# Past and projected trends in teacher demand and supply in Michigan

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**State and school district leaders in Michigan are concerned about the challenges some districts are facing in filling certain classroom teacher vacancies and about the harmful impact of teacher shortages on students, schools, and communities. They have asked for better and more comprehensive information on the existence and extent of teacher shortages in the state. Using data from the 2013/14–2017/18 school years, this study examined trends in teacher demand, supply, and shortages in Michigan and projects shortages and surpluses for 2018/19–2022/23. The study found that total enrollment in Michigan public schools declined by 3 percent between 2013/14 and 2017/18, while enrollment of English learner students increased by 27 percent. Over the same period the size of the teacher workforce, measured in full time equivalent teachers, declined by 2 percent, and the number of newly certified active teachers declined by 23 percent. Some subject areas (particularly business education and career and technical education) and regions of the state (Upper Peninsula and Northwest) are projected to see teacher shortages between 2018/19 and 2022/23. However, the total active teacher supply in Michigan public schools is projected to meet demand during this period.**

## Why this study?

State and school district leaders in Michigan[1] have asked for better and more comprehensive information on the existence and extent of teacher shortages in the state and on future trends. Prior research suggests that Michigan has been producing more new teachers at the elementary school level than were able to find jobs in the state, while districts have struggled to fill vacancies in math, special education, and world languages (Chambers, 2018; Michigan Department of Education, 2017; Sawchuk, 2013). Several statewide trends may be affecting the ability of Michigan schools to fill teaching positions, including higher turnover among Michigan teachers than the national average (Robinson & Lloyd, 2017) and declining enrollment in teacher preparation programs in Michigan in recent years (Sutcher, Darling-Hammond, & Carver-Thomas, 2016; U.S. Department of Education, n.d.). This study provides a systematic analysis of trends in teacher demand, supply, and shortages in Michigan between 2013/14 and 2017/18 and projects shortages and surpluses for 2018/19–2022/23, to enable state and district leaders in Michigan to align their plans with future trends.

1. These include members of the Regional Educational Laboratory Midwest Alliance to Improve Teacher Preparation, a collaborative research partnership that leverages existing data on education preparation providers to explore teacher preparation models, study relationships between existing models and teacher and student outcomes, and examine the implementation of changes in state policy across the Midwest. The alliance's primary focus is teacher preparation in Michigan.

For additional information, including background on the study, technical methods, and supporting analyses, access the report appendixes at https://go.usa.gov/xVxJf

Teacher shortages are of particular concern to policymakers, schools, and districts because of the potential harmful impact on overall teacher quality (Boe & Gilford, 1992; Clotfelter, Ladd, & Vigdor, 2010; Loeb & Beteille, 2009; Raphael, 2009). Faced with an insufficient supply of qualified teachers, districts and schools that need to fill teaching vacancies while respecting class size limits may have to hire less-qualified candidates, such as uncertified teachers or teachers who have not yet completed their training and demonstrated competence in their subject area. Student learning may suffer as a result (Clotfelter, Ladd, & Vigdor, 2007; Palardy & Rumberger, 2008). Teacher shortages within states tend to vary by subject area, region, and type of school and often dispro-portionately affect schools with high percentages of economically disadvantaged students. For example, disad-vantaged schools and schools in urban and rural areas are more likely to experience teacher shortages because of the challenges they often face in attracting and retaining quality teachers (Cowan, Goldhaber, Hayes, & Theobald, 2016; Ingersoll, Merrill, & Stuckey, 2014; Markow, Marcia, & Lee, 2013; Podgursky, Ehlert, Lindsay, & Wan, 2016; Sawchuk, 2014).

Having recognized these concerns and challenges, the Michigan Department of Education has been formulating policies designed to affect the teacher pipeline. The state now allows alternative teacher preparation programs to operate and is working toward reciprocal certification agreements with other states. Michigan also is consid-ering other actions to improve the quality of teachers entering the workforce while maintaining a sufficient pool of teacher candidates, including increasing the flexibility for entering the profession through new pathways and strengthening the battery of tests in certification subject areas to reflect more rigorous standards and better align the tests with what is being taught in classrooms (Rozema, 2016).

Members of the Regional Educational Laboratory Midwest Alliance to Improve Teacher Preparation requested a study on trends in teacher demand and supply so that these actions could be informed by data. Michigan Depart-ment of Education policymakers may be able to use the findings from this study to make more knowledgeable decisions about whether to adjust certification requirements and educator preparation policies and whether to establish alternative routes to teacher certification. The department may also be able to use the information to develop support for recruiting teachers in high-need certification areas and regions of the state. Michigan's teacher preparation institutions may also be able to use the results to better align their program offerings with areas of need in the state, such as specific subject areas or regions.

## Research questions

This study addressed two research questions:

1. What were the trends in teacher demand, supply, and shortages in Michigan public schools between 2013/14 and 2017/18 overall and by subject area, region of the state, district locale (urban, suburban, town, and rural), and district average teacher salary?

2. What will Michigan's public school teacher demand and supply picture look like between 2018/19 and 2022/23?

See box 1 for definitions of key terms used in the report.

The study considered a combination of teacher demand and supply components and how each contributes to an understanding of the teacher demand–supply balance (figure 1). A summary of the data and methodology used to address the research questions is provided in box 2; see appendix A for details.

## Box 1. Key terms

**Active teacher supply** (also referred to in the literature as the effective supply of teachers; see, for example, Boe, 2014; Levin, Berg-Jacobson, Atchison, Lee, & Vontsolos, 2015). The sum of teachers retained in the same district from the previous year, teachers who transferred from another Michigan district, newly certified teachers, and other entrants. The active teacher supply is a subset of the potential teacher supply, which is the number of eligible individuals from all sources who are willing and able to teach under prevailing conditions (Boe & Gilford, 1992; Gilford & Tenenbaum, 1990; Lindsay, Wan, & Gossin-Wilson, 2009). The analysis for this study uses active teacher supply rather than potential teacher supply because the study team could not identify an adequate source of data on potential teacher supply in Michigan, particularly for data on individuals in the reserve pool and the number from each source who are willing to teach.

**Daily Substitute Permit.** An authorization issued by the Michigan Department of Education to a school or district allowing an individual without the necessary certification and endorsement to teach temporarily, on a day-to-day basis, for fewer than 90 days per school year. These permits are not portable and are not linked to a subject area.

**District average teacher salary.** The total salaries of certified teaching staff in a district divided by the total number of full-time equivalent teachers. District average teacher salaries reflect the interplay of several factors, including how much districts are willing to pay for hiring teachers, the average length of tenure in the district for teachers, and the cost of living. Districts were divided into three categories: low salary (districts in the lowest quartile of average teacher salary), medium salary (districts in the middle two quartiles), and high salary (districts in the highest quartile).

**District locale.** A district's National Center for Education Statistics urban-centric locale type—city, suburban, town, or rural —which is based on the district's location in relation to the nearest urbanized area or urban cluster. See https://nces.ed.gov/pubs2007/ruraled/exhibit_a.asp for definitions of major locale types.

**Long-term substitute permit.** A term used in this report to refer to any substitute permit other than a Daily Substitute Permit. In other words, it is an authorization issued by the Michigan Department of Education to a school or district allowing an individual without the necessary certification and endorsement to teach in a regular or long-term substitute assignment when a properly certified and endorsed teacher (as required under The Revised School Code, Act 451 of 1976) is not readily available (Michigan Department of Education, 2016). These permits include Annual Career and Technical Education Authorizations, Full-Year Basic Substitute Permits, and Expert Substitute Permits (see table B20 in appendix B for the complete list of long-term substitute permit categories). These permits are linked to a subject area. Permits are granted to schools or school districts, not individuals, and are not portable across schools.

**Newly certified teacher.** A teacher who entered into teaching for the first time and who received an initial teaching certificate within the past three years. This category is one component of the active teacher supply.

**Other entrant.** A teacher who was not teaching in the previous year and was not newly certified. This category includes certified teachers who returned after a break in service or experienced teachers from out of state who hold a valid teaching certification. This category is one component of the active teacher supply.

**Region of the state.** One of 10 Prosperity Regions created in Michigan in 2014 through the Regional Prosperity Initiative, which encourages regional private, public, and nonprofit partners to develop vibrant regional economies. See map A1 in appendix A for a map of the regions.

**Student–teacher ratio.** Student enrollment divided by full-time equivalent teachers.

**Teacher demand.** The number of teachers required to serve the student population while maintaining some stipulated or desired student–teacher ratio.

**Figure 1. Conceptual approach for examining teacher demand and supply**
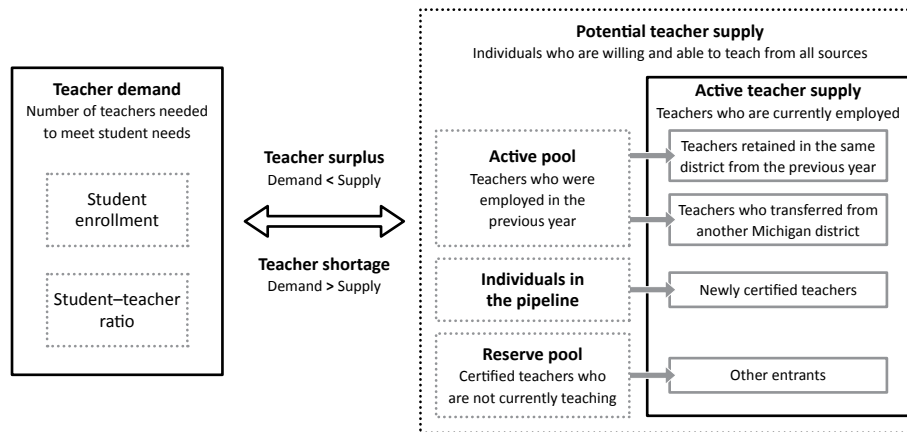


Source: Adapted from Lindsay, Wan, Berg-Jacobson, Walston, & Redford (2016) and Lindsay et al. (2009).

## Box 2. Data sources, sample, methods, and limitations

**Data sources.** The study used a combination of data supplied by the Michigan Department of Education and publicly available data:

- Personnel data from the Registry of Educational Personnel, which contains annual snapshots of teachers working in each Michigan public school between 2012/13 and 2017/18.
- Teacher certification data from the Michigan Online Educator Certification System, which contains all educator certificates issued by the state since 2010/11.
- Substitute permit data provided by the Michigan Department of Education, which provide the number and type of substitute permits issued to each district each year between 2013/14 and 2017/18.
- District-level enrollment data by grade level, race/ethnicity, and subgroup of disadvantaged students (English learner students, students in special education, and students eligible for the national school lunch program) for 2012/13–2017/18 from MI School Data, the state's official public portal for education data.
- Average teacher salaries by district for 2013/14–2016/17 from various editions of the Michigan Department of Education's Bulletin 1014.
- County population by age and sex for 2008–2016 from the U.S. Census Bureau and fertility rates for 2016 (the most recent year available) from the Michigan Department of Health and Human Services.
- Data on people who completed teacher preparation programs in Michigan between 2011/12 and 2015/16 from U.S. Department of Education (n.d.).
- Data on the Comparable Wage Index from the Bush School of Government and Public Service at Texas A&M University.

**Sample.** The sample for addressing research question 1 on past trends in demand and supply included teachers with a valid record each year between 2013/14 and 2017/18 in the personnel data (99.9 percent of all teachers across all years). Teacher certification data were linked to the personnel data by teachers' unique identification numbers. The sample included teachers employed between 2013/14 and 2017/18 in public schools in Michigan's 561 local education agencies, 431 public school academies (public charter schools), 58 intermediate school districts,[1] and 6 state districts (for example, the Michigan School for the Deaf).[2] The sample for addressing research question 2 on projected demand and supply included 536 local education agencies and 229 public charter schools that were operational between 2012/13 and 2017/18 and had complete data on the key metrics used in the study analyses, such as enrollment or full-time equivalent teachers. Enrollment in these districts represented 95–96 percent of total enrollment each year.

**Methodology.** To address research question 1, the study team first examined data on two demand components, K–12 enrollment and student–teacher ratios, and calculated annual total enrollment and enrollment among subgroups of disadvantaged students. Annual active teacher supply was examined next by calculating total teacher counts, total full-time equivalent teacher counts,

full-time equivalent teacher counts by subject area, and counts and percentages of teachers from various sources of supply (that is, teachers retained in the same district from the previous year, teachers who transferred from another Michigan district, newly certified teachers, and other entrants). Finally, the study team analyzed the substitute permit data as an indicator of teacher shortages by calculating the total number of Daily Substitute Permits and long-term substitute permits as well as the number of long-term substitute permits by subject area and the percentage of long-term substitute permits as a share of total teacher count in each subject area.[3] The study team conducted all analyses for the state overall as well as by region, district locale, and district average teacher salary.

To address research question 2, the study team analyzed historical data (for 2012/13–2017/18) to identify trends and apply them to future years (2018/19–2022/23) to project teacher demand and active teacher supply for each year. In other words, the projections can be interpreted as what would be expected to happen if past trends remain fairly constant. Grade progression ratios and birth-to-kindergarten ratios were used as the basis for forecasting enrollment. Previous research has shown this approach to be accurate for projections as far as 10 years into the future (Hussar & Bailey, 2016; Levin et al., 2015; Lindsay et al., 2016). The study team conducted projections of other demand and supply elements (student–teacher ratio, total active teacher supply, and teacher demand and active supply by subject area) using regression-based methods, which model an outcome of interest (for example, student–teacher ratio) as a function of a time trend and other factors that may be related to the outcome (for example, district-level enrollment and teacher demographics). A detailed discussion of the projection methodology, the limitations of the analyses, and the validity of the results is in appendix A.

**Limitations.** This study has three main limitations. First, the analysis of teacher supply focuses on the active teacher supply (the number of teachers hired and currently working from among those available through several sources of supply) rather than the potential teacher supply (those who are available and willing to enter the teacher workforce). The active teacher supply represents an unknown proportion of the potential teacher supply, and its size and composition are usually determined by both supply constraints and the number of funded teaching positions available. A 1992 National Academy of Sciences review noted that analyzing the potential teacher supply involved conceptual and data challenges and was beyond the capacity of existing models in the literature (Barro, 1992). That observation still holds. The main problem in modeling potential teacher supply is that the number of eligible individuals who are available and willing to enter the teacher workforce at a given time is unknown. Information on the sources of active teacher supply provided in this report, however, can be used to identify the sources of teachers that might be influenced by policy to provide a more adequate supply.

Second, the study analyzes data on substitute permits issued to schools and districts each year as an indicator of teacher shortages. However, the bulk of the permits are Daily Substitute Permits, which are not associated with a subject area. Counts of permits by subject area therefore come from the smaller pool of other, long-term substitute permits, most of which are renewable for up to four years. As a result, the report's counts by subject area undercount the true use of permits by subject area.

Third, there are limitations in making projections. A projection is a calculation showing what happens under particular assumptions. Projections in this study were made based on historical trends and thus assume that those trends will persist; however, unexpected events may lead to sharp changes in a trend. The projection methods used in this study cannot anticipate or reliably account for these shocks or changes in policies. A more detailed discussion of the limitations of projections is provided in appendix A.

Notes

1. Intermediate districts in Michigan, sometimes called regional educational service agencies, provide administrative and instructional services to constituent local school districts and public charter schools. The boundaries of an intermediate district follow county lines; however, some cover more than one county.

2. These numbers represent total unique counts of districts across 2012/13 and 2017/18. The number of districts for each entity type varied by year.

3. Schools are not required to obtain a Daily Substitute Permit for a certified staff member to fill an intermittent vacancy outside the grade and subject area of his or her certification. The number of long-term substitute permits issued to a district in a given year therefore could be seen as an indicator of shortage, both for the need to fill a vacancy and for the lack of other certified staff in the district who could cover an intermittent gap.

## Findings

This section first describes trends between 2013/14 and 2017/18 in teacher demand (enrollment and student–teacher ratio) and in active teacher supply. It then presents trends in substitute permits (as an indicator of shortages) over the same period. The findings are summarized statewide and disaggregated by subject area, region of the state, district locale, and district average teacher salary. Finally, projections of teacher demand and active teacher supply are presented for 2018/19–2022/23. Additional results are in appendix B.

### *Overall teacher demand in Michigan declined between 2013/14 and 2017/18, but trends varied by subgroup of disadvantaged students, region of the state, and district locale*

Total Michigan public school enrollment declined every year between 2013/14 and 2017/18, with year-to-year declines of 0.5–0.9 percent and a cumulative decline of 3 percent (table 1). The decline was driven primarily by a 4 percent decline in elementary school enrollment; middle school enrollment declined by 3 percent, and high school enrollment by 2 percent. Declines in total student enrollment may lessen demand for teachers overall, but enrollment trends among some subgroups of students may increase demand for instructional staff with special expertise in meeting the needs of those students:

- Enrollment of English learner students increased every year over the period, with year-to-year growth of 3–10 percent and cumulative growth of 27 percent.
- Enrollment of students in special education remained fairly stable, declining by 1 percent over the period.
- Enrollment of students eligible for the national school lunch program declined every year between 2013/14 and 2016/17 but increased by 10 percent in 2017/18, when Michigan expanded the direct certification of national school lunch program eligibility to include Medicaid income data.[2]

Enrollment among all three subgroups of disadvantaged students increased in suburban and rural districts between 2013/14 and 2017/18, despite declines in total enrollment (figure 2; see also table B5 in appendix B). The largest percentage increase in English learner student enrollment was in rural districts (52 percent), and the

**Table 1. Enrollment in Michigan public schools, total and by grade level and subgroup of disadvantaged students, 2013/14–2017/18**

| Group | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | Change between 2013/14 and 2017/18 Number | Percent |
|---|---|---|---|---|---|---|---|
| Total[a] | 1,564,114 | 1,550,802 | 1,540,005 | 1,532,335 | 1,520,065 | −44,049 | −2.8 |
| *Grade level* | | | | | | | |
| Elementary (grades K–5) | 679,213 | 670,691 | 660,250 | 657,030 | 652,006 | −27,207 | −4.0 |
| Middle (grades 6–8) | 349,340 | 343,058 | 340,738 | 339,275 | 338,761 | −10,579 | −3.0 |
| High (grads 9–12) | 487,818 | 485,292 | 482,657 | 480,145 | 477,489 | −10,329 | −2.1 |
| *Subgroup of disadvantaged students* | | | | | | | |
| English learner students | 77,005 | 84,640 | 90,121 | 95,037 | 97,838 | 20,833 | 27.1 |
| Students in special education | 200,522 | 198,087 | 196,845 | 197,788 | 198,536 | −1,986 | −1.0 |
| Students eligible for the national school lunch program | 757,756 | 725,964 | 713,295 | 702,790 | 771,239 | 13,483 | 1.8 |

a. Includes students without grade levels (for example, adult students) and thus does not equal the sum of grade-level enrollment values.

Source: Authors' analysis of data from the MI School Data portal.

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2. This expansion of the direct certification of national school lunch program eligibility led to an increase in the number of students directly certified as eligible for free meals and a decrease in the number eligible for reduced-price meals.

**Figure 2. Enrollment among subgroups of disadvantaged students increased in rural and suburban districts in Michigan between 2013/14 and 2017/18**
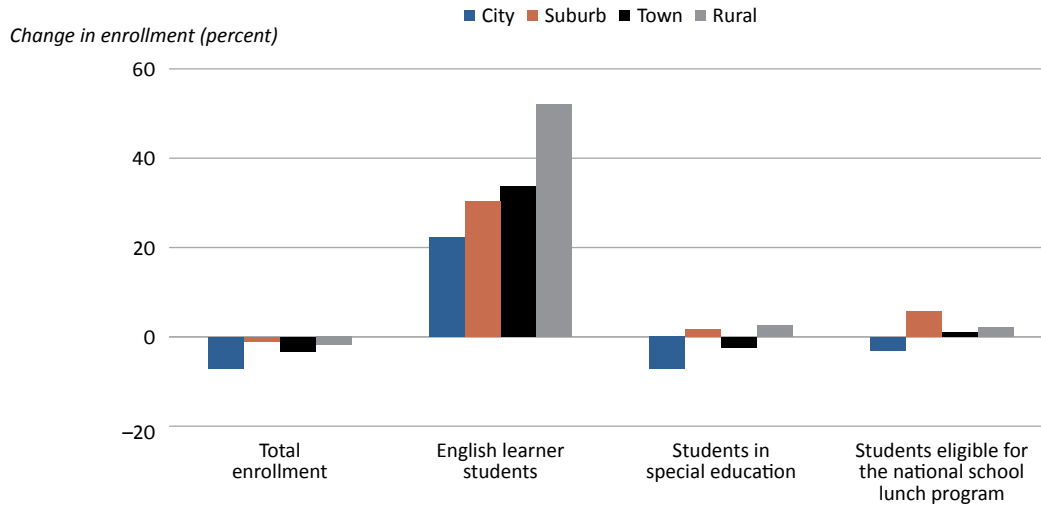


Source: Authors' analysis of data from the MI School Data portal.

largest percentage increase in enrollment of students eligible for the national school lunch program was in suburban districts (6 percent). In all four district locale categories (city, suburban, town, and rural) total enrollment declined while English learner student enrollment increased.
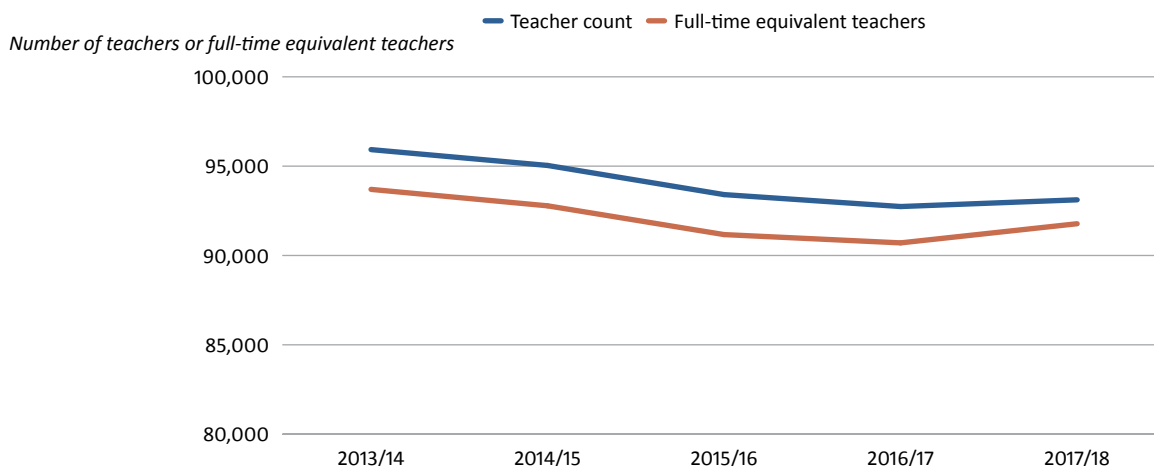
Student–teacher ratios remained fairly stable between 2013/14 and 2017/18. The statewide student–teacher ratio declined by 0.8 percent, from 16.9 students per teacher to 16.8 (see table B7 in appendix B).[3] Changes were small in the student–teacher ratio across regions of the state, district locales, and district average teacher salary in both absolute and percentage terms, with a few exceptions. The largest declines were in the Southeast Michigan region (0.8 student per teacher, or 5 percent) and the Upper Peninsula region (0.6 student per teacher, or 4 percent).

### *Total active teacher supply and the percentages of newly certified teachers and teachers retained in the same district from the previous year declined between 2013/14 and 2017/18*

The total active teacher supply declined in both teacher count and full-time equivalent teachers from 2013/14 to 2017/18 (figure 3). The teacher count declined from 95,925 to 93,115, or by 3 percent, and full-time equivalent teachers declined from 93,699 to 91,777, or by 2 percent. This difference may suggest a decline in the number of part-time teachers or, more generally, an increase in the average teacher caseload. Declines in full-time equivalent teachers varied by subject area. Full-time equivalent teachers of English language arts declined by 1,214, or 4 percent, which accounted for 63 percent of the reduction in total full-time equivalent teachers (see table B8 in appendix B). The largest percentage declines in full-time equivalent teachers were in business education (14 percent), technology (6 percent), and health and physical education (6 percent). Full-time equivalent teachers increased in three subject areas: bilingual education (16 percent), world languages (8 percent), and special education (3 percent).

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3. Student–teacher ratios were calculated based on total enrollment from the MI School Data portal and total full-time equivalent teachers (excluding early childhood teachers) from the Michigan Department of Education's Registry of Educational Personnel at each level of analysis (that is, statewide or region). The ratios calculated using this method are generally smaller than those reported in Michigan Department of Education financial data (Bulletin 1014; https://www.michigan.gov/mde/0,4615,7-140-6605-21514--,00.html). And statewide ratios calculated using this method are smaller than those calculated using the average of district-level ratios.
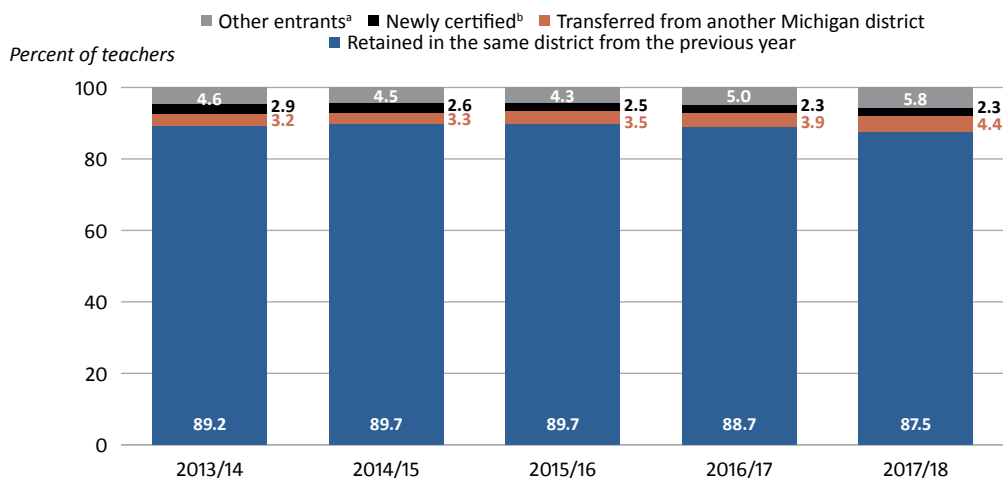
**Figure 3. The size of the Michigan teacher workforce declined between 2013/14 and 2017/18**



*Number of teachers or full-time equivalent teachers*

Legend: Teacher count — Full-time equivalent teachers

Source: Authors' analysis of Registry of Educational Personnel data provided by the Michigan Department of Education.

The sources for the pool of active teachers shifted over time. The percentages of newly certified teachers and teachers retained in the same district from the previous year declined, while the percentage of teachers from other sources increased. The largest source of teachers every year was teachers retained in the same district from the previous year (figure 4). The percentage of teachers from this source remained stable between 2013/14 and 2015/16 but declined by 2 percentage points between 2015/16 and 2017/18. The percentage of newly certified teachers declined from 2.9 percent in 2013/14 to 2.3 percent in 2017/18, due largely to the decline in the number of newly certified teachers from in-state traditional teacher preparation programs, which fell by 30 percent (figure 5). The number of newly certified teachers from alternative certification programs was small but also declined by 66 percent during the period. In contrast, the number of newly certified teachers from out of state increased by 51 percent. The percentage of teachers who transferred from another Michigan district increased

**Figure 4. As a percentage of Michigan's active teacher supply between 2013/14 and 2017/18, newly certified teachers and teachers retained in the same district from the previous year declined, while teachers who transferred from another Michigan district and other entrants increased**



*Percent of teachers*

Legend: Other entrants[a] ■ Newly certified[b] ■ Transferred from another Michigan district ■ Retained in the same district from the previous year

| Year | Other entrants | Newly certified | Transferred | Retained |
|------|---------------|-----------------|-------------|----------|
| 2013/14 | 4.6 | 2.9 | 3.2 | 89.2 |
| 2014/15 | 4.5 | 2.6 | 3.3 | 89.7 |
| 2015/16 | 4.3 | 2.5 | 3.5 | 89.7 |
| 2016/17 | 5.0 | 2.3 | 3.9 | 88.7 |
| 2017/18 | 5.8 | 2.3 | 4.4 | 87.5 |

a. Teachers who were not teaching in the previous year and were not newly certified.

b. Teachers who entered into teaching for the first time each year and who received their initial teaching certificate within the previous three years.

Source: Authors' analysis of Registry of Educational Personnel data and teacher certification data provided by the Michigan Department of Education.
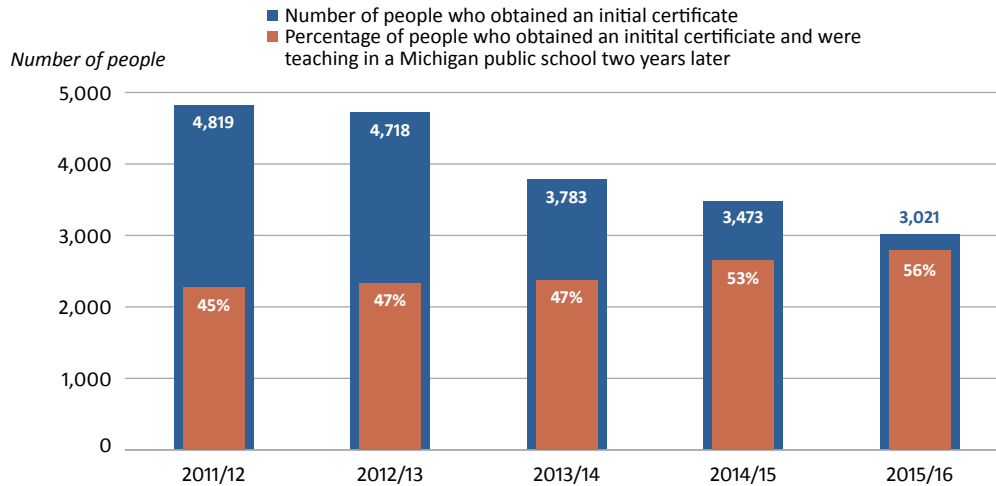
**Figure 5. The number of newly certified active teachers from in-state traditional teacher preparation programs in Michigan declined between 2013/14 and 2017/18**
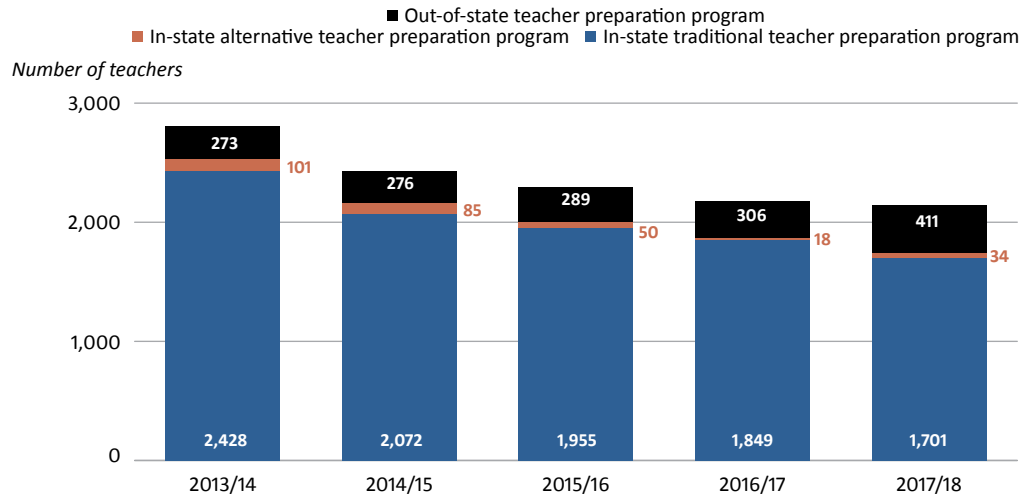


Note: Newly certified teachers are teachers who entered into teaching for the first time each year and who received their initial teaching certificate within the previous three years.

Source: Authors' analysis of Registry of Educational Personnel data and teacher certification data provided by the Michigan Department of Education.

slightly each year, from 3 percent in 2013/14 to 4 percent in 2017/18 (see figure 4). The percentage of other entrants decreased between 2013/14 and 2015/16 but increased between 2015/16 and 2017/18.

The decline in the percentage of newly certified active teachers was consistent with the decline in the number of people who completed in-state teacher preparation programs and the number who obtained an initial teaching certificate in the state. Between 2011/12 and 2015/16 the number of people who completed an in-state teacher preparation program declined by 34 percent, from 4,720 to 3,120, and the number who obtained an initial teaching certificate declined by 37 percent, from 4,819 to 3,021 (figure 6). However, among people who obtained an initial certificate, the percentage who were teaching in a Michigan public school two years after certification increased from 45 percent for those certified in 2011/12 to 56 percent for those certified in 2015/16.

The trends between 2013/14 and 2017/18 in the percentage of teachers from various supply sources by subject area, region of the state, district locale, and district average salary are largely consistent with the statewide trends. Key findings include:

- Early childhood education had the lowest average percentage of teachers retained in the same district from the previous year (81 percent), though that percentage increased by 12 percentage points over the period (see table B9 in appendix B).
- Bilingual education teachers experienced the largest decline in the percentage of teachers retained in the same district from the previous year (7 percentage points), as well as the largest increase in the percentage of teachers who transferred from another Michigan district (5 percentage points; see tables B9 and B10 in appendix B).
- Career and technical education teachers experienced the largest decline in the percentage of newly certified teachers (6 percentage points; see table B11 in appendix B).
- All regions saw declines in the percentage of teachers retained in the same district and increases in the percentages of teachers who transferred from another Michigan district and other entrants. The percentage of newly certified teachers declined in all but three regions—Northeast, West Michigan, and Southeast Michigan (see tables B13–B16 in appendix B).

**Figure 6. The number of people who obtained an initial certificate in Michigan declined every year between 2011/12 and 2015/16, but the percentage who entered into teaching in a Michigan public school rose**



*Number of people*

Legend:
- ■ Number of people who obtained an initial certificate
- ■ Percentage of people who obtained an initial certificate and were teaching in a Michigan public school two years later

| | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 |
|---|---|---|---|---|---|
| Number who obtained initial certificate | 4,819 | 4,718 | 3,783 | 3,473 | 3,021 |
| Percentage teaching two years later | 45% | 47% | 47% | 53% | 56% |

Note: The percentages shown in the red bars indicate, for example, that of all the people who obtained an initial teaching certificate in 2015/16, 56 percent were teaching in a Michigan public school in 2017/18. Initial certificate refers to three types of certificates in Michigan's teacher certification database: Standard Teaching Certificate, Standard Career and Technical Education Certificate, and Interim Teaching Certificate.

Source: Authors' analysis of data from U.S. Department of Education (n.d.) and Registry of Educational Personnel and teacher certification data provided by the Michigan Department of Education.

• Low-salary districts had the lowest average percentage of teachers retained in the same district from the previous year (85 percent), 6 percentage points lower than the average for medium-salary districts and 9 percentage points lower than the average for high-salary districts (see table B18 in appendix B).

*The number of substitute permits issued to Michigan schools and districts increased between 2015/16 and 2017/18, which may reflect teacher shortages by subject area, region of the state, district locale, and district average teacher salary*

The number of substitute permits issued to Michigan schools and districts fell between 2013/14 and 2015/16, from 47,516 to 42,584 (figure 7), or by 10 percent, but increased between 2015/16 and 2017/18 to 46,163, or by 8 percent. The trends in the total permit count varied across regions of the state, district locales, and district average teacher salary. Key findings include:
• Half of the regions saw the total number of substitute permits increase between 2013/14 and 2017/18. The percentage increase was largest in East Michigan (73 percent), followed by East Central Michigan (24 percent; see table B19 in appendix B).
• The substitute permit count increased by 3 percent in suburban districts and by 13 percent in rural districts (see table B19 in appendix B). The counts in city districts declined between 2013/14 and 2016/17 but increased by 3 percent between 2016/17 and 2017/18. And the count in towns fluctuated from year to year.
• Between 2013/14 and 2016/17 the number of substitute permits increased by 49 percent in medium-salary districts and by 24 percent in high-salary districts (see table B19 in appendix B). In low-salary districts the permit count in 2016/17 was essentially unchanged from 2013/14.

The number of long-term substitute permits increased overall and as a share of total substitute permits between 2013/14 and 2017/18. The number of long-term substitute permits increased from 899 (2 percent of the total) in 2013/14 to 2,674 (6 percent of the total) in 2017/18 (see figure 7; see also table B20 in appendix B for the permit types included in the long-term substitute permit category).

**Figure 7. The total number of substitute permits in Michigan public schools declined between 2013/14 and 2015/16 but increased between 2015/16 and 2017/18, while the percentage of long-term substitute permits increased every year from 2013/14 to 2017/18**
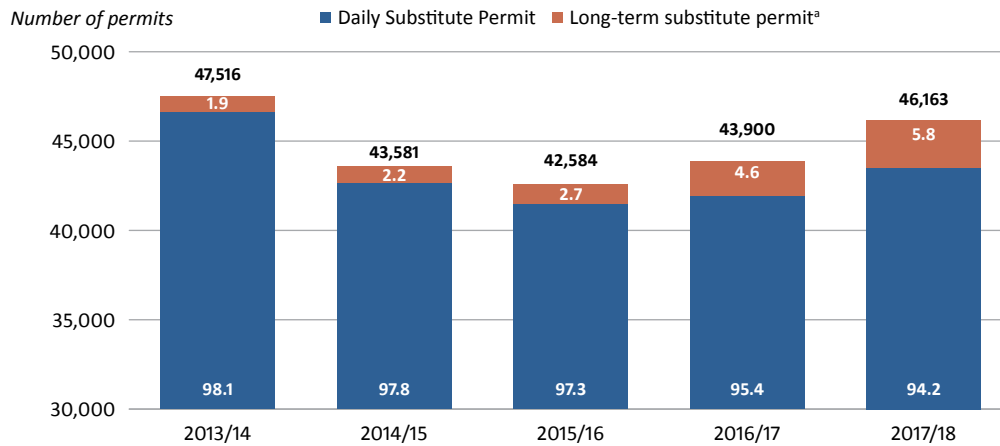


Note: The label on top of each bar is the total number of substitute permits. The labels inside the bars are the percentage of substitute permits of each type.

a. See table B20 in appendix B for the permit types included in the long-term substitute permit category.

Source: Authors' analysis of substitute permit data provided by the Michigan Department of Education.

The number of long-term substitute permits increased in all subject areas between 2013/14 and 2017/18, particularly between 2016/17 and 2017/18. Career and technical education, world languages, and special education were consistently among the five subject areas with the most long-term substitute permits (see table B21 in appendix B). General elementary education and English language arts moved into the top five in 2016/17 and 2017/18.

Career and technical education, world languages, bilingual education, technology, and health and physical education were consistently among the five subject areas with the highest percentage of long-term substitute permits as a share of total teacher count between 2013/14 and 2017/18 (see table B21 in appendix B). In 2017/18 long-term substitute permits accounted for 66 percent of the total career and technical education teacher count and more than 4 percent of the total teacher count in the other four subject areas.
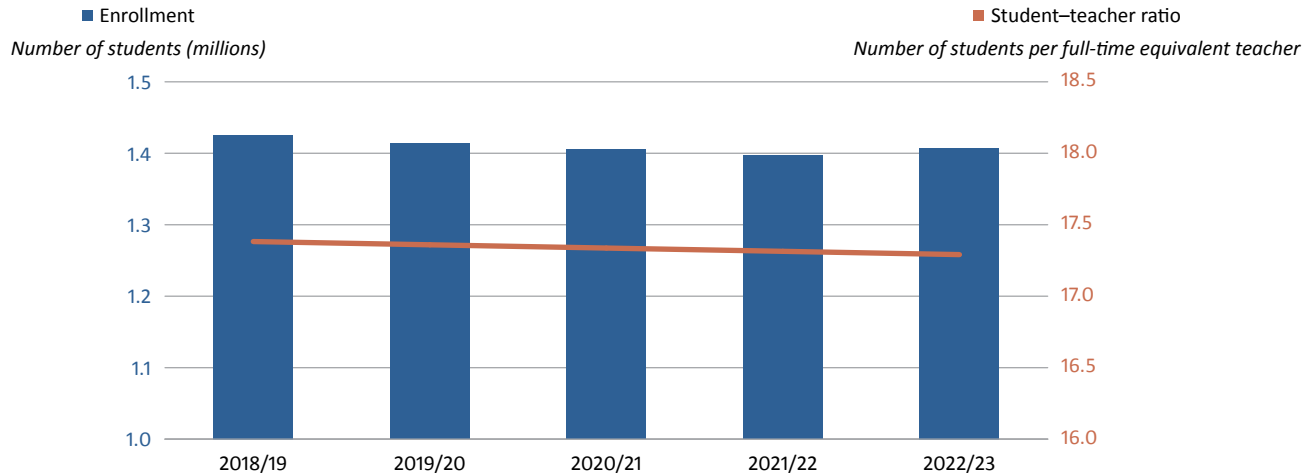
### Some subject areas and regions of the state are projected to see teacher shortages between 2018/19 and 2022/23, but the total active teacher supply in Michigan public schools is projected to meet demand

Total enrollment is projected to decline by 1 percent between 2018/19 and 2022/23 (figure 8). This trend is largely consistent across regions of the state, district locales, and district average teacher salaries:
- All but three regions—Northwest, West Michigan, and South Central—are projected to see enrollment declines over the period, with East Michigan projected to have the largest decline (5 percent; see table B22 in appendix B).
- Enrollment is projected to decline for districts in all four locale categories, with rural districts projected to see the largest decline over the period (2 percent; see table B23 in appendix B).
- Low-salary districts are projected to see larger enrollment declines (2.1 percent) than medium-salary districts (1.4 percent) and high-salary districts (1.2 percent; see table B24 in appendix B).

The total active teacher supply in Michigan public schools is projected to meet demand between 2018/19 and 2022/23. Total demand (calculated as enrollment divided by student–teacher ratio) is projected to decline each year between 2018/19 and 2021/22 and to increase between 2021/22 and 2022/23 (figure 9). There is a positive

**Figure 8. Total enrollment and student–teacher ratios in Michigan public schools are projected to decline between 2018/19 and 2022/23**



Source: Authors' analysis of data from the MI School data portal and Registry of Educational Personnel data provided by the Michigan Department of Education.

**Figure 9. The total active teacher supply in Michigan public schools is projected to meet demand between 2018/19 and 2022/23**
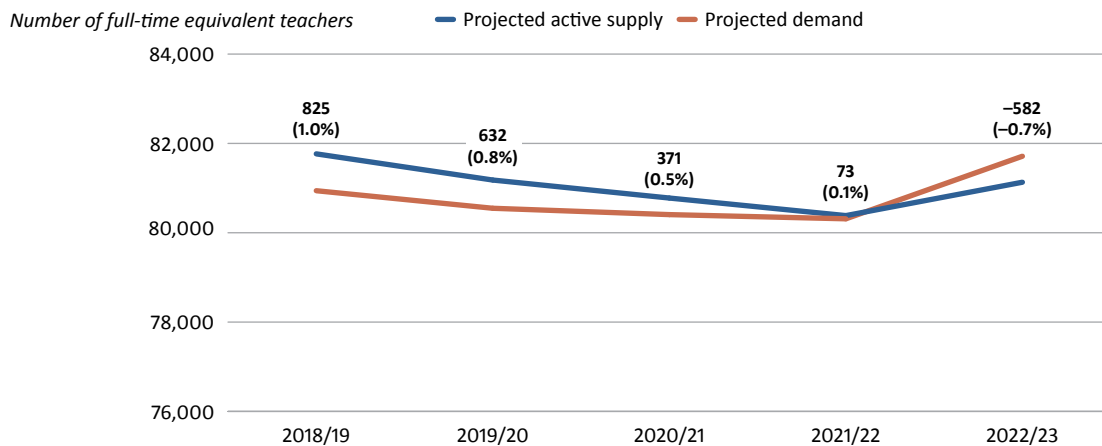


Note: The curves track the absolute and percentage differences between projected total active supply and projected demand each year. The absolute difference is the difference between projected demand and projected total active supply; the percentage difference is the absolute difference divided by projected demand.

Source: Authors' analysis of data from the MI School data portal, data from various editions of the U.S. Census Bureau's Annual County Resident Population Estimates report, and Registry of Educational Personnel and teacher certification data provided by the Michigan Department of Education.

difference of 825 teachers (1 percent) between projected total active supply and projected demand in 2018/19, but the surplus is projected to shrink over time. By 2022/23 demand is projected to exceed supply by 582 teachers (0.7 percent).

Key findings of teacher demand and active supply projections between 2018/19 and 2022/23 by subject area, region of the state, district locale, and district average teacher level include:
- Teacher shortages are projected over the entire period in business education, career and technical education, and English language arts, with the largest—and increasing—shortages projected for business education

(3–19 percent) and career and technical education (7–13 percent) and smaller shortages for English language arts (1–5 percent; see table B28 in appendix B).

- Subject areas that are projected to see surpluses greater than 5 percent include technology, arts, and science. Smaller surpluses are projected for world languages, social studies, health and physical education, and special education over the period. But most of those surpluses are projected to decline over time, leading to a near balance in active demand and supply or even small shortage in 2022/23.
- Two regions—Upper Peninsula and Northwest—are projected to see teacher shortages greater than 5 percent over the period (see table B25 in appendix B). Three regions—East Michigan, Southwest, and Detroit Metro—are projected to see smaller shortages in one or more years. And three regions—Northeast, South Central, and Southeast Michigan—are projected to see surpluses greater than 5 percent.
- Districts in rural and town locales are projected to see teacher shortages of 0.8–2 percent over the period (see table B26 in appendix B). City districts are projected to see a surplus of 5 percent in 2018/19, but that is projected to shrink, and by 2022/23 city districts will have a shortage of 4 percent.

## Implications

This study was designed to help state policymakers and other stakeholders in Michigan better understand imbalances in teacher demand and supply and the factors that drive those imbalances. Policymakers and other stakeholders in Michigan may be able to use the findings from the study to make more knowledgeable decisions about teacher preparation and certification policies and to develop targeted supports to address shortages and meet the needs of all students.

Enrollment trends, trends in teacher preparation, and data for specific subject areas suggest that, although enrollment in Michigan schools is declining overall, pockets of teacher shortages will emerge between 2018/19 and 2022/23. A particular concern is the availability of instructional personnel equipped to meet the needs of English learner students, students with disabilities, and lower income students. The data also suggest that teachers qualified to teach career and technical education, business education, and English language arts will be in demand. Broader teacher shortages may be an issue throughout the five-year forecast period in the Upper Peninsula and Northwest regions of the state and in districts in rural and town locales.

The anticipated shortfall of about 600 teachers in Michigan's total active teacher supply by 2022/23 implies that state leaders will need to carefully balance efforts to retain qualified teachers with efforts to improve the preparation and certification of new teachers. Because the findings suggest shortages in specific subject areas, regions, and locales, decisionmakers may wish to target their efforts accordingly. For example, past research demonstrating the positive relationship between improved teacher induction experiences and teacher retention could inform the design of programs targeting new teachers in certain subject areas or regions (Ladd, 2011; Loeb, Darling-Hammond, & Luczak, 2005; Ronfeldt & McQueen, 2017). Targeted teacher retraining or relocation support policies could be used to leverage existing high-quality teachers in response to local needs (Zanville, 2006).

To mitigate teacher shortages, teacher preparation programs will need to increase the number of program completers, increase the percentage of program completers who actually take on teaching jobs, or both. But perhaps more important, they will need to better align their preparation of teachers with district demand. One way is through partnerships between teacher preparation programs and school districts, such as Grow Your Own programs (Gist, Bianco, & Lynn, 2019). These partnerships allow teacher preparation programs and local school districts to co-design and implement streamlined pathways into teaching that meet the workforce needs of their communities and regions. Forgivable loans, service scholarships, and teacher residency models can also be effective strategies for recruiting and retaining high-quality teacher candidates while better preparing them for the challenges they will face in high-need schools (Henry, Bastian, & Smith, 2012; Li & Sass, 2017; Sutcher et al., 2016).

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