michigan's Education Staff](#) display on MI School Data (which are based on student FTE).

We calculate ratios first based on all teaching assignments and then for core academic teaching assignments only. We identify "core academic" teaching assignments using a definition MDE and CEPI developed to fulfill state and federal reporting requirements. Under this definition, "core academic" assignments include language arts, English, reading, mathematics, social studies, economics, geography, history, political science, biology, chemistry, physics, geology-earth science, integrated science, physical science, astronomy, world languages, music education, visual art,

theatre/performance, special education classrooms where all students are assessed by alternate achievement standards, and self-contained elementary, alternative education, and speech/language impaired classrooms.

- 3. Teachers with temporary credentials.** We use counts of *unique educators* who both hold a temporary credential (i.e., a full-year substitute teaching permit, extended daily substitute teaching permit, annual career authorization, or special education approval) and are actively employed with a teaching assignment. These counts, by definition, are lower than the counts of *temporary credentials issued* in OEE's annual [Educator Workforce Reports](#), as more than one credential can be issued to the same person. We do not include daily substitute teaching permits in these counts (however, as we noted above, we do include *extended* daily substitute teaching permits, which allow an educator to cover a teaching assignment for a longer period than a daily substitute teaching permit).

- 4. Appropriate placement of core academic general education teachers.** We categorize all permanently or temporarily filled teaching assignments based on the credentials of the employee filling the assignment. Specifically, we consider whether the employee has a teaching certificate and/or a temporary teaching credential, and whether they have an appropriate endorsement for their assignment. We then calculate the appropriate placement rate as the total FTE across assignments filled by an appropriately placed teacher divided by the total FTE across all filled teaching assignments (i.e., all teaching assignments except unfilled vacancies).

We identify appropriate combinations of assignment codes and endorsement codes using the same definitions that CEPI and MDE developed and used for their reports. However, we focus on general education, core-academic teaching assignments only, as some non-core academic assignments require additional credentials that are not captured in the datasets available to researchers. We identify "general education" teaching assignments based on the educational settings that districts report for each assignment in the REP. These include all the assignments we listed in the definition of "core academic" assignments, except two that are specific to special education settings (special education classrooms where all students are assessed by alternate achievement standards and self-contained speech/language impaired classrooms).

Teacher Retention Metrics

To capture different aspects of teacher retention, we examine the rates at which teachers enter or exit the teaching profession, the rates at which they transfer to other districts or to other schools within the same district, and the rates at which they renew or progress their teaching certificates.

1. **Educators entering and exiting the teaching profession.** We compare fall-to-fall changes in educators' employment within the state public school system to identify individuals entering or exiting the teaching profession each year. We define educators "entering the teaching profession" as those with teaching positions in the fall of a given year who were not teaching the prior fall. We define educators "exiting the teaching profession" as those who are not teaching in the public school system in the fall of a given year but were teaching the prior fall. Because these definitions are based only on two consecutive years, some "enterers" may have worked as teachers in earlier years, and some identified as "exiting" may have returned to teach in a later year. Similarly, support staff and other personnel who transition to a teaching role are considered "enterers" under this definition, while teachers who transition to other roles (e.g., teachers who become administrators) are classified as having exited the profession. We also examine patterns among some of these subsets of teachers who entered or exited the profession.
2. **Within- and between-district transfers.** We define a within-district transfer as a change in an individual's assignment as a teacher working in a single building one fall to a teaching assignment in a different, single building in the same district the next fall. Similarly, we define a between-district transfer as a change in an individual's assignment as a teacher working in a single district one fall to a teaching assignment in a different, single district the next fall.
3. **Teaching certificate renewal/progression.** We use the term "recertification" to encompass all teachers who either renew their certificates upon expiration or progress to a more advanced certificate. We calculate the recertification rate as the number of unique educators with expiring teaching certificates who renew or progress to a more advanced teaching certificate no later than one year after their certificate expired, divided by the total number of unique educators with expiring teaching certificates.

Teacher Preparation Metrics

In addition to trends in postsecondary teacher preparation program enrollment and completion from Title II reports, we also examine district-reported student teacher

and teaching intern assignments, and the number of initial teaching certificates issued each year to provide additional information about teacher preparation.

1. **Enrollment in and graduates from postsecondary teacher preparation programs.** The counts we present are identical to the completer and enrollment counts from publicly available Title II reports. Completers are a subset of total enrollment. These counts align closely with public reports derived from other postsecondary data sources (e.g., the [College Degrees and Certificates Awarded](#) report on MISchoolData, which uses data from CEPI's Student Transcript and Academic Record Repository [STARR] collection).
2. **District-reported student teacher and teaching intern placements.** We calculate the number of unique individuals reported in the REP with a student teacher or teaching intern assignment code at any time within a given school year. However, we note that there are far fewer educators reported with these assignments than there are teacher candidates completing traditional Michigan teacher preparation programs each year. This raises concerns about possible underreporting.
3. **Teachers issued an initial certificate.** We consider the first standard, standard CTE, interim, or temporary teacher employment authorization (a certificate issued to out-of-state teacher candidates who already met most requirements for a Michigan certificate; recently renamed "temporary teaching certificate") an individual receives to be their "initial certificate." Our counts capture all initial certificates with issue dates falling between September 1st of the fall calendar year and August 31st of the spring calendar year of a given school year. We calculate these as counts of *unique educators* issued an initial teaching certificate; these are lower than counts of *all initial teaching certificates* issued because some educators received more than one initial teaching certificate at the same time (e.g., both a standard teaching certificate and a standard CTE certificate).

RESULTS

Vacancies

Table 3.1 shows the number of full-time equivalent teaching assignments, both those that are filled by a permanent employee and those that are vacant, as of the fall count day of each school year. Notably, districts report very few vacant positions (about one per district on average). Thus, we believe that this finding is a result of underreporting and not a true reflection of the number of vacant teaching positions in Michigan.

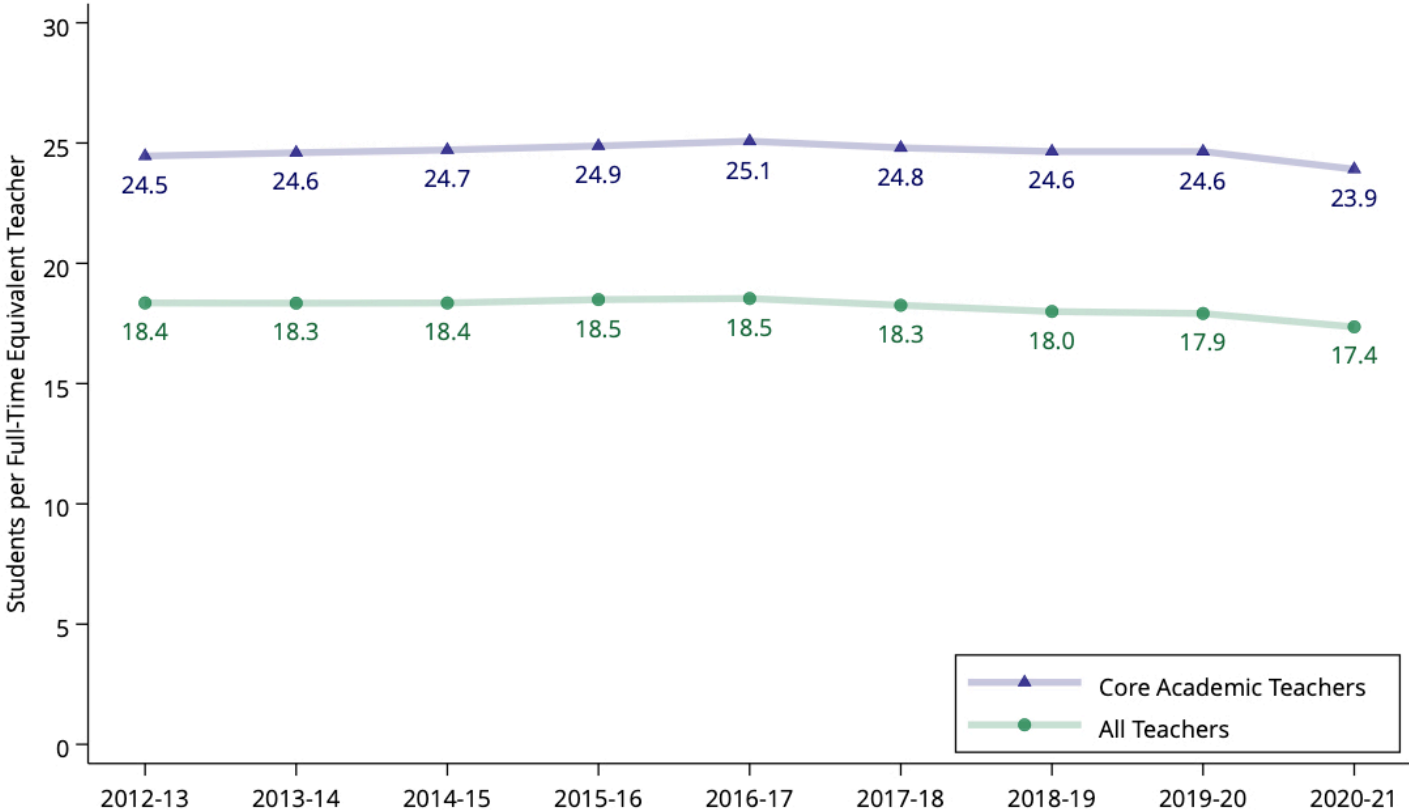
Table 3.1 also shows a decreasing trend in permanently filled, FTE teaching assignments over the last several years. Student enrollment also decreased over this period. As Figure 3.1 shows, the ratio of student enrollment to FTE teachers has remained quite consistent over time, with a slight decreasing trend over the past five years. This suggests that the number of FTE teachers has declined at a slightly slower rate than has student enrollment. Nonetheless, the average student to FTE teacher ratio has remained relatively consistent over the last decade, at approximately 17 to 18 students per teacher. Although the ratio is somewhat higher after excluding non-core academic teaching assignments (about 24 students per core academic teacher), the trend over time is still consistent and just slightly decreasing in recent years. As we noted earlier, this tells us that both the size of the teaching workforce and the number of students in the state have been changing at roughly the same rate. However, this does not tell us whether the number of teachers is sufficient to meet student needs or how many students are in a typical classroom, only that the total number of teachers has changed proportionally to the number of students.

To compare trends across regions of the state, we focus on the ratios for core academic teachers only, as these individuals are more likely to be classroom-based teachers as opposed to other types of educators like guidance counselors and librarians. Figure 3.2 shows the ratios of student enrollment to permanently filled, full-time equivalent, core academic teaching assignments separately for each of Michigan's 10 prosperity regions. Across all regions and years, the ratios are always between 20 and 25, though we do see some variation within this range across the different regions. Across all years, the ratios of student enrollment to permanently filled, FTE, core academic teaching assignments are consistently lowest in the Upper Peninsula region. Although the ratios are consistently highest in the Detroit Metro and East Michigan regions, they have been improving slightly (i.e., getting smaller) over the last few years.

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Permanently Filled	84,263	83,654	82,716	81,277	80,565	81,179	81,763	81,665	80,825
Vacant (*likely underreported)	498	558	590	541	598	1,020	801	599	875
<i>Temporary Vacancy — Temporarily Filled</i>	384	419	400	354	413	507	397	348	439
<i>Temporary Vacancy — Unfilled</i>	31	27	71	77	61	42	61	45	53
<i>Permanent Vacancy — Temporarily Filled</i>	59	76	82	82	87	441	286	117	244
<i>Permanent Vacancy — Unfilled</i>	24	36	37	28	37	30	57	89	139

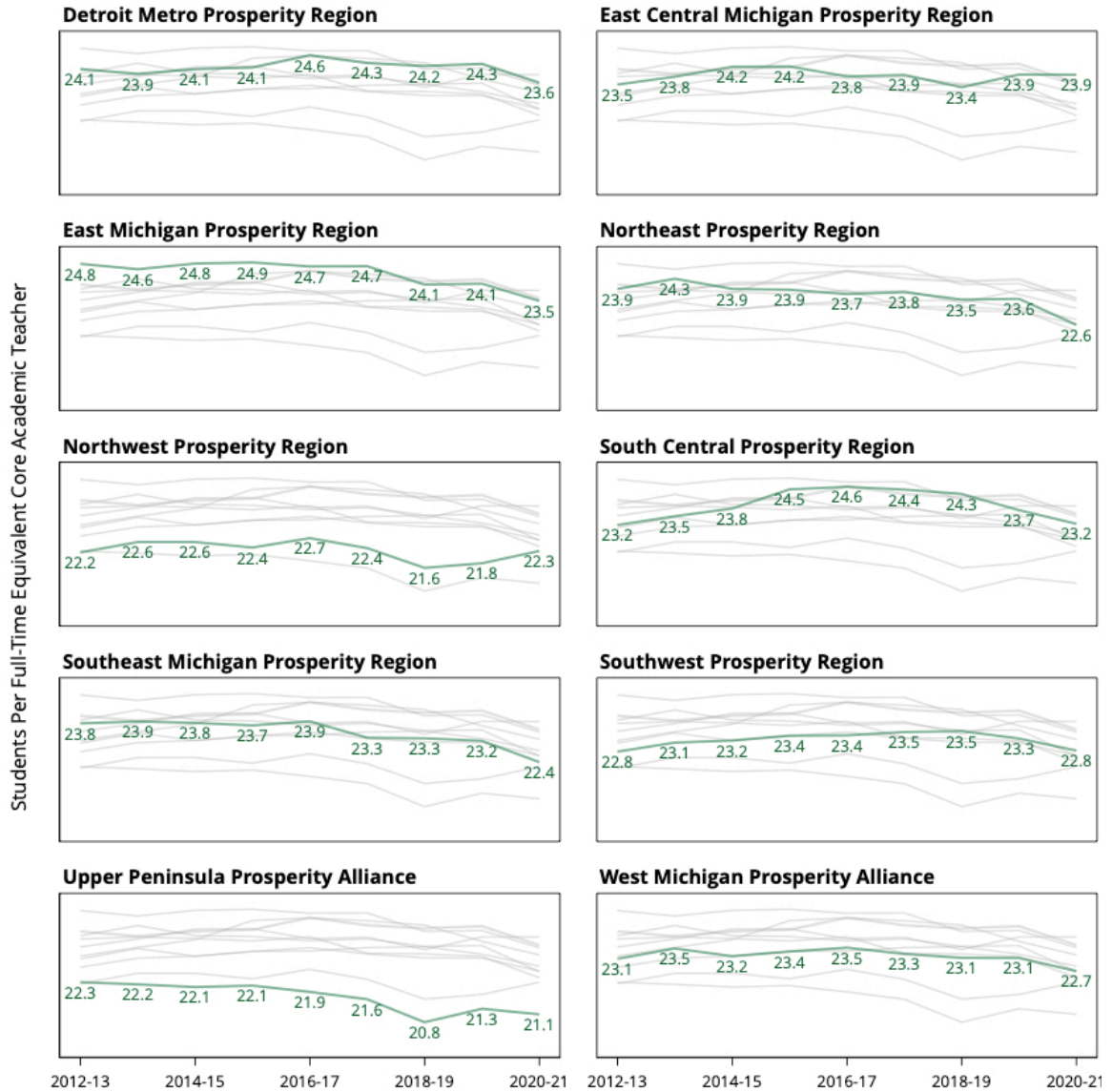
Notes: FTE sums are rounded to the nearest whole number. “Permanently Filled” assignments include those reported in the fall REP collection with funded position status code 9 (“Filled position, regular: The position is filled by a permanently assigned employee.”). The “Temporary Vacancy” categories include positions reported as “Funded, employee on loan or leave,” while the “Permanent Vacancy” categories include those reported as “Vacant, funded, open position. The position is unfilled by a permanent employee at the time of the report, and the position is posted.” Vacancies are considered “Temporarily Filled” if they are reported with a funded position status code indicating that either a temporary employee or outside contractor is assigned to the position. Vacancies are classified as “Unfilled” if they are reported with a funded position status code indicating that “no one is assigned to fill the position.”

Figure 3.1. Statewide Ratio of Students Enrolled to Full-Time Equivalent Teachers (Fall)



Notes: Fall student enrollment is based on statewide enrollment counts from the MISchoolData student count reports from 2012-13 to 2020-21. The number of FTE teachers is calculated as the sum of FTEs across all fall teaching assignments filled by permanent employees. The blue triangles represent ratios of student enrollment to FTE core academic teaching assignments, while the green circles represent ratios of student enrollment to all FTE teaching assignments.

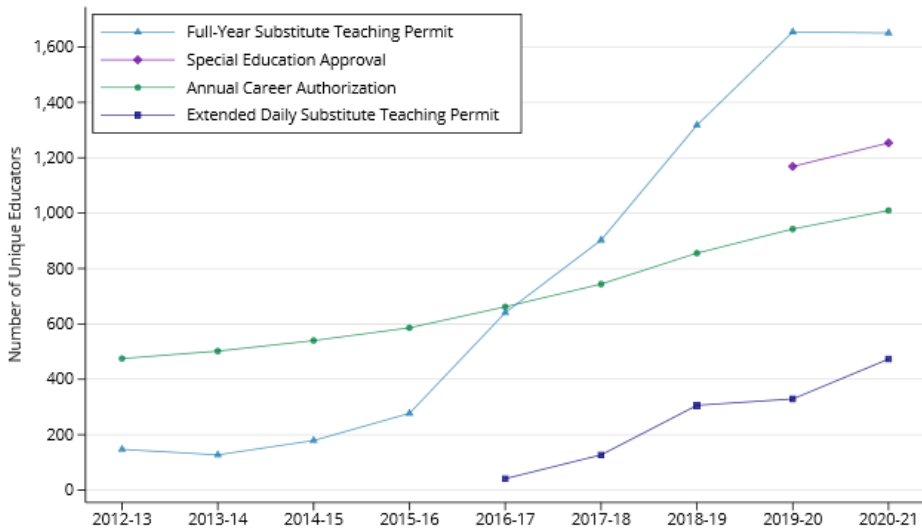
Figure 3.2. Ratio of Students Enrolled to Full-Time Equivalent Core Academic Teachers by Prosperity Region (Fall)



Notes: The grey lines in this figure represent the trends for all regions except the focal region, which is represented in green. This is intended to show where the focal region falls relative to other regions in the state, while highlighting the trends for each individual region separately. Map of prosperity regions for reference: https://www.michigan.gov/documents/dmb/Prosperity_Map1_430346_7.pdf

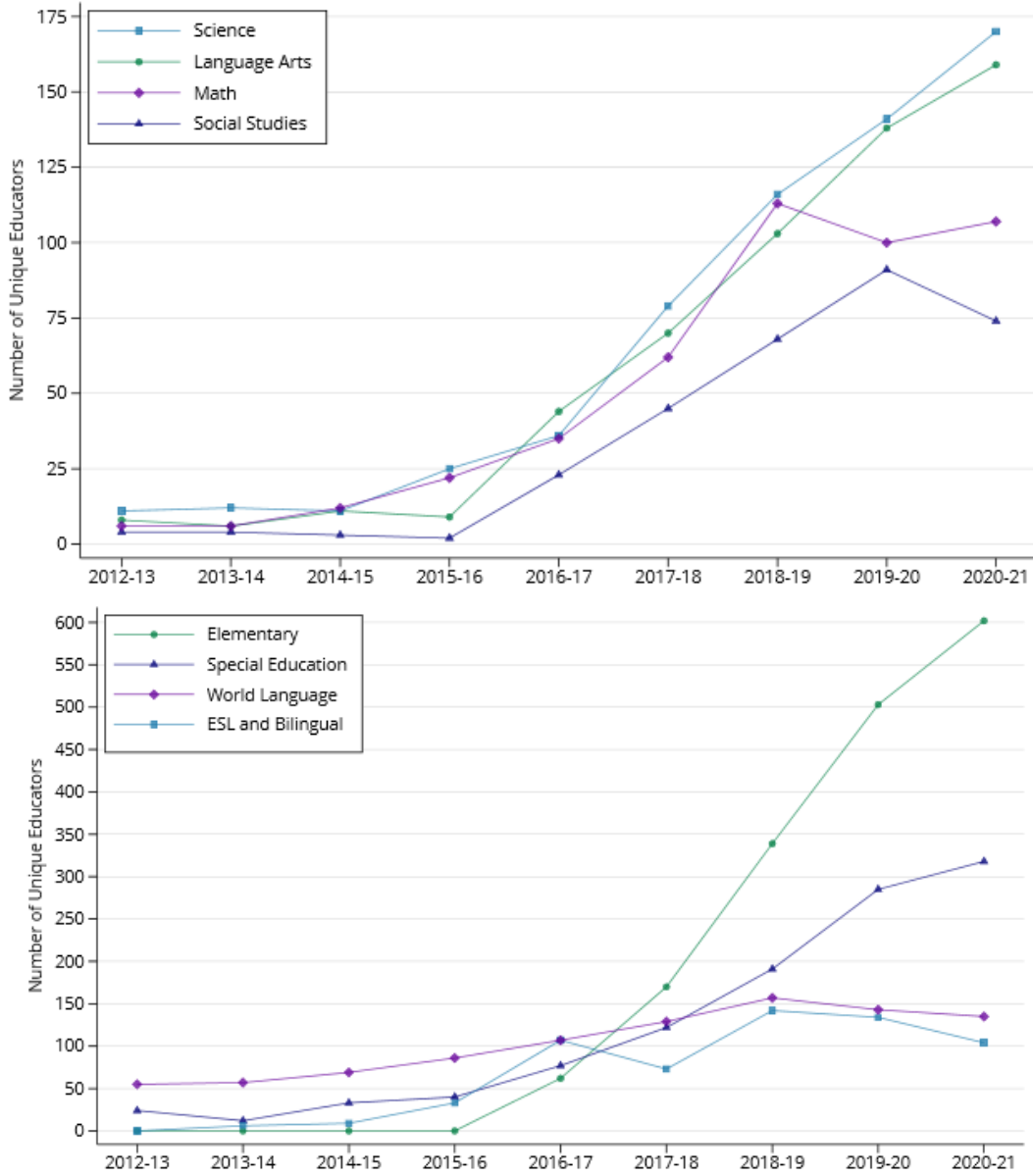
On the other hand, Figure 3.3 shows consistent increases in the number of educators employed with full-year substitute teaching permits, extended daily substitute teaching permits, and annual career authorizations. We note that the increases in the number of teachers with full-year substitute teaching permits began after the 2015-16 school year, when the permit system was restructured to include new types of full-year permits and extensions to the daily substitute teaching permit. Figure 3.4 shows trends in the number of employed educators with full-year or extended daily substitute teaching permits by endorsement area. We see particularly acute increases in the number of permit-holders with elementary and special education endorsements, and somewhat larger increases in permit-holders with science and language arts endorsements than for math and social studies.

Figure 3.3. Individuals with Temporary Teaching Credentials



Notes: The permit system was restructured in 2016. All data points represent counts of unique educators with a particular type of credential who were actively employed with a teaching assignment. Educators with more than one type of temporary teaching credential are included in the counts for each type of credential they hold. Green circles represent educators with annual career authorizations; light blue triangles represent educators with full-year substitute teaching permits; dark blue squares represent educators with extended daily substitute teaching permits; and purple diamonds represent with special education approvals. At the time of the analysis, special education approval data were only available for the end-of-year 2020 collection and after.

Figure 3.4. Educators with Full-Year or Extended Daily Substitute Teaching Permits by Subject Area



Notes: The permit system was restructured in 2016. Each line represents the number of unique, actively employed educators with full-year or extended daily substitute teaching permits in a given subject area. In the top panel of the figure, light blue squares represent holders of teaching permits with science endorsements, green circles represent language arts, purple diamonds represent math, and dark blue triangles social studies. In the bottom panel, green circles represent elementary, dark blue triangles special education, purple diamonds represent world languages, and light blue squares represent ESL and bilingual endorsements.

Viewed on their own, these trends might appear to suggest an increasing need to fill teaching positions with less-than-fully-credentialed educators. However, the number of educators with temporary teaching credentials far outnumbers educators temporarily assigned to fill vacant teaching positions shown in Table 3.1, implying that most of the educators with temporary teaching credentials are considered (or at least reported as) permanent employees. These educators likely include some permanent employees who are actively working toward a teaching credential (e.g., through a [“grow-your-own” program](#)) or covering a teaching assignment outside their endorsement area in addition to their regular, permanent assignment, as well as some who simply are not reported properly by districts. Unfortunately, we cannot distinguish between these two types of individuals with the currently available data.

By comparing educators’ credentials to their teaching assignments, we can gain some insight into what these temporary credential trends might mean for students and classrooms. Table 3.2 shows the percentage of all filled, FTE, core academic, general education teaching assignments filled by educators with and without teaching certificates, as well as the percentages with and without appropriate subject area endorsements for their assignments. These percentages do not include unfilled vacancies in the total core academic teaching FTE for each year, however, we know from Table 3.1 that unfilled vacancies only account for a fraction of a percent of all FTE teaching assignments each year. By combining the top two rows of Table 3.2, we see that about 98% of all filled, FTE, core academic teaching assignments are filled by a certified teacher. The top row shows that about 93% are filled by a certified teacher with an appropriate endorsement for the assignment. For brevity, we refer to the educators filling these assignments as “certified and endorsed” or “certified and appropriately placed” teachers.

Figure 3.5 shows the statewide trend in assignments filled by certified and endorsed teachers from Table 3.2, along with the range of percentages across each of Michigan’s 10 prosperity regions. As the figure shows, across all years and prosperity regions, the percentage of assignments filled by certified and endorsed teachers always falls between 91% and 97%. In Figure 3.6, we zoom in to examine variation in regional trends. However, we note that all regional rates and trends fall within the very narrow range shown in Figure 3.5. Thus, even the largest gaps between regions and the largest changes in regional rates over time that we observe in Figure 3.6 are small in terms of percentage points.

Figure 3.6 shows some variation in region-specific trends within this narrow range. For instance, the percent of assignments filled by a certified and endorsed teacher tends to be lowest for the Upper Peninsula region and highest in the Northeast region. Although, as we saw in Figure 3.2, there are more teachers employed per student

enrolled in the Upper Peninsula compared to other regions of the state, teachers in this region are the least likely to be appropriately placed in assignments for which they are certified and endorsed. In other words, although there are more teachers employed relative to the number of students enrolled, Upper Peninsula districts may be struggling to find teachers who are endorsed in the subject areas they need most.

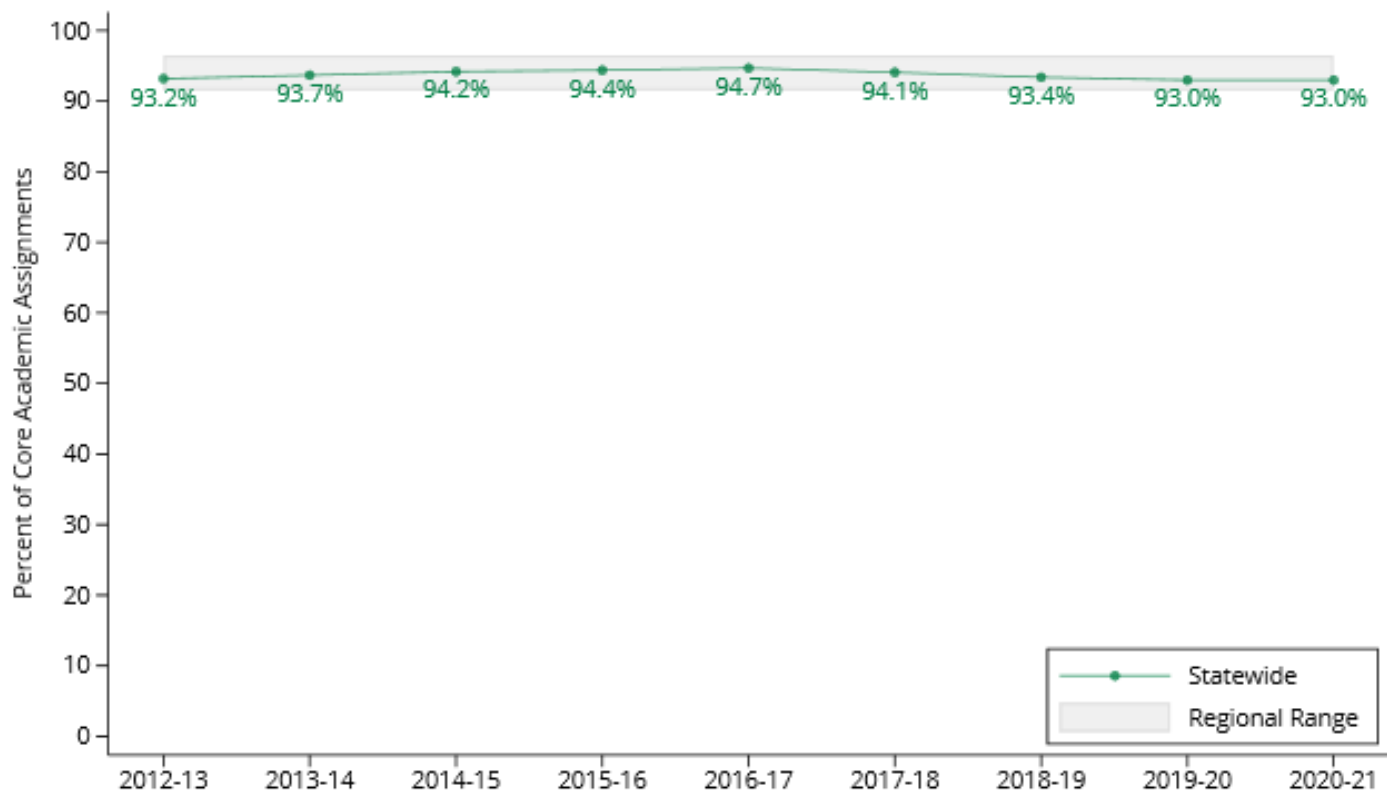
We see increasing trends across the full nine-year period in the Northwest and West Michigan regions, while the East Central, East Michigan, South Central, and South Michigan regions experienced increasing trends for the first few years, followed by decreasing trends. The Detroit Metro region, which had one of the highest percentages of certified and appropriately placed teachers in 2012-13, experienced the most substantial decreases of any region in the state. By 2018-19, the Detroit Metro region had the lowest share of core academic assignments filled by a certified and endorsed teacher.

Table 3.2. Appropriate Placement of Core Academic General Education Teachers

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Certificate with appropriate endorsement	93.2%	93.7%	94.2%	94.4%	94.7%	94.1%	93.4%	93.0%	93.0%
Certificate without appropriate endorsement	6.4%	6.1%	5.7%	5.3%	4.9%	5.1%	5.2%	5.2%	5.3%
Permit with appropriate endorsement	0.0%	0.1%	0.1%	0.1%	0.2%	0.4%	0.7%	1.2%	1.2%
Permit without appropriate endorsement	0.0%	0.0%	0.1%	0.0%	0.1%	0.3%	0.4%	0.4%	0.4%
No certificate or permit found	0.3%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%

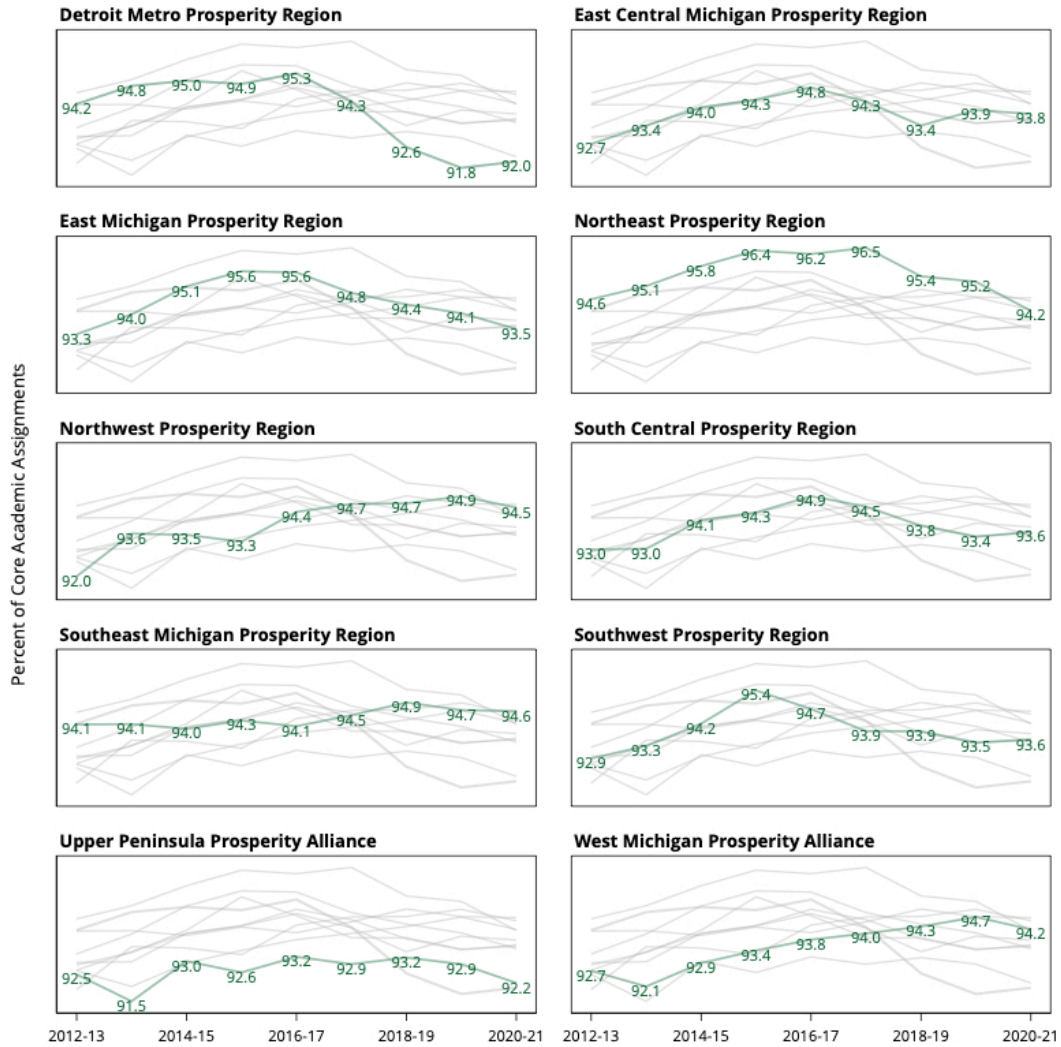
Notes: Percentages are based on all filled, core academic, general education teaching FTE assignments reported in the fall a given school year. We focus on core academic teaching assignments because some non-core assignments (e.g., JROTC, Driver's Ed) require different types of credentials that are not captured in the researcher data files. We focus on general education because the researcher data files only include special education approvals for the 2020 end-of-year collection and after. Unfilled vacancies are not counted toward the total core academic, general education, teaching FTE for each year.

Figure 3.5. Appropriate Placement of Core Academic General Education Teachers, Statewide and Regional



Notes: The green line represents the statewide trend. The shaded grey area represents the range of appropriate placement rates across all prosperity regions and years. Percentages are based on all core academic teaching FTE in the fall a given school year. We focus on core academic teaching assignments, as some non-core assignments (e.g., JROTC, Driver's Ed) require different credentials that are not yet captured in the researcher data files. We focus on general education because special education approval data are not yet available before the 2020 end-of-year collection.

Figure 3.6. Appropriate Placement of Core Academic General Education Teachers by Prosperity Region



Notes: Percentages are based on all core academic teaching FTE in the fall a given school year. We focus on core academic teaching assignments, as some non-core assignments (e.g., JROTC, Driver's Ed) require different credentials that are not yet captured in the researcher data files. We focus on general education because special education approval data are not yet available before the 2020 end-of-year collection. The grey lines represent the trends for all regions except the focal region, which is represented in green. This shows where the focal region falls relative to other regions in the state, while highlighting the trends for each individual region separately. Reference map: https://www.michigan.gov/documents/dmb/Prosperity_Map1_430346_7.pdf

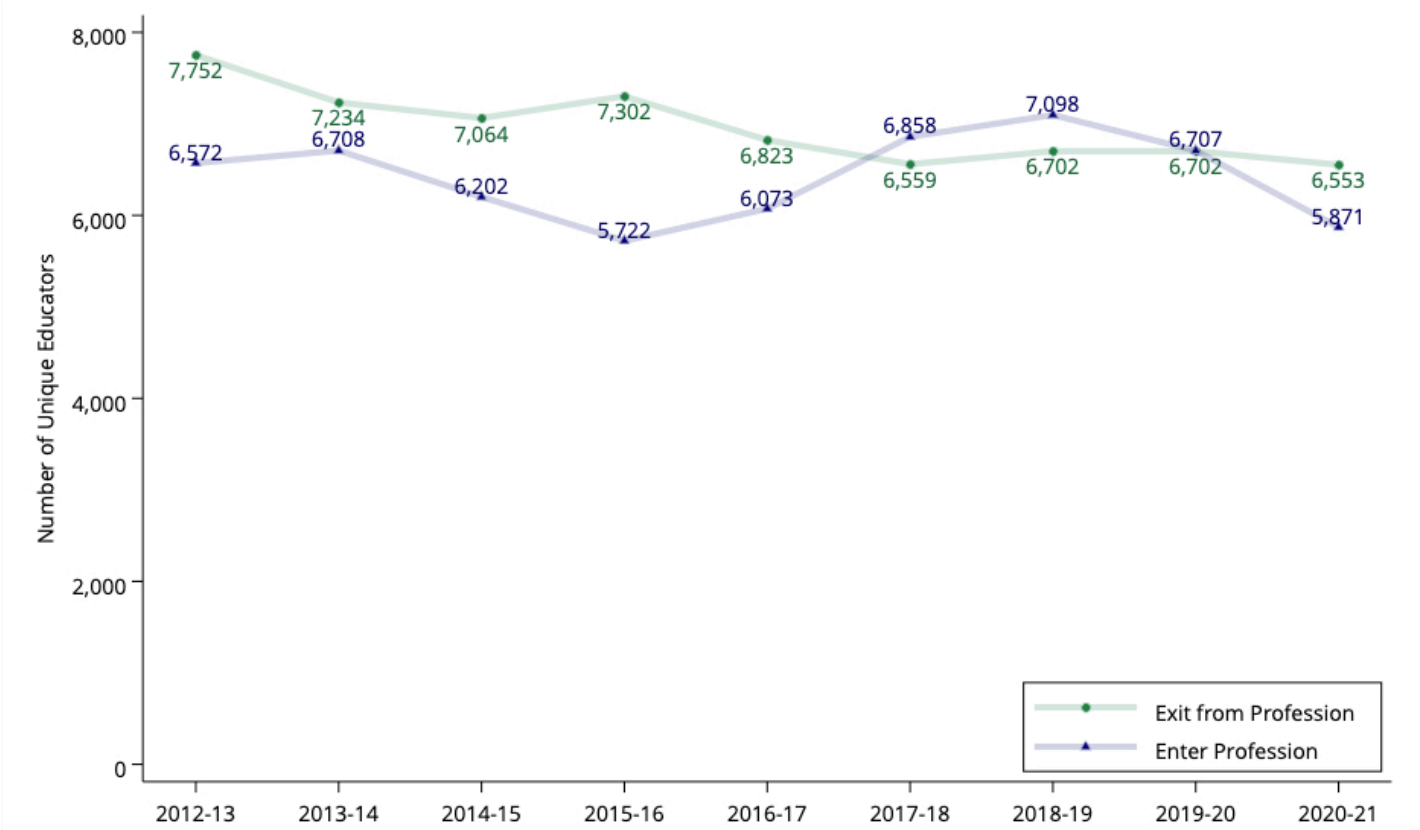
Retention

Figure 3.7 shows the number of educators who entered or exited the teaching profession each year. In years when the green line is above the blue line, more teachers exited than entered, while in years when the blue line is above the green line, more teachers entered than exited. We see from the figure that there were more Michigan teachers exiting the profession than entering each year until 2017-18. This is not surprising, as we know from Table 3.1 that the total number of teachers decreased over this period. This is not necessarily indicative of a teacher shortage, as student enrollment decreased across the state as well. From Figure 3.1 and Figure 3.2, we know that the ratio of students to teachers remained fairly stable over time, both across the state as a whole and within each of the 10 prosperity regions. However, higher rates of turnover could indicate that districts are struggling to retain teachers.

To gather more insight about teacher turnover in Michigan, we examine trends for teachers who remained in the profession but switched to a different school or district. High rates of within-district transfers could (but do not necessarily) indicate that a district is struggling to meet staffing needs in some of its buildings and moving teachers' assignments as a result. High rates of between-district transfers, on the other hand, could (but do not necessarily) indicate that teachers are choosing to leave certain districts in favor of others. Figure 3.8 shows that, statewide, the number of within-district transfers has decreased each year while the number of between-district transfers has mostly increased. There is a noticeable decrease in the number of teachers transferring to other districts during the pandemic. This finding substantiates other reports of decreases in between-district transfers in Michigan (Strunk et al., 2021).

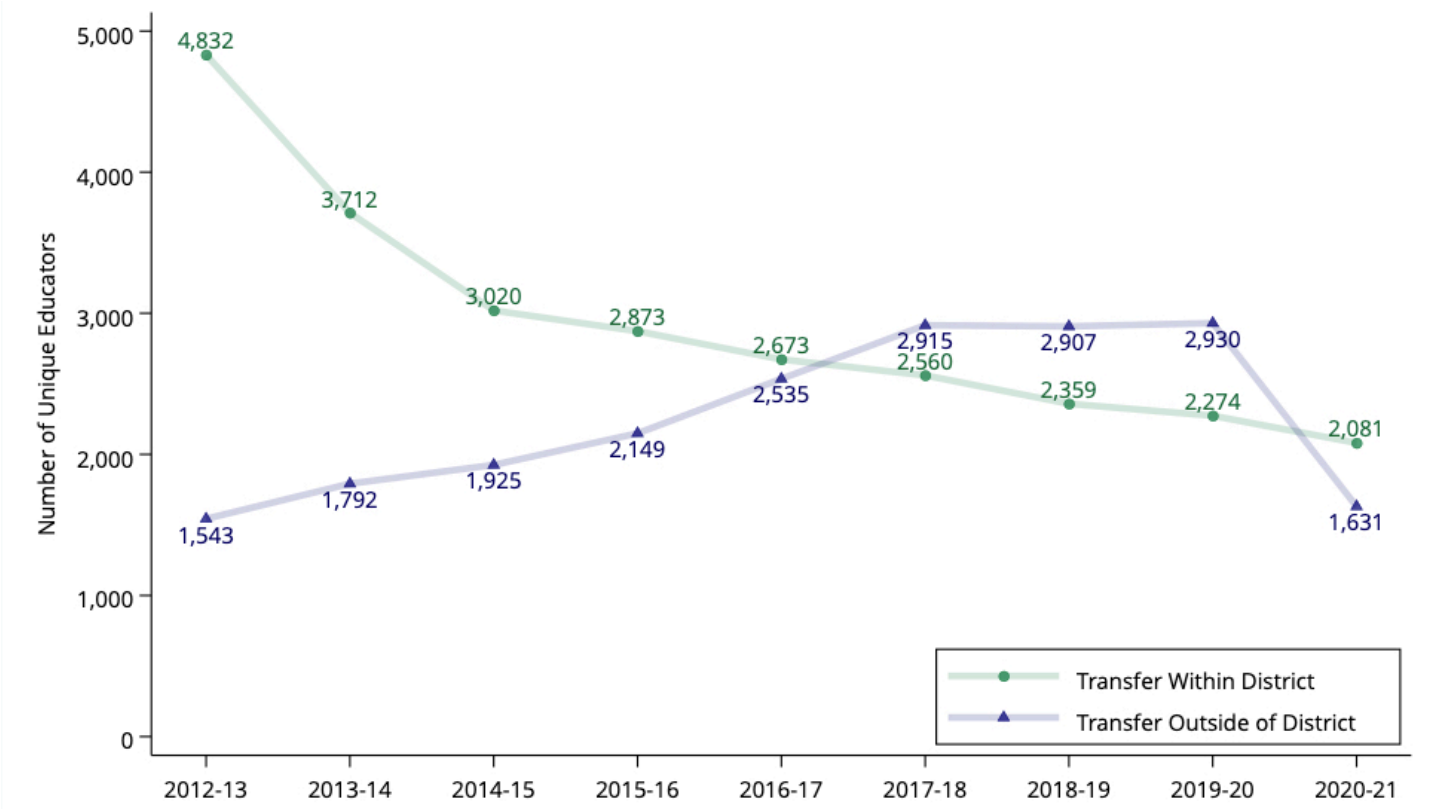
We examine regional trends in between-district transfers to further investigate this pattern. Figure 3.9 shows that between-district transfer rates have followed a similar trend across all regions, with increases across most years, followed by a sharp decrease in 2020-21 (again, seemingly attributable to the COVID-19 pandemic). Differences across regions may reflect differences in opportunities to transfer more than the presence or absence of a shortage. For instance, transfer rates tend to be higher in the Detroit Metro region and lower in the Upper Peninsula region, compared to elsewhere in the state. This may simply be because there are more opportunities to transfer in areas where there are many districts located near each other (e.g., in densely populated areas), and fewer such opportunities in rural areas where districts tend to be further apart. The South Central region, on the other hand, had among the lowest between-district transfer rates in earlier years, but some of the highest rates in later years. This could point to changing conditions for teachers in this region and should be further investigated.

Figure 3.7. Mobility In and Out of the Teaching Profession (Fall-to-Fall)



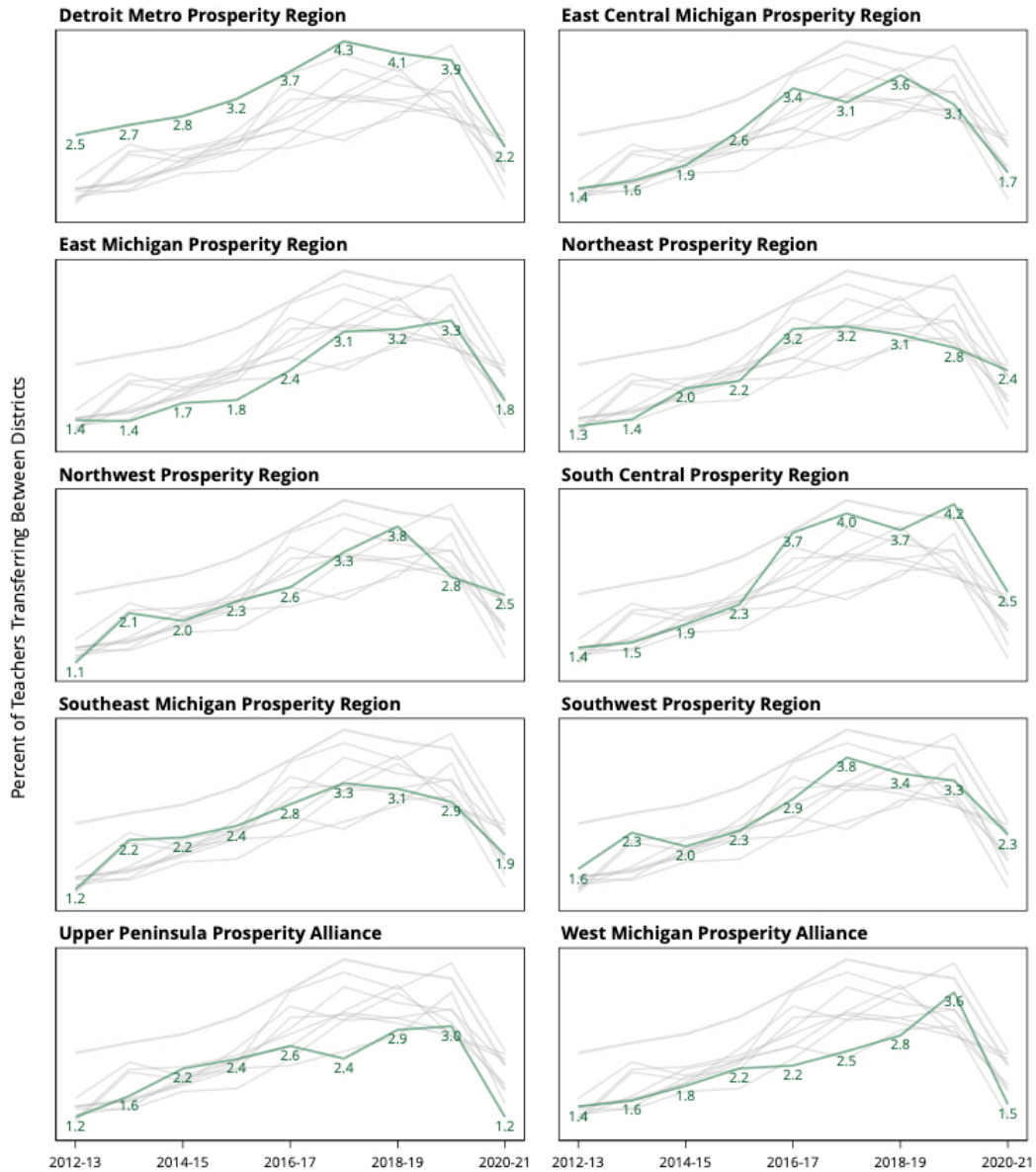
Notes: The green circles represent educators exiting from the teaching profession and the blue triangles represent educators entering the teaching profession. Some “enterers” may have previous teaching experience, and some identified as “exiting” may have returned to teach in a later year. “Enterers” also include some educators who switched from a non-teaching to a teaching role, while educators who switched from a teaching to a non-teaching role are included as “exits” from teaching.

Figure 3.8. Teachers Transferring to Other Schools or Districts (Fall-to-Fall)



Notes: The green circles in this figure represent teachers who transferred within the same district, and the blue triangles represent teachers who transferred outside their district. We identify within-district transfers as a change in an individual's assignment as a teacher working in a single building one fall to a teaching assignment in a different, single building in the same district the next fall. Similarly, we identify between-district transfers as a change in an individual's assignment as a teacher working in a single district one fall to a teaching assignment in a different, single district the next fall.

Figure 3.9. Between-District Transfers by Prosperity Region (Fall-to-Fall)



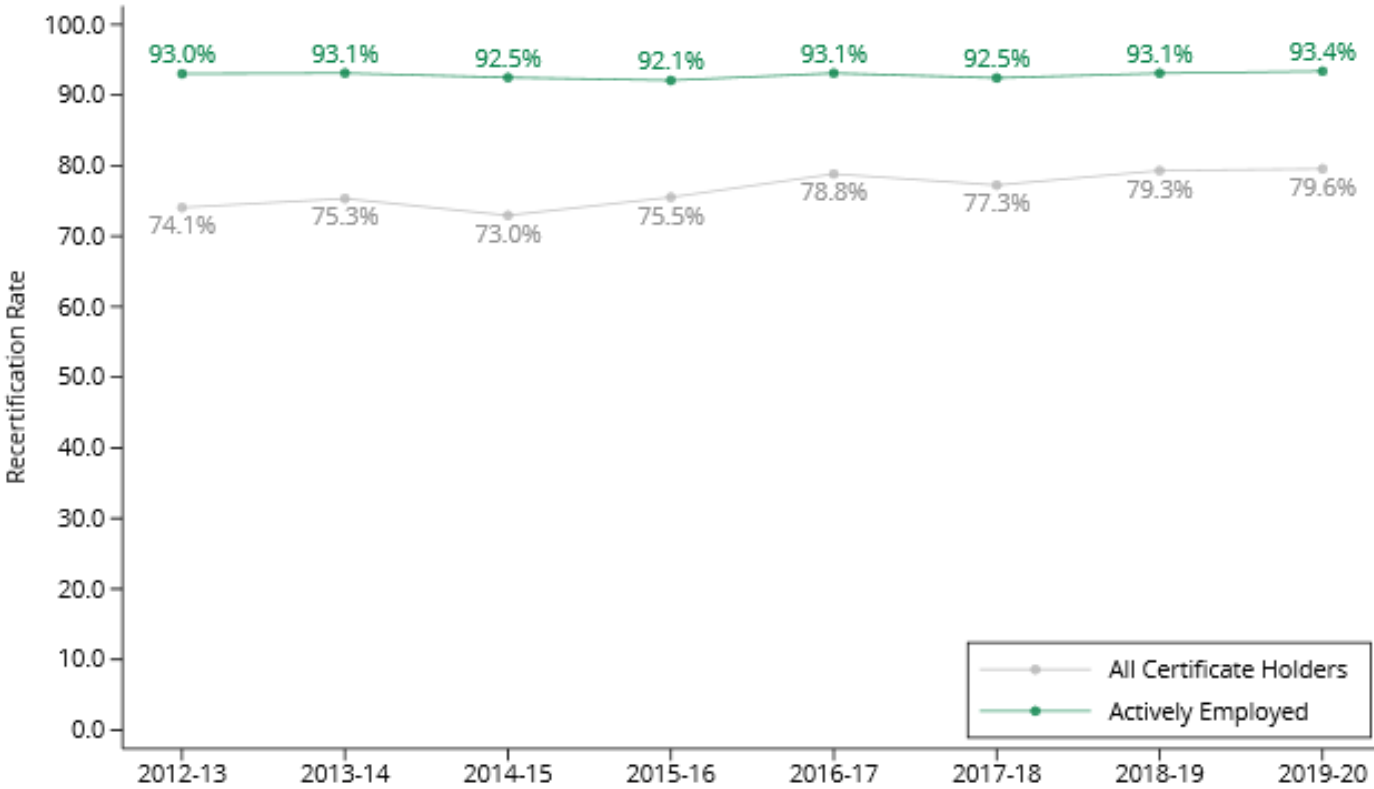
Notes: The grey lines in this figure represent the trends for all regions except the focal region, which is represented in green. This is intended to show where the focal region falls relative to other regions in the state, while highlighting the trends for each individual region separately. Reference map: https://www.michigan.gov/documents/dmb/Prosperity_Map1_430346_7.pdf

The next set of figures examines the rates at which teachers renew or progress their certificates before or within a year of their expiration. We provide recertification rates for all certificate holders and just for those who hold certificates and are actively employed as teachers in each given year. The former includes certified teachers who already stopped teaching before their certificates were up for renewal and certified teachers who never worked within the state public school system. The latter focuses on certified teachers who were actively employed in teaching positions in the year before their certificates expired. Figure 3.10 shows that, overall, 70% to 80% of all teachers with an expiring certificate choose to renew or progress to a more advanced certificate. However, recertification rates are consistently above 90% among teachers who were actively employed in teaching positions in the year before their certificates expired. This suggests that certified teachers who have already left the state public school system, or never entered it to begin with, account for a large proportion of all teachers who do not renew or progress their certificates. We also examine heterogeneity in recertification rates by experience level, demographic group, and subject area. For these analyses, we show recertification rates among all certified teachers, as we found almost no variation in recertification rates among actively employed teachers across subgroups.

To capture relationships to teaching experience, we compare recertification rates by certificate level (e.g., recertification upon expiration of an initial certificate versus a first renewal, etc.). Although the term lengths for some teaching certificates have changed slightly over time, we can still think of individuals with initial certificates as less experienced teachers, as these certificates typically expire after their first five to six years as certified teachers. Similarly, teachers with a first standard certificate renewal are somewhat more experienced, having been certified for nine to ten years by the time their certificates expire, and each subsequent renewal implies additional experience. Teachers with professional certificates up for renewal have both accrued several of years of experience and met various professional learning and performance evaluation requirements. Although these certification levels are not perfect indicators of experience, they serve as a reasonable proxy.

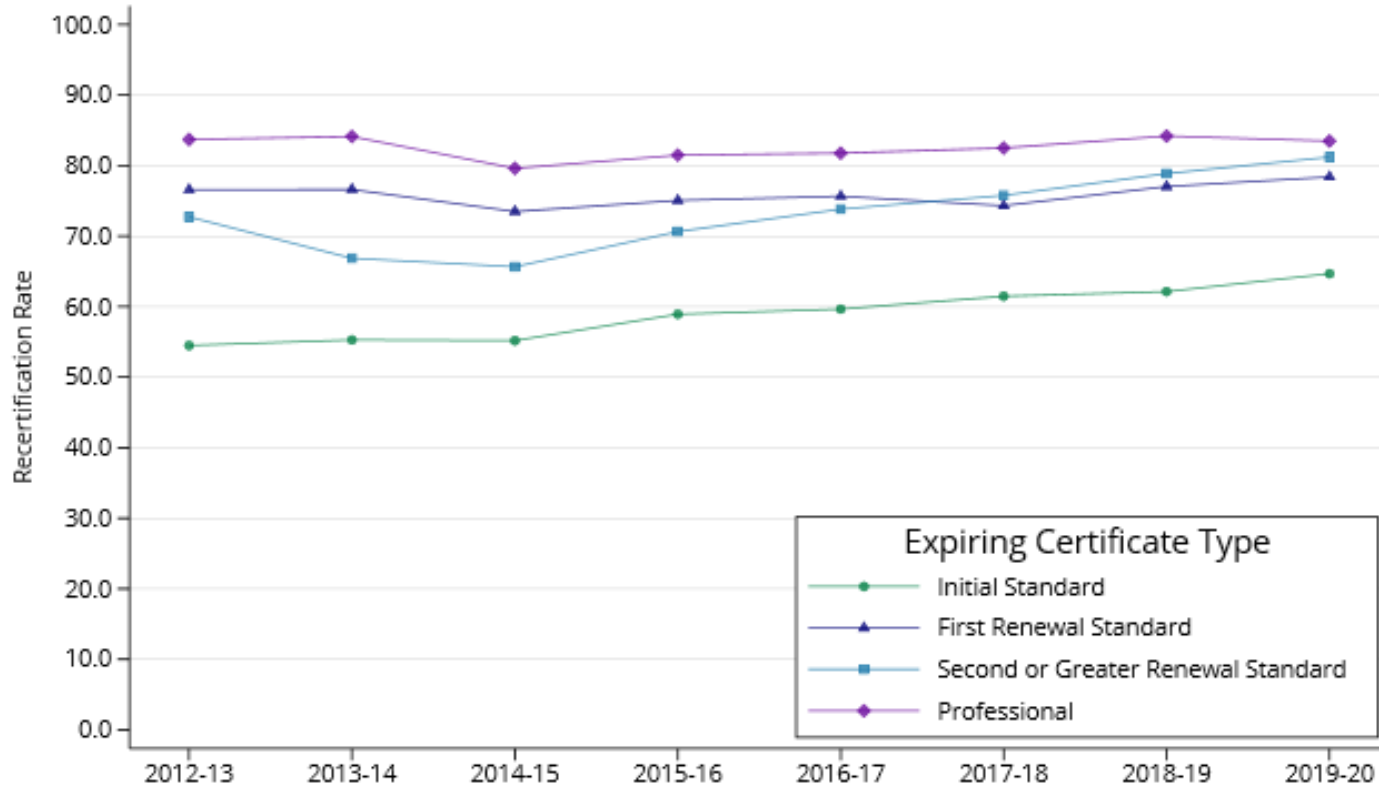
Figure 3.11 shows that recertification rates are lowest among teachers with an initial certificate, compared to those who previously renewed or progressed their certificates. This suggests that newer teachers are less likely to renew their certificates. Teachers who previously progressed to a professional certificate are more likely to renew than are teachers with standard certificates (regardless of how many times the teachers with standard certificates have previously renewed).

Figure 3.10. Teacher Recertification Rates



Notes: Recertification rates represent the percentage of individuals with an expiring teaching certificate who renewed or progressed to a more advanced certificate no later than one year after their certificate expired. The green line represents the recertification rate for teachers who were actively employed the year leading up to their certificate expiration, while the grey line represents the recertification rate for all certificate holders.

Figure 3.11. Teacher Recertification Rates by Certificate Type, All Certificate Holders



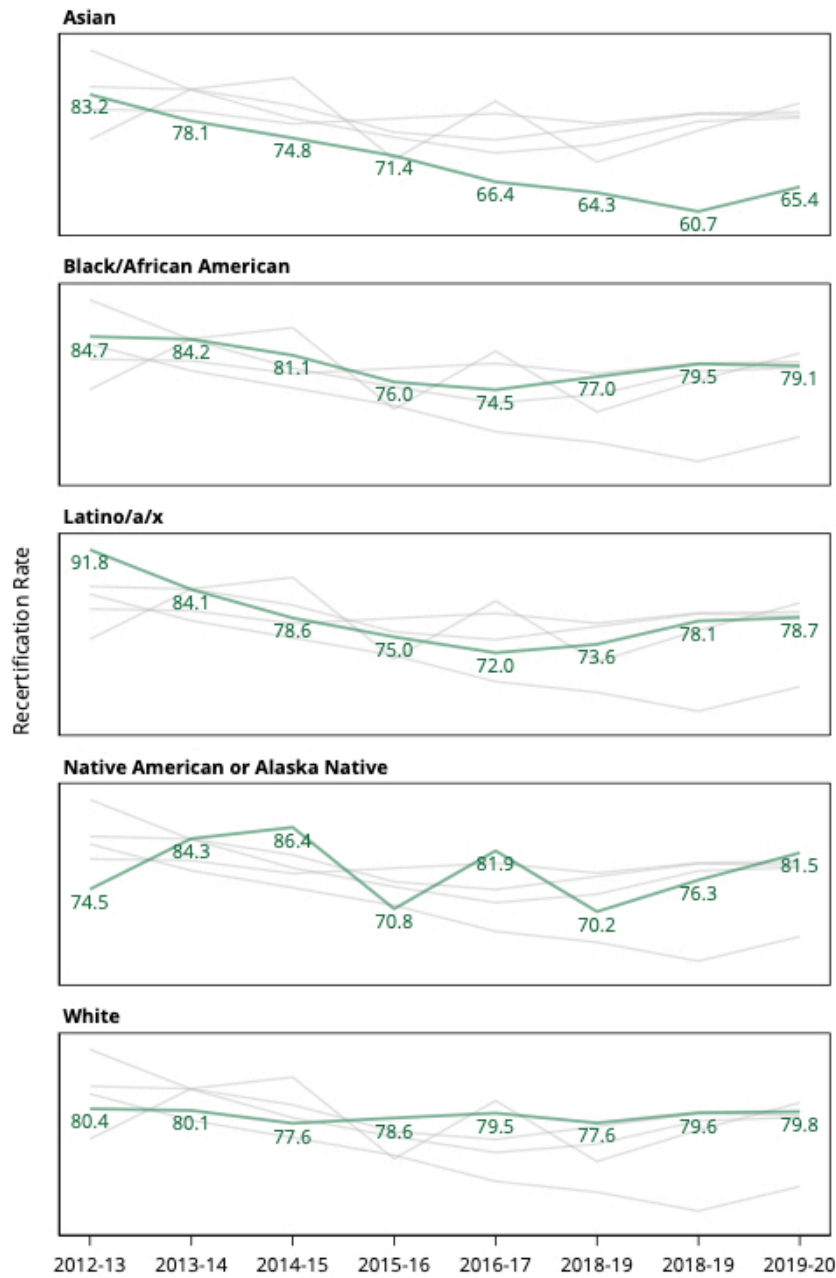
Notes: Recertification rates represent the percentage of individuals with an expiring teaching certificate who renewed or progressed to a more advanced certificate no later than one year after their certificate expired. The rates in this figure include all certificate holders, not just those who were actively employed. The green circles represent recertification rates for teachers whose initial standard certificates are expiring, dark blue triangles represent teachers with standard certificates that have been renewed once before, light blue squares represent teachers with standard certificates that have been renewed two or more times before, and purple diamonds represent teachers with professional or advanced professional certificates.

It is important to note that changes in certificate renewal policies may have affected some of these patterns. Prior to 2017, teachers could only renew a standard certificate twice, with a third two-year renewal option available with district sponsorship. This may explain the increase we see in second or greater standard renewals. We are just beginning to see effects of these policy changes and may soon start to see effects of other recent changes in the requirements for renewal and progression.

Given the substantial amount of research showing the importance of having a diverse teacher workforce for both White and non-White students (Dee, 2004, 2005; Egalite et al., 2015; Gershenson et al., 2016; Harbatkin, 2021), we further break down these rates by teacher race and ethnicity. Figure 3.12 shows that, while recertification for White teachers have remained relatively consistent over time, the same is not true for teachers of color. In 2012-13, Black, Latino/a/x, and Asian teachers all had higher recertification rates than White teachers. Across these three groups, recertification rates decreased each year from 2012-13 through 2016-17 (except for Asian teachers, whose recertification rates continued to decrease until 2018-19). By 2016-17, recertification rates for all three groups had fallen below the recertification rate for White teachers. However, recertification rates began to increase for Latino/a/x and Black teachers after 2016-17, and by 2019-20 recertification rates for Latino/a/x and Black teachers were nearly equivalent to those of White teachers. Asian teachers' recertification rates remain substantially lower than for White teachers. Fluctuations in recertification rates for American Indian or Alaska Native teachers from year to year are likely due to the low number of Michigan teachers in this group.

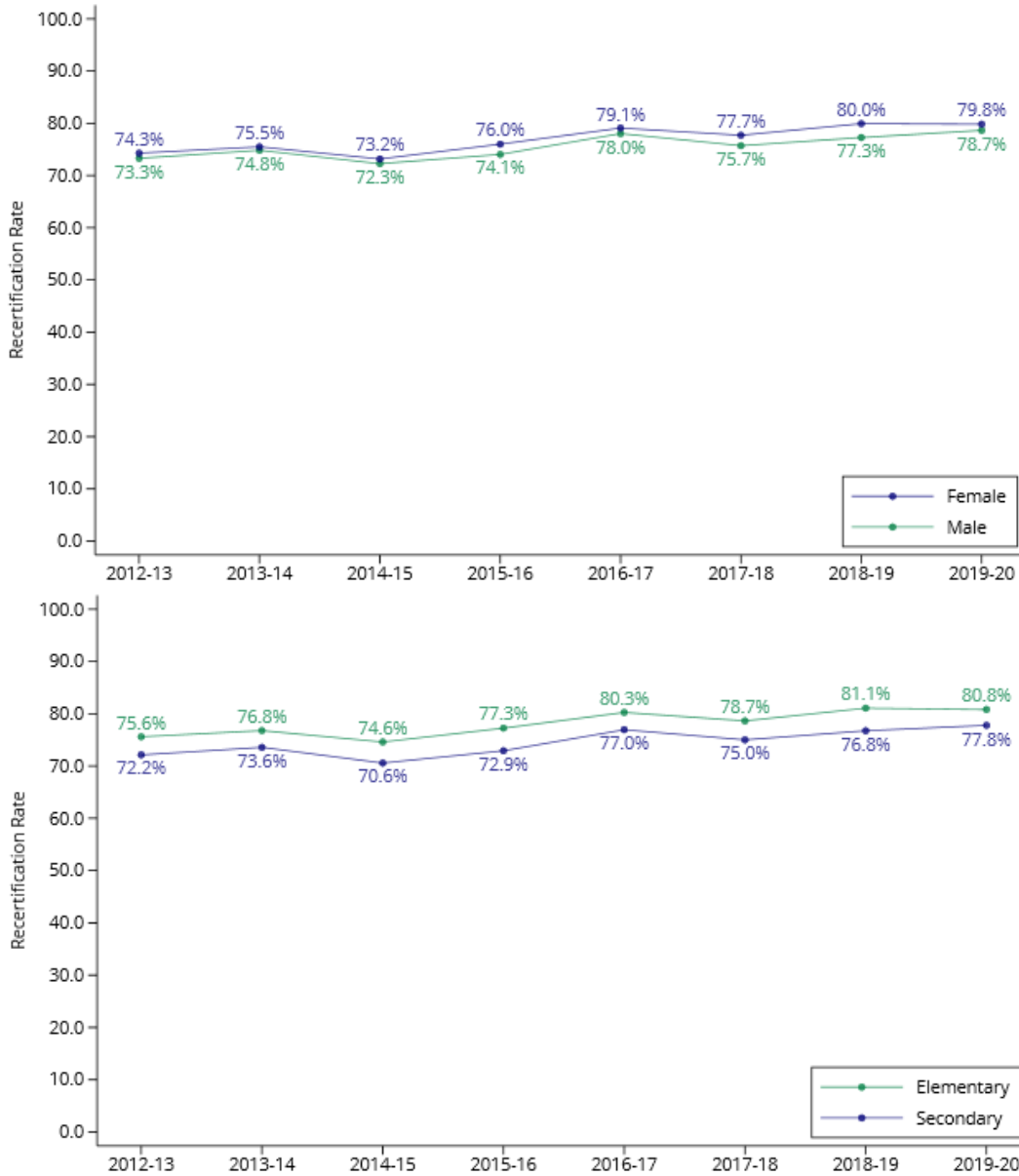
Figure 3.13 shows teaching certificate recertification rates by gender and grade level. Across all years, female teachers are very slightly more likely to renew or progress their certificates than male teachers, and elementary teachers are slightly more likely to renew or progress than are secondary teachers. Finally, Figure 3.14 shows recertification rates by broad subject area or educational setting. Recertification rates generally range from about 70% to 80% across subject areas and years and are slightly higher for teachers with special education endorsements.

Figure 3.12. Teacher Recertification Rates by Race, All Certificate Holders



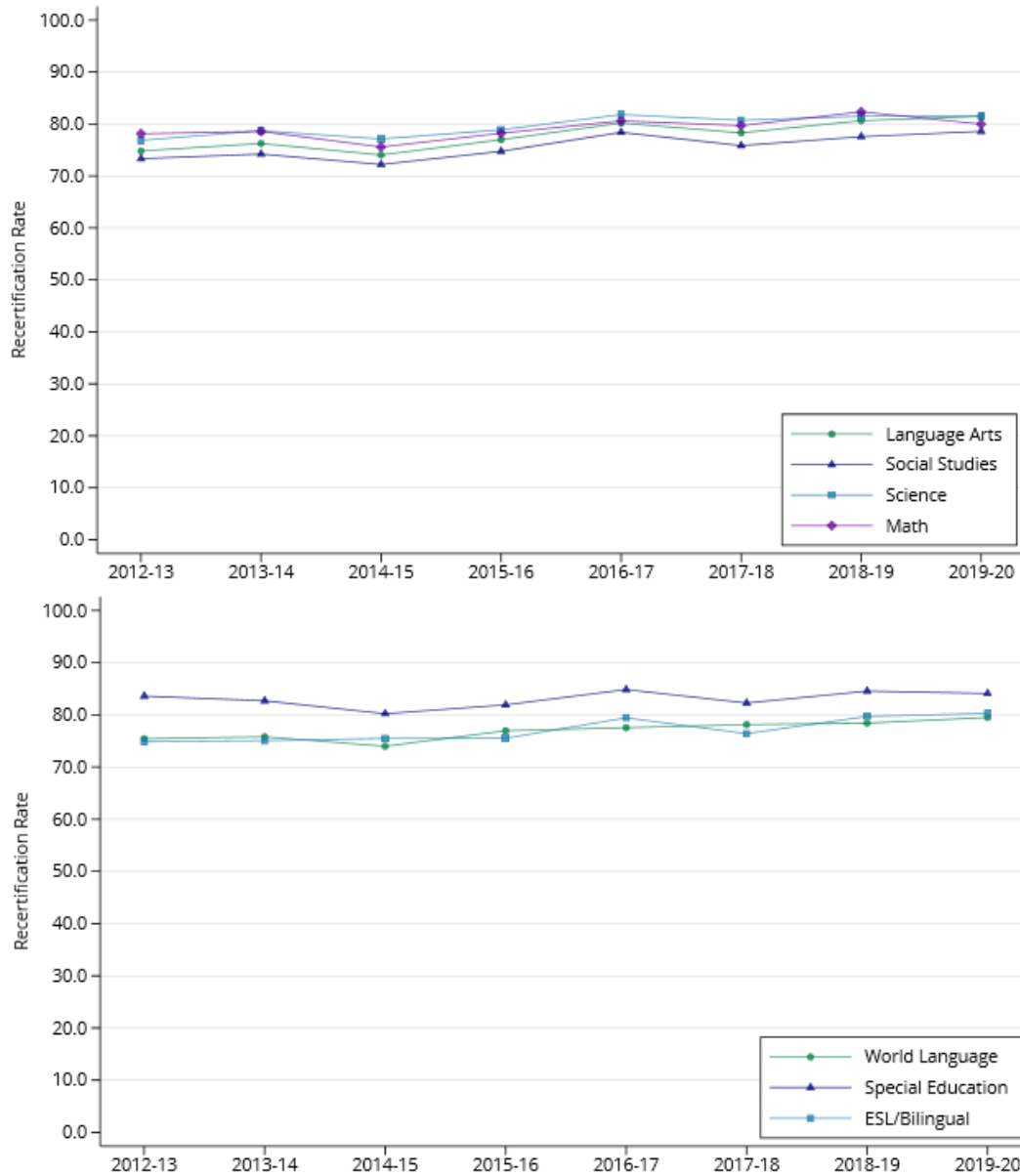
Notes: Recertification rates represent the percentage of individuals with an expiring teaching certificate who renewed or progressed to a more advanced certificate no later than one year after their certificate expired. The rates in this figure include all certificate holders, not just those who were actively employed. The grey lines in this figure represent the recertification rates for all races except the focal race, which is represented in green. This is intended to show where the focal race falls relative to other races, while highlighting the trends for each individual race separately.

Figure 3.13. Teacher Recertification Rates by Gender and Grade Level, All Certificate Holders



Notes: Recertification rates represent the percentage of individuals with an expiring teaching certificate who renewed or progressed to a more advanced certificate no later than one year after their certificate expired. The rates in this figure include all certificate holders of a given gender or grade level, not just those who were actively employed. In the top panel of the figure, dark blue squares represent recertification rates for expiring certificates held by female teachers, while green circles represent male teachers. In the bottom panel, dark blue squares represent secondary, while green circles represent recertification rates for elementary certificates.

Figure 3.14. Teacher Recertification Rates by Subject, All Certificate Holders



Notes: Recertification rates represent the percentage of individuals with an expiring teaching certificate who renewed or progressed to a more advanced certificate no later than one year after their certificate expired. The rates in this figure include all certificate holders in a given subject area, not just those who were actively employed. In the top panel of the figure, green circles represent recertification rates for expiring certificates with language arts endorsements, dark blue triangles social studies, light blue squares represent science, and purple diamonds represent math. In the bottom panel, green circles represent world languages, dark blue triangles special education, and light blue squares represent ESL and bilingual endorsements.

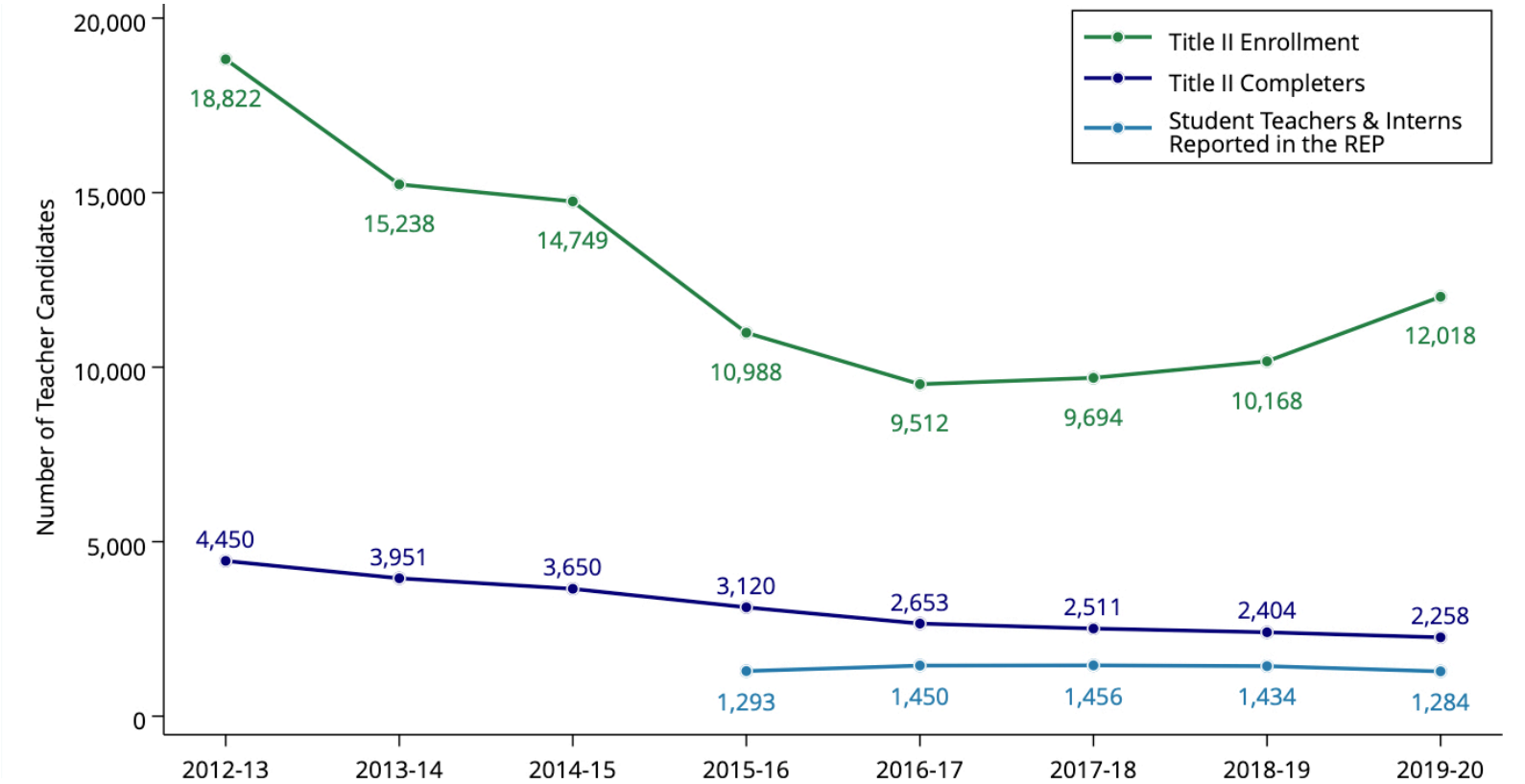
Teacher Preparation

Figure 3.15 shows the total number of teacher candidates enrolled in and completing teacher preparation programs according to Title II reporting, as well as the number of individuals reported with student teaching or teaching intern assignments in the REP. Although enrollment in Michigan's teacher preparation programs decreased over much of the last decade, this trend started to reverse in 2016-17. We do not yet see an increase in the number of completers; however, we would expect this to follow a few years behind the enrollment trend as new enrollees reach the end of their programs. Notably, the number of reported student teachers and teaching interns is, at best, about half as high as the number of completers reported in the Title II data. This reinforces concerns that student teachers may be underreported in the REP.

With fewer prospective teachers enrolling in and graduating from teacher preparation programs, it is not surprising that the number of initial teaching certificates (shown in Figure 3.16) also decreased for several years and has increased slightly in recent years. This pattern is consistent across elementary and secondary teacher preparation programs, shown in Figure 3.17. Figure 3.18 shows that, while the declines began to level off around 2016 in most cases, they persisted longer for certificates with math, science, and special education endorsements.

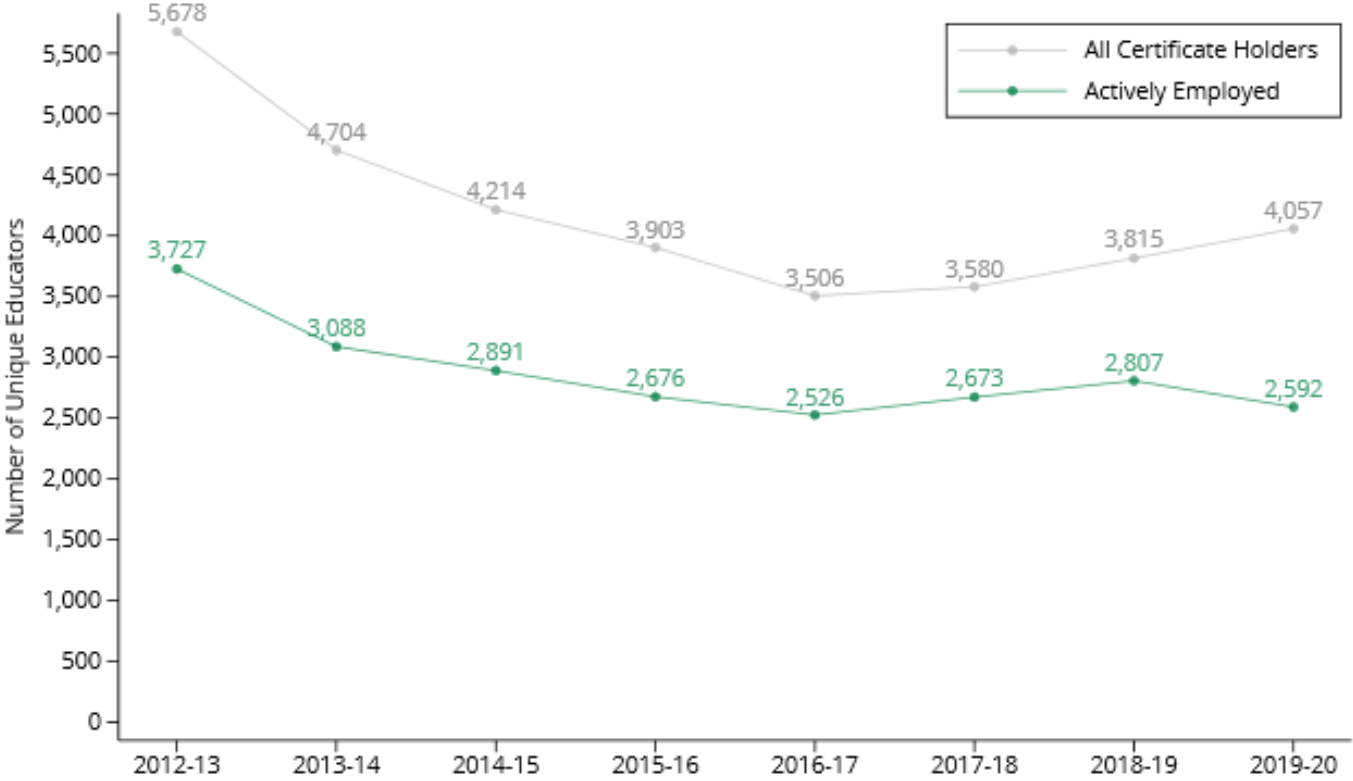
The gap between the grey and green lines in Figure 3.16 indicates that many newly certified teachers were not employed as teachers in the state public school system within a year of receiving their certificates. Some of these individuals may be teaching in nonpublic schools or in another state, but recent research about Michigan's population of certified teachers who are not teaching suggests that many of these individuals chose to pursue other professions, often for financial reasons (Lindsay, Gnedko-Berry, & Wan, 2021).

Figure 3.15. Postsecondary Teacher Preparation Program Enrollment and Completers and District-Reported Student Teaching and Intern Assignments



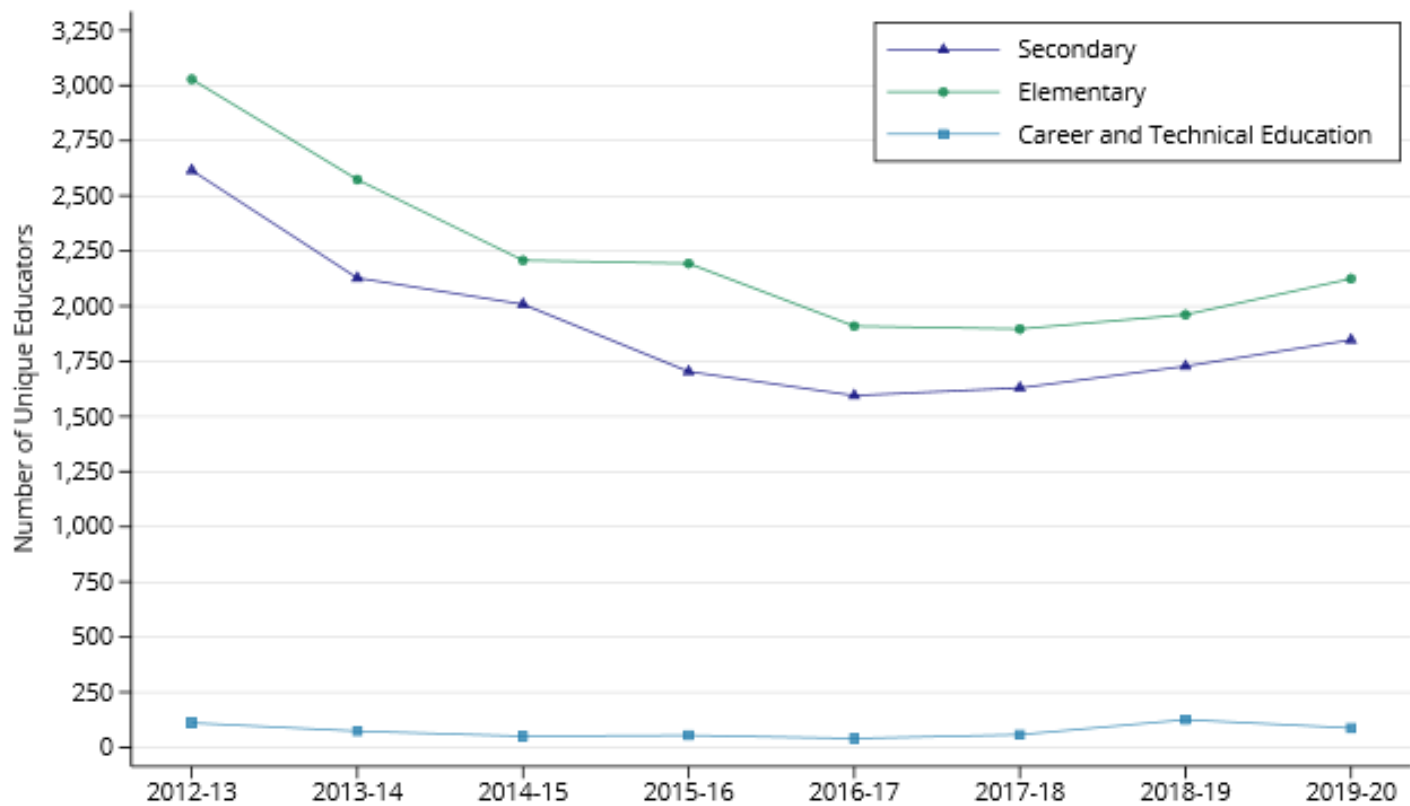
Notes: The green line represents total enrollment in Michigan teacher preparation programs, the dark blue line represents completers from these programs, and the light blue line represents individuals reported in the REP with student teacher or teaching intern assignment codes at any time during the school year. Completers are a subset of total enrollment. The student teacher assignment code did not exist until 2015-16.

Figure 3.16. Teachers Issued Initial Certificates



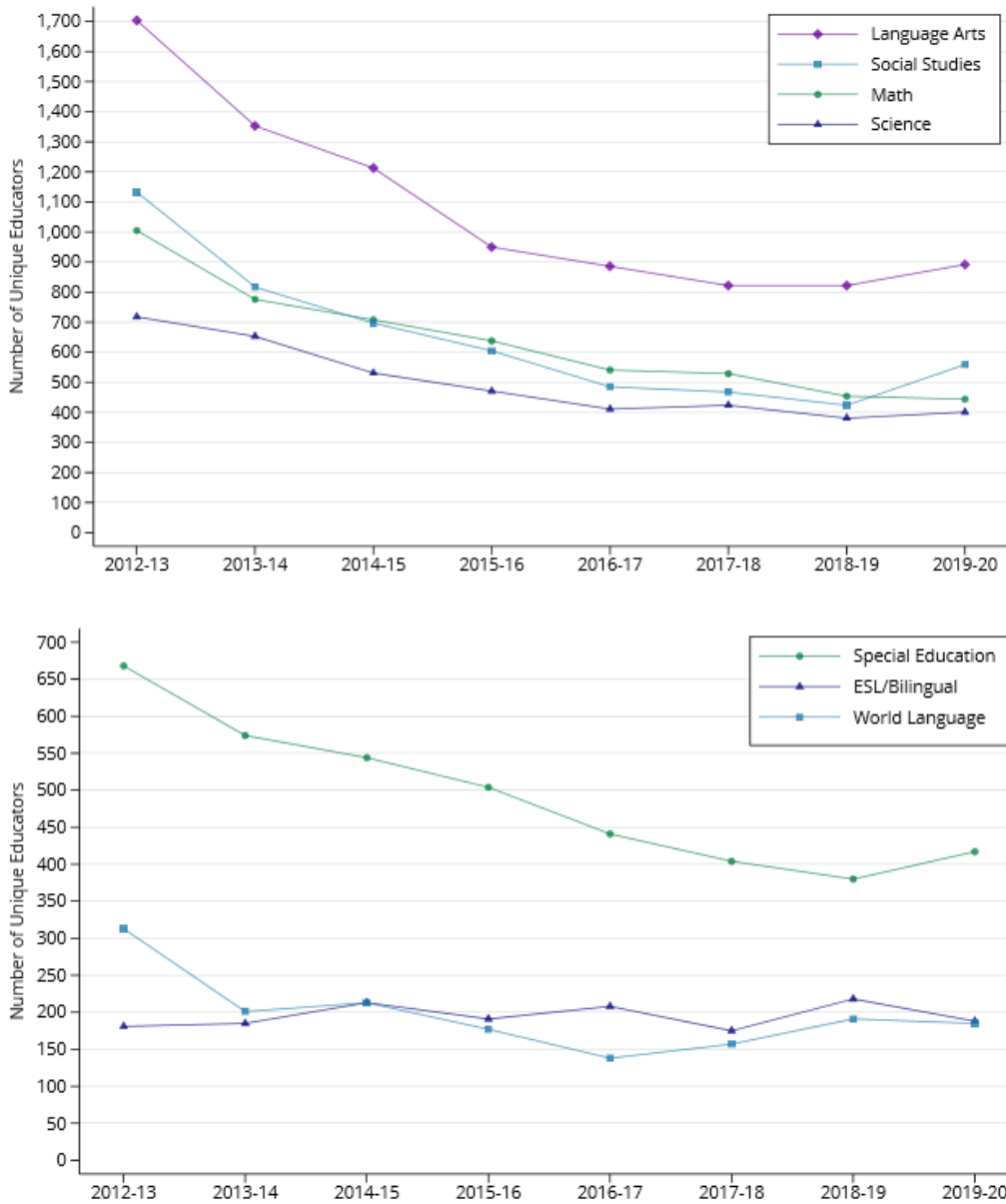
Notes: The grey line represents the number of unique educators issued an initial teaching certificate each year; the green line represents the subset who were actively employed as teachers within the state public school system within a year of issue.

Figure 3.17. Teachers Issued Initial Certificates by Program Type



Notes: Dark blue triangles represent unique educators issued initial secondary certificates, green circles represent elementary certificates, and light blue squares represent CTE certificates. The counts in this figure include all certificates issued, not just those who were actively employed.

Figure 3.18. Teachers Issued Initial Certificates by Subject Area



Notes: In the top panel of the figure, purple diamonds represent unique educators issued initial certificates with language arts endorsements, light blue squares represent social studies, green circles represent math, and dark blue triangles represent science. In the bottom panel, green circles represent special education, dark blue triangles represent ESL and bilingual, and light blue squares represent world language endorsements. The counts in this figure include all certificates issued in a given subject area, not just those who were actively employed.

SUMMARY

Although none of these metrics are ideal indicators of a teacher shortage, these baseline analyses begin to provide some insight about the topics the legislature required for inclusion in future reports. Some of our initial analyses also validate or highlight the concerns and limitations of the data discussed in the prior section. Below, we summarize what these analyses do and do not tell us about each of the areas to be addressed in next year's comprehensive report for the legislature.

- a. *"The number of educator vacancies in this state, disaggregated by geographic region and by any broad subject areas and educational settings required for those vacancies."*

The number of district-reported vacancies is unrealistically low and conflicts with other information about teacher shortages in the state. While there are more and more teachers with temporary credentials each year, this could mean that districts are successfully recruiting and training new teachers from their existing support staff. Without additional or improved data, we still know little about how many teaching vacancies truly exist in the state, and whether the increasing trends in temporary credentials signify a worsening shortage or progress toward alleviating a shortage.

- b. *"The educator retention rates in this state, disaggregated by geographic region, broad subject areas and educational settings, number of years in the profession, and educator demographics."*

Districts may be struggling to retain teachers, as between-district transfer rates increased prior to the pandemic across every region in the state. Currently available data do not enable us to assess retention in the 2021-22 school year, which, based on media reports and the lived experiences of educators and school and district leaders, is noticeably more challenging than in previous years.

We find that most teachers who do not renew or progress their certificates tend to be newer to the profession and not employed within the state public school system in the year leading up to their certificate expiration. Certificate renewal rates for teachers of color decreased throughout much of the last decade but have been improving in recent years.

- c. *“The number of graduates from approved, in-state teacher preparation programs, disaggregated by the broad subject areas and educational settings of those graduates, if any.”*

Following several years of decreasing enrollment in postsecondary teacher preparation programs, enrollment rates have started to increase, and the number of newly certified teachers has followed a similar trend. Decreasing trends in new certificates persisted longer for math and special education than for certificates with endorsements in other subject areas or educational settings.

- d. *“An analysis of the regions in this state that present the highest need for educators based on educator shortages in those regions, disaggregated by the broad subject areas and educational settings of the positions in which there are shortages in those regions.”*

Due to the data limitations discussed throughout this report, we do not feel that we can conclusively identify regions that are or are not facing teacher shortages. We do observe that the percent of teaching assignments covered by certified and appropriately endorsed teachers has decreased slightly over the last few years in the East Central, East Michigan, South Central, South Michigan, and Detroit Metro regions. Changes in between-district transfer rates in the South Central region may also point to districts in this area having difficulty retaining teachers. However, we cannot conclude definitively from the information available that these regions are experiencing severe shortages or that other regions in the state are not experiencing severe shortages.

While these analyses provide some basic understanding about the state of Michigan’s teacher labor market, it is clear that the information available is limited. In the next section, we outline our recommendations for future data collection activities that would allow us to study teacher shortages in Michigan, particularly with respect to the legislatively required topics for future comprehensive reports.

Section Four:

Recommendations for Future Data Collection

Given the limitations of the data that are currently available, we make several recommendations for future data collection to help understand the breadth of teacher shortages in Michigan. The bulk of these recommendations are suggestions for improving and better utilizing data that already exist, rather than introducing entirely new data collection activities. This is intended to limit the administrative burden that additional data collection requirements would place on schools and districts. Of course, any new data collection activities should be considered in light of potential administrative burdens for district and state agencies. In addition, state statute makes it difficult if not impossible for MDE and CEPI to collect new sets of data without legislative action authorizing them to do so.

These recommendations are at varying stages in their development, meaning that while some may be ready to implement immediately or are already in progress for upcoming data collections, others require further investigation to determine whether they are feasible or how to implement them most effectively, and, as noted above, some would require legislative action authorizing MDE or CEPI to collect new data. It is also important to note that the systems through which the state collects credential and personnel data (the MOECS and the REP, respectively) will be replaced with new, redesigned systems within the next few years. Some of the changes we recommend could likely be implemented far more easily and efficiently as part of the new systems than they could within the current systems. Throughout this section, we describe each recommendation and what we believe are the most appropriate next steps for pursuing them. We also note which of our recommendations are already in progress and use **bold text** to highlight recommendations that require further action on the part of state agencies, research partners, or the legislature.

Finally, we stress that these are recommendations for improving and expanding data available to study Michigan's teacher shortage, and not policy recommendations for

addressing the shortage itself. MDE recently proposed several policy initiatives designed to address the teacher shortage that align closely with the evidence we've seen thus far (Michigan Department of Education, 2021). For instance, many of these policies focus on financial support and incentives for teachers and teacher candidates, mentoring for early career teachers, and local shortages in regions with fewer teacher preparation programs. The data collection activities we recommend here would be helpful for evaluating the impact of these types of policies on the teacher shortage, as well as identifying additional areas to target in the future.

TEACHER VACANCIES

Recommendation 1: Improve reporting of vacancies, temporary placements, and long-term substitute teachers.

Section 19 of the State School Aid Act limits the scope of the REP collection to “information related to educational personnel as necessary for reporting required by state and federal law” ([MCL 388.1619](#)). This includes basic information about “individuals employed by or assigned to regularly and continuously work under contract in a school of a school district, intermediate school district, public school academy, or nonpublic school” required to fulfill school safety legislation ([MCL 380.1230](#)). However, some data fields are only legislatively necessary for certain types of employees or positions. For instance, Section 501 of Public Act 115 of 2009 requires reporting of funded positions (including those that are vacant), but there is no existing legislation requiring districts to report vacancies that are not funded or have had the funding reallocated elsewhere due to difficulties filling the position. Districts are also only legislatively required to report personnel data twice per year: By the first business day in December and by the last business day in June of each year.

Additional requirements to report information about newly hired or terminated employees within a set number of days would improve workforce data with respect to identifying when vacancies are filled or created and identifying situations where districts may be misusing or misreporting educators in temporary or long-term substitute teaching assignments. **We recommend that the legislature update Section 19 (3) of MCL 388.1619 to require reporting of vacant positions in addition to educational personnel, as well as to require that new hires, terminations, and changes in an employee’s assignment be reported within a set number of days.**

Numerous state and federal laws and promulgated rules require the collection of limited data about vacancies, temporary placements, and long-term substitute teachers; however, this information is not always collected in a way that is useful for

identifying or monitoring shortages, nor do districts always report these data consistently or accurately.

We recommend that state agencies continue to use their established processes for communicating with districts, providing reporting guidance and training, and monitoring data quality to emphasize and target these concerns. CEPI and MDE have already identified and begun implementing several activities to improve districts' reporting of vacancies, temporary placements, and long-term substitute teachers in upcoming collections. We support these changes, which include the following:

- increasing targeted communications, guidance, and training for districts about how to properly report vacant positions and long-term substitute teaching assignments and when districts should use various funded position and employment status codes;
- conducting additional data quality checks aimed at identifying reporting errors in vacancy and long-term substitute data districts report; and
- providing clear communication to districts stressing the importance of these data and the ways that they will be used in reporting.

Some limitations of the existing data may require changes to the data fields themselves or the rules about when and how to report them. For instance, some of the data fields in the REP are reported only for positions that are filled and not for vacant positions. The state could use the "hire date" and "termination date" fields, which currently are only required for filled positions, to collect start and end dates for vacant positions. Additionally, the status of the position is reported at the individual level, rather than assignment level. These details (whether they're collected through existing data fields or new ones) would help us understand how many positions were vacant at a particular time of the year and the length of time that a position remained vacant.

Similarly, information about active employees from the previous school year automatically populates when districts begin reporting for a new school year, but information about vacant positions does not roll over from one school year to the next. Thus, rather than simply updating any details that have changed since the prior school year, districts must reenter all data about a vacant position each year. This may be burdensome on districts and contribute to underreporting of vacant positions. If vacancies were to remain in the system until a district reports a termination date for it, the existing "employment status" field (or a new, vacancy-specific field) could capture information about why the vacancy was terminated. Similarly, the "employment status" (or an equivalent) field could identify the reason why a newly

reported vacancy exists (e.g., a new position that has never been filled, a position that became vacant after an employee retired, etc.).

In short, **we recommend that legislation be changed to require districts to provide data regarding start dates and end dates for each vacant position, reasons positions are vacant, and reasons for terminating a vacant position.**

Recommendation 2: Incorporate additional existing MDE data into researcher data files.

Some of the information that MDE collects through applications for full-year teaching permits has not yet been integrated into the datasets used for research purposes. These details include, but are not limited to, the reason for obtaining a permit, the district that applied for the permit, and waivers the state superintendent of public instruction (SPI) granted, and individuals authorized to teach under Section 1233b of the Revised School Code ([MCL 380.1233b](#)). **We recommend that research partners formally request any existing MDE data from applications for full-year teaching permits that may be informative about vacancies and shortages.**

Recommendation 3: Investigate the feasibility of integrating data about job postings, job applicants, and substitute teachers from external sources, and if feasible, proceed with integration.

External data sources would be helpful to supplement the currently available state data to enable a more accurate understanding of teacher shortages across the state. In particular, the state would benefit from accessing data about job postings and job protection from the Bureau of Labor Market Information and Strategic Initiatives and vacancy as well as job applicant data from commonly used central application systems (e.g., Applitrack). This would allow the state and research partners to understand which districts post openings for jobs and whether and how many applicants they get for each posting, including applicant characteristics. This would enable us to paint a much richer picture of shortages across the state and enable the development of policies that target local needs.

Ideally, the proposed strategies for improving reporting of substitute teachers will allow us to more accurately identify the number of teaching positions that are regularly covered by a temporary employee or long-term substitute. However, data from major substitute teacher staffing agencies (e.g., EDUSTAFF) and districts about the types and duration of substitute teaching assignments would be helpful for validating the data districts report.

We recommend investigating the potential usefulness of these data for identifying and monitoring teacher shortages, as well as the feasibility of integrating data from these external sources into state datasets. If the external systems allow for data integration with state systems, we recommend pursuing this integration. Because such data development or integration can be costly, we recommend that the legislature allocate funding to support the development or integration of such data into the state datasets.

Recommendation 4: Supplement administrative data with surveys about districts' responses to vacancies and reasons for job openings.

Finally, we suggest using survey data to supplement and provide context in areas that are not captured in the available administrative data sources. For example, surveys of administrators may provide insight into the actions districts have taken in response to vacancies and the reasons for teacher job openings in their districts. This may involve integration of existing survey data from MDE and partner organizations into state administrative datasets, or new survey data collection to address different shortage-related topics or provide insight into how perceptions of these topics have changed over time. **We recommend first examining how we can use existing surveys to supplement administrative data and what topics or perspectives are relatively uncovered in existing survey instruments and the resulting data. Then, we recommend adjusting existing surveys or developing a new survey or surveys to enable the state to examine vacancies, job openings, and other workforce-related issues more deeply. This might be most easily accomplished by developing and administering a new state-wide educator survey to enable the collection of data that would provide deeper context about the teacher workforce and teacher shortages in Michigan.** This would not require a legislative mandate, as the survey would be voluntary.

RECRUITMENT AND RETENTION

Recommendation 1: Improve reporting of employee exit reasons, reevaluate categories, and update if necessary to match district needs and common reporting standards.

As with vacancies, existing state data on the topic of recruitment and retention could be improved through additional data quality checks and reporting guidance or training for districts. Districts are required to select an exit reason for personnel who terminate their employment, but often do not report this information accurately or consistently.

CEPI has already begun implementing additional data quality checks to flag districts that frequently report employee exits with the same exit reason category.

While additional communications, targeted training, and data quality alerts may help to improve the problem, **we recommend also considering whether the current options from which districts select an exit reason adequately capture the reasons why Michigan teachers tend to terminate their employment.** If districts frequently report “unknown” exit reasons because none of the available options reflect the reasons why their employees are exiting, then perhaps a more appropriate solution is to update the exit reason options. We thus recommend gathering feedback from districts about how well the current exit reasons reflect the types of employee exits that occur in their districts, how and when they use the “unknown” exit reason category, and examples of reasons for employee exits in their districts that were not captured in any of the existing reporting options. Based on this feedback, **if there is a need to update the exit reason categories to better reflect districts’ needs, we recommend aligning the new categories as closely as possible with established exit reason definitions from a commonly used education data standard and implement these changes as part of the new system that CEPI and MDE are designing to replace the REP and MOECS.**

Recommendation 2: Investigate the feasibility of incorporating data from Michigan’s Office of Retirement Services, Treasury Department, and Unemployment Insurance Agency.

Data from other Michigan departments and agencies can provide valuable context about teacher shortages in Michigan. For instance, research shows that a key consideration in teacher employment is compensation (e.g., Viano et al., 2020). The Office of Retirement Services (ORS), Treasury Department, and Unemployment Insurance Agency all collect data about teachers’ salaries. These data would be useful for examining relationships between districts’ abilities to recruit and retain teachers and their compensation structures (e.g., salaries for newly hired teachers, salary increases for returning teachers, etc.). The Treasury Department also collects data about second jobs, family size, and spouses’ jobs, which may be helpful in better approximating the financial factors in teachers’ decisions about whether to remain in the profession.

The ORS collects additional data on years of service, retirement eligibility, and retiree status that may be helpful for understanding teacher retention patterns. Years of service would be helpful in estimating experience levels of teachers whose

employment within the state public school system pre-dates the state datasets that capture employment and assignment details. Retirement eligibility and retiree status would be helpful for disaggregating exits due to retirement from other types of teacher exits. These data would enable the state and research partners to develop a more complete understanding of teacher retention and attrition patterns. Notably, ORS only collects data for teachers in traditional public school districts and not for all Public School Academies.

We recommend investigating the differences between the salary information and other data collected by these three state agencies to identify which source(s) would be most helpful for the purpose of studying teacher shortages. We then recommend working with the appropriate organizations to obtain access to these data and, if feasible, integrate them with other state datasets.

Recommendation 3: Supplement administrative data with new and existing survey data about factors affecting recruitment and retention.

Existing survey data from MDE and partner organizations may provide information about the factors affecting districts' recruitment efforts and strategies, turnover rates, support available for new teachers, and financial incentives or compensation structures used in recruitment. New surveys may also be necessary to address topics that were not covered in prior surveys or require more up-to-date survey data. **We once again recommend first examining existing survey data to identify whether additional surveys are necessary, and if so, identify topics or populations on which to focus.** As discussed above, a voluntary, state-wide educator survey that combines all relevant questions into a single instrument might remove some of the burden on educators who could answer one survey instead of several different ones, and might help to diminish administration costs and increase response rates. **We recommend that the state investigate ways to incentivize and encourage educators to respond to a state-wide survey.**

TEACHER PREPARATION

Recommendation 1: Establish links between existing and available data sources.

CEPI has been working to establish a link between the identification code associated with students' pre-K-12 and postsecondary education records and the personnel identification codes (PICs) used for their personnel records while employed within the

state public school system. This link between student and teacher identification codes will allow us to follow individuals through the pipeline and examine the experiences of prospective teachers that are associated with eventual employment within the Michigan public school system, thus helping the state to target policies to help grow the supply of teachers in Michigan. **We recommend continuing to prioritize this work.**

For the same reasons, adding these student and personnel identification codes to rosters of student teachers from teacher preparation programs would enable us to analyze data about the placements and experiences of student teachers with their student or employment records. This may require including additional fields in these rosters, such as a student's date of birth, gender, and Unique Identification Code to facilitate the data matching process. **We recommend adding identifiers that would enable linking pre-K-12 data to other state administrative datasets.**

SUMMARY

We believe the following changes will improve our ability to identify, monitor, and examine patterns in teacher shortages across the state of Michigan:

- **Legislatively require vacancy reporting and more timely reporting of personnel changes.** The requirements in Section 19 (3) of MCL 388.1619 currently only apply to educational personnel (and not to unfilled vacancies), and only require reporting twice per year. Changes to this language could greatly improve data quality and coverage.
- **Collect additional details about vacant positions.** We recommend collecting start and end dates for each vacancy, and the reason why a position is vacant and the reason for terminating a vacant position. This information could be collected through existing REP fields used for employees (e.g., hire and termination date, employment status) or by adding fields specifically for vacancies.
- **Investigate factors that may contribute to inaccurate or incomplete reporting, and introduce additional data quality checks, guidance, and training for districts to improve reporting.** We recommend investigating whether the current exit reason options are sufficient and, if necessary, revising these options in the new system. Various improvements and additions to existing processes for ensuring data quality and providing training and guidance to districts are already in progress for upcoming data collections.

- **Continue efforts to establish a link between student and education personnel datasets.** This will allow us to study the experiences of prospective teachers throughout the pipeline.
- **Incorporate additional data from MDE and, if feasible, external data sources into researcher datasets.** MDE collects data from teaching permit applications that may be helpful for studying Michigan's teacher shortage, and researchers should begin the process of requesting these be incorporated into datasets for research use. External data sources may provide useful information about job postings and applicants, substitute teaching placements, and financial factors affecting recruitment and retention.
- **Use surveys to supplement administrative data and provide more context about the experiences of teachers and administrators.** First examine available data from previous surveys to determine whether and what types of new surveys would be most useful (*Michigan Legislature - Section 380.1233b, n.d.*).

Overall, the recommendations above focus on potential ways to improve existing data and data collection processes and, where applicable, explore the possibility of integrating other sources of data that are less readily available.

REFERENCES

- Ashcroft, B. (2021, August 20). Michigan's teacher shortage is 'scary,' MEA says, as new school year begins. *WZZM* 13. <https://www.wzzm13.com/article/news/michigans-teacher-shortage-is-scary-mea-says-as-new-school-year-begins/69-09016eb2-1a08-4369-9b35-62a8bfa9c6e4>
- Barnum, M. (2021, September 23). Still hiring: Teacher vacancies up as year begins, limiting recovery plans. *Chalkbeat*. <https://www.chalkbeat.org/2021/9/23/22689774/teacher-vacancies-shortages-covid>
- Chambers, J. (2018, September 10). Michigan school districts battle widespread teacher shortages. *The Detroit News*. <https://www.detroitnews.com/story/news/education/2018/09/10/teacher-shortage-michigan-schools/1203975002/>
- Citizen's Research Council of Michigan. (2019, February). *Michigan's leaky teacher pipeline: Examining trends in teacher demand and supply*. Citizen's Research Council of Michigan. https://crcmich.org/wp-content/uploads/rpt404-teacher_pipeline.pdf
- Dee, T. (2004). Teachers, race, and student achievement in a randomized experiment. *Review of Economics and Statistics*, 86(1), 195–210.
- Dee, T. (2005). A teacher like me: Does race, ethnicity, or gender matter? *The American Economic Review*, 95(2), 158–165.
- Egalite, A. J., Kisida, B., & Winters, M. A. (2015, April). Representation in the classroom: The effect of own-race teachers on student achievement. *Economics of Education Review*, 45, 44–52. <https://doi.org/10.1016/j.econedurev.2015.01.007>
- Gecker, J. (2021, September 22). COVID-19 creates dire shortage of teachers, school staff. *KPBS*. <https://www.kpbs.org/news/education/2021/09/22/covid-19-creates-dire-us-shortage-teachers-school>
- Gershenson, S., Holt, S. B., & Papageorge, N. W. (2016, June). Who believes in me? The effect of student-teacher demographic match on teacher expectations. *Economics of Education Review*, 52, 209–224. <https://doi.org/10.1016/j.econedurev.2016.03.002>

- Harbatkin, E. (2021, April). Does student-teacher race match affect course grades? *Economics of Education Review*, 81, 102081. <https://doi.org/10.1016/j.econedurev.2021.102081>
- Higher Education Opportunity Act, 20 U.S.C. § 1001 *note*. (2008). <http://www.govinfo.gov/content/pkg/PLAW-110publ315/html/PLAW-110publ315>
- Hopkins, B., Kilbride, T., & Strunk, K. O. (2021, May). *Trends in Michigan's K-12 public school teaching workforce*. Education Policy Innovation Collaborative. <https://epicedpolicy.org/wp-content/uploads/2021/05/Teacher-Workforce-Pol-Brief-May2021.pdf>
- Lieberman, M. (2021, October 15). How Staff Shortages Are Crushing Schools. *EducationWeek*. <https://www.edweek.org/leadership/how-staff-shortages-are-crushing-schools/2021/10>
- Lindsay, J., Gnedko-Berry, N., & Wan, C. (2021). *Michigan teachers who are not teaching: Who are they, and what would motivate them to teach?* REL 2021-076. Regional Educational Laboratory Midwest.
- Lowe, K. (2021, September). Michigan teacher shortage fueled by pandemic, lack of resources and policy input. *Up North Live*. <https://upnorthlive.com/news/local/michigan-teacher-shortage-fueled-by-pandemic-lack-of-resources-and-policy-input>
- Mason, K. (2021, August 2). 'We're losing more teachers than we are bringing in': Michigan's teacher shortage worsens. *WWMT*. <https://wwmt.com/news/local/were-losing-more-teachers-than-we-are-bringing-in-michigans-teacher-shortage-worsens>
- Michigan Department of Education (2021, November 19). Teacher Recruitment and Retention Proposal. https://content.govdelivery.com/attachments/MIMDE/2021/12/08/file_attachments/2016378/Teacher%20Recruitment%20and%20Retention%20Letter%20November%202021.pdf
- Mills, H., Moore, D., & Keane, W. G. (2001). Addressing the teacher shortage: A study of successful mentoring programs in Oakland County, Michigan. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 74(3), 124–126. <https://doi.org/10.1080/00098650109599176>

- National Council on Teacher Quality (2021, December). State Reporting of Teacher Supply and Demand Data. *State of the States 2021*. <https://www.nctq.org/publications/State-of-the-States-2021:-State-Reporting-of-Teacher-Supply-and-Demand-Data>
- Rodriguez-Delgado, C., Kai-Hwa Wang, F., Hays, G., & Chavez, R. (2021, November 23). Schools across the country are struggling to find staff. Here's why. *PBS NewsHour*. <https://www.pbs.org/newshour/education/schools-across-the-country-are-struggling-to-find-staff-heres-why>
- Shakrani, S. (2008). *Teacher turnover: Costly crisis, solvable problem*. Education Policy Center. <https://files.eric.ed.gov/fulltext/ED502130.pdf>
- St. George, D. & Strauss, V. (2021, December 5). The principal is cleaning the bathroom: Schools reel with staff shortages. *The Washington Post*. https://www.washingtonpost.com/education/school-staff-shortages-bus/2021/12/03/05b88a0e-4cab-11ec-a1b9-9f12bd39487a_story.html
- Strunk, K. O., Harbatkin, E., Torres, C., Mcilwain, A., Cullum, S., & Griskell, C. (2021, September). *Partnership Turnaround: Year Three Report*. Education Policy Innovation Collaborative. <https://epicedpolicy.org/partnership-turnaround-year-three-report/>
- The Revised School Code, Mich., Act no. 451 § 380.1230. (2009). [http://www.legislature.mi.gov/\(S\(aytilrrkwlqaalyobwitbzmr\)\)/mileg.aspx?page=GetObject&objectname=mcl-380-1230](http://www.legislature.mi.gov/(S(aytilrrkwlqaalyobwitbzmr))/mileg.aspx?page=GetObject&objectname=mcl-380-1230)
- The Revised School Code, Mich., Act no. 451 § 380.1233b. (2018). [http://www.legislature.mi.gov/\(S\(h1fkl3jtckjmidokwpjdu1t\)\)/mileg.aspx?page=GetObject&objectname=mcl380-1233b](http://www.legislature.mi.gov/(S(h1fkl3jtckjmidokwpjdu1t))/mileg.aspx?page=GetObject&objectname=mcl380-1233b)
- The Revised School Code, Mich., Act no. 451 § 380.1531. (2018). [http://www.legislature.mi.gov/\(S\(h1fkl3jtckjmidokwpjdu1t\)\)/mileg.aspx?page=GetObject&objectname=mcl380-1233b](http://www.legislature.mi.gov/(S(h1fkl3jtckjmidokwpjdu1t))/mileg.aspx?page=GetObject&objectname=mcl380-1233b)
- The State School Aid Act of 1979, Mich., Act no. 94 § 388.1916. (2021). [http://www.legislature.mi.gov/\(S\(lhczjy1en3vi3t2pbdsfgvz0\)\)/mileg.aspx?page=GetObject&objectname=mcl-388-1619](http://www.legislature.mi.gov/(S(lhczjy1en3vi3t2pbdsfgvz0))/mileg.aspx?page=GetObject&objectname=mcl-388-1619)
- Viano, S., Pham, L. D., Henry, G. T., Kho, A., & Zimmer, R. (2020). What teachers want: School factors predicting teachers' decisions to work in low-performing schools. *American Educational Research Journal*.

Will, M. (2021, December 20). The Teaching Profession in 2021 (in Charts). *EducationWeek*. https://www.edweek.org/teaching-learning/the-teaching-profession-in-2021-in-charts/2021/12?utm_source=nl&utm_medium=eml&utm_campaign=eu&M=64252887&U=57060&UUID=3e8178c0e1bb2320265466b690a3d259

WXYZ Detroit. (2021, October 21). *State reaches out to retired teachers asking them to return to classroom amid shortage*. WXYZ Detroit. <https://www.wxyz.com/news/state-reaches-out-to-retired-teachers-asking-them-to-return-to-classroom-amid-shortage>.