POLICY BRIEF

Is There A Teacher Shortage in Maryland? Examining Trends in Supply and Demand

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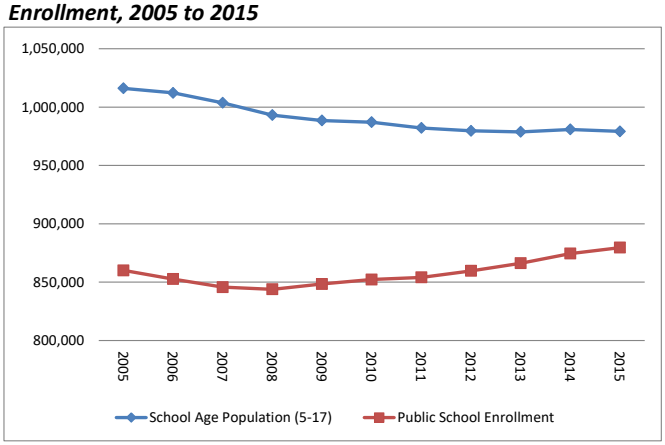
Widely publicized reports have generated attention across the US of possible shortages in the supply of teachers. These reports attribute the shortages to fewer college students enrolling in teacher training programs, stagnant pay, attrition, and retirements (McKenna, 2015; Sutcher et al, 2016). While there is evidence to suggest that enrollments in undergraduate teaching education programs have declined (McKenna, 2015; Sutcher et al, 2016) concerns over a nation-wide teacher shortage may be premature as this decline has also been met with increasing enrollment in master level programs. Teacher shortages also vary across and within states. There are well-documented cases of teacher shortages in some states (e.g., California, Arizona, Kansas), but other states graduate more teachers than are employed locally (e.g., New York). Suburban school districts have far less trouble hiring qualified and experienced candidates while urban and rural schools struggle to keep up (McKenna, 2015). Shortages also differ by content areas. Elementary teachers are often oversupplied, while math, science and special education are in greater demand. Clearly, a number of factors influence the supply and demand for teachers.

In this policy brief, we examine trends in the Maryland teacher pipeline over 10 years, from 2005 to 2015, using data from the United States Census Bureau (USCB), the National Center for Educational Statistics (NCES), and the Maryland State Department of Education (MSDE). To better understand whether there is a teacher shortage, we examine how the supply of and demand for teachers in Maryland has changed between 2005 and 2015. We define a shortage as a situation when demand for teachers exceeds supply. To gain insight into the nature of this market, we examine a variety of supply and demand factors. In the first section, we focus on factors that influence demand for teachers followed by an analysis of trends in the supply of teachers. The following section considers the interplay between these supply and demand trends. We end by offering recommendations to address this issue.

Figure 1: Maryland School Age Population and Public School Enrollment, 2005 to 2015



Sources:

- School Age Population Estimates: US Census Bureau, *State Characteristics: Vintage 2015*
- Public School Enrollment: National Center for Education Statistics, *Common Core of Data*

Demand for Teachers in Maryland

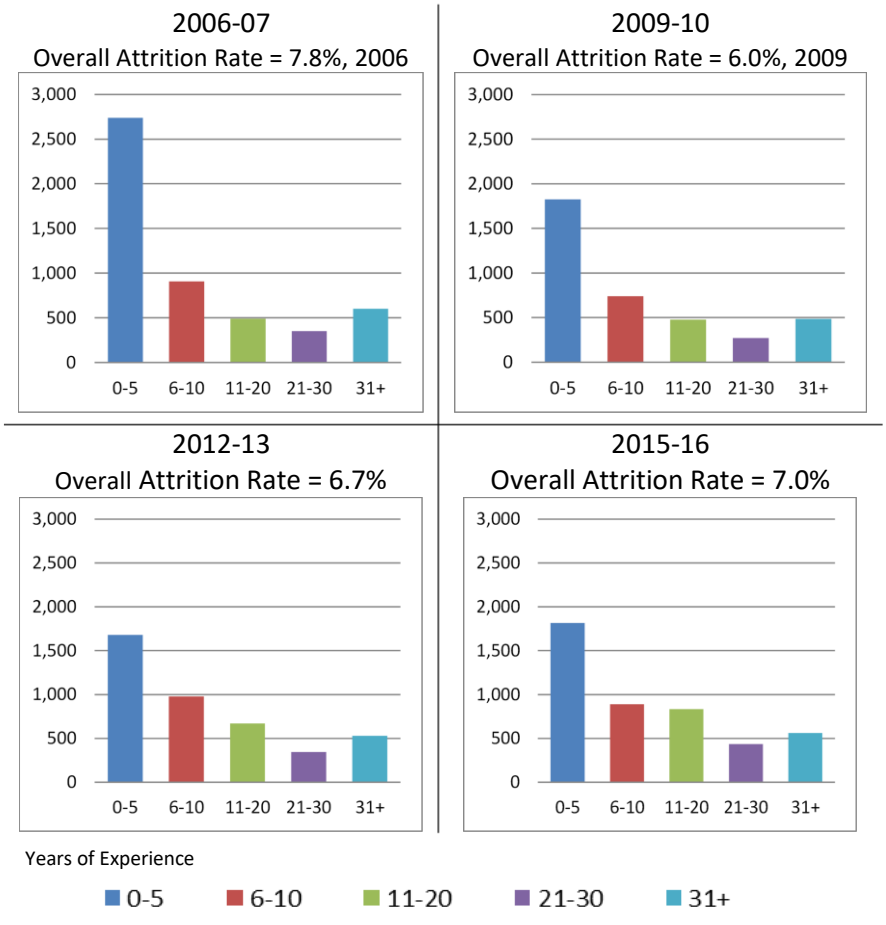
School Age Population & Public School Enrollment: Both the population of school-aged children (aged 5-17) in the state and public school enrollment influence the demand for teachers. School age population provides an estimate of the potential student body. Enrollment is a measure of the actual public school population and as a result is a more direct measure of demand. Growth in

enrollment generally indicates an increase in the demand for teachers. As Figure 1 shows, the total school age population in Maryland has declined 3.7%, from 1,016,053 in 2005 to 979,191 in 2015 (USCB, 2015). In contrast, public school enrollment declined 1.9% between 2005 and 2008, mirroring the population decline during that time period, but has climbed since, for an increase of 2.2% between 2005 and 2015 (NCES, 2016). If the number of students enrolling in public schools continues to increase, this may impact the number of teachers required in Maryland.

Changes in class size also influence the demand for teachers. Many states saw an increase in the student-teacher ratio in a response to budget cuts following the 2008 recession. Some have argued that as states attempt to return to pre-recession student teacher ratios (15.3:1 in 2008 compared to 16.0:1 in 2015 nationally), demand for teachers will increase (Sutcher et al, 2016). The student teacher ratio in Maryland has ranged from a 2008 pre-recession ratio of 14.3:1 to a high of 14.9:1 in 2013, and at 14.8:1 in 2014, it was below the nationwide pre-recession average of 15.3:1 (NCES, 2016). If the Maryland trend towards student-teacher ratios closer to pre-recession levels continues, Maryland may need additional teachers.

Teacher Attrition: Teacher attrition also plays a role in the demand for teachers. Teacher attrition effects the hiring of new teachers, even when the overall demand for teachers remains static. Because teachers leave at different points in their career, we examine attrition by number of years teaching.

Figure 2: Maryland Attrition by Years of Experience, 2006 to 2015



Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Report, 2008 - 2010 & 2010 - 2012*

In Maryland, teacher attrition rates have ranged from a high of 7.8% in 2006-07 to a low of 6.0% in 2009-10 (figure 2). However, attrition rates have increased since 2009, from 6.0% to 7.0% in 2015-16. Even so, the most recent nation-wide estimate (2012-13) of the teacher attrition rate is 7.7% (Goldring, Taie, & Riddles, 2014), putting Maryland at or below the national average.

Figure 2 also shows teacher attrition by number of years teaching. The number of early career teachers, those with 0-5 years of experience, leaving Maryland public

schools dropped, from 2,737 in 2006-07 to 1,681 in 2012. This drop persisted despite an overall attrition rate increase of 0.7% from 2009-10 to 2012-13. While fewer early career teachers leave the profession they still accounted for 40% of overall attrition in 2015-16. At the other end of the spectrum, the proportion of teachers leaving late in their career or retiring (21+ years of experience), remained fairly constant at 12-13%, ranging from a low of 755 in 2009-10 to a high of 999 in 2015-16. While there is often a concern about retiring baby boomers, these data suggest that the wave of retirements among this generation has passed. Instead, mid-career teachers, those with 6-10 and 11-20 years of experience, make up a larger number (increasing from 1,398 in 2006-07 to 1,722 in 2015-16) of those leaving the state's public schools. This suggests that although the state has improved the retention of teachers early in their career, it has not had substantial effects on overall attrition rates because more mid-career teachers are leaving.

Other Demand Factors: Teachers are certified in a specific content area, and typically, there are some content areas that are considered surplus areas while others are traditional shortage areas. MSDE estimates teacher shortages in critical content areas using a regression analysis of the number of teachers hired in a given year compared to the number of teachers produced by colleges and universities in Maryland for each certification area. While hiring data used in the regression analysis includes in-state and out-of-state hires, the production data includes only those graduates from Maryland institutions of higher education. Since more than half of new hires in Maryland are from out of state (see figure 6), this method inflates content area teacher shortages because it does not take into account out of state hires. That said, in 2016 MSDE reported critical teacher shortages in art, dance, Family and consumer sciences, technology education, English, ESOL, foreign language (French & Spanish), mathematics, science, and special education (MSDE, 2016).

Research suggests that urban and rural school districts tend to have a harder time filling positions than suburban districts (Schwartzbeck, et al, 2005, Hanushek, Kain, & Rivkin, 2004). However, Maryland does not have a measure to track teacher shortages by geographic region that is independent of content area shortages. MSDE collects information on geographic shortages in content areas from a school district survey, which asks whether the district wants to be declared an area of geographic shortage. All counties in Maryland have declared shortages in at least one content area (MSDE, 2016).

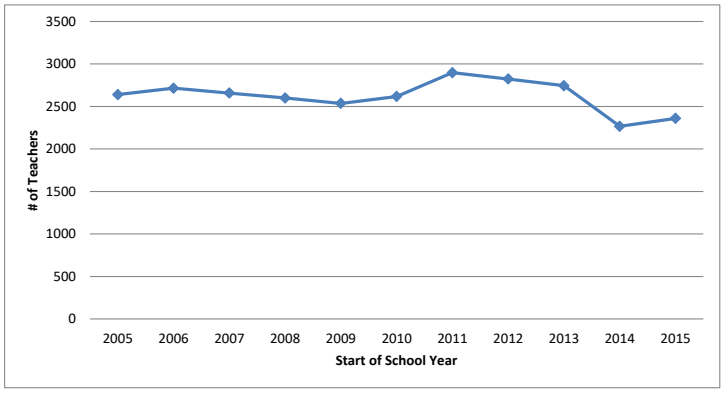
Supply of Teachers in Maryland

Maryland Teacher Pipeline: Compared to other fields, licensing requirements create relatively high barriers to entry to the teaching field. To earn certification, students must attend a state approved teacher-training program, earn a bachelor's degree, and pass a teacher certification exam. To measure the supply of teachers, we use: (1) the number of graduates of Maryland teacher education programs, and (2) enrollment in Maryland teacher education programs.

There is more than one path to obtaining a teaching certificate in Maryland. The primary path is through a Maryland Academic Program (MAP). These are educator preparation programs approved by MSDE and offered by 23 colleges and universities in Maryland (MSDE, 2015). MAP graduates receive a bachelors' or masters' degree and are certified to teach in Maryland. MAPs may also offer certificate programs for those who have a non-teaching B.A. and wish to obtain teaching licensure without obtaining an additional degree. Of the 23 programs, six institutions produce roughly three-fourths of the candidates: Towson University, University of Maryland College Park, Johns Hopkins University, Salisbury University, Notre Dame of Maryland University, Frostburg State University (see Appendix figure A1 for graduates by institution).

The supply of teachers, as measured by the number of MAP graduates, has been fairly constant. Between 2005-2015 MAPs graduated an average of 2,622 teachers yearly and showed only marginal variation around that mean (Figure 3). Even so, the number of MAP graduates dropped below that average to 2,266 in 2014 and 2,359 in 2015. In contrast, Figure 4 shows that beginning in 2010, student enrollment in teacher education programs has steadily declined. Statewide enrollment in BA and MA education programs dropped 19% between 2010 and 2014. This trend may be an early indicator of a possible downturn in teacher supply and explains why Maryland saw a drop in MAP graduates beginning in 2014.

Figure 3: Number of MAP Graduates, 2005 to 2015

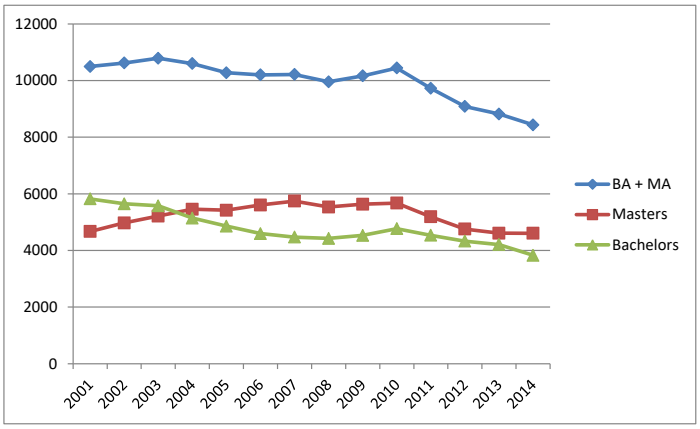


Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports*

Another pathway into teaching in Maryland is through Maryland Approved Alternative Preparation Programs (MAAPP). These are partnerships between local districts and a local teacher-training provider, such as a college or university, Teach for America, or the New Teacher Project that recruit, screen, and train individuals with non-education undergraduate degrees. Program graduates receive a Resident Teacher Certificate and are placed in the local participating district. Currently five school districts host MAAPP (Anne Arundel, Baltimore City, Baltimore County, Montgomery, and Prince Georges) with a total of 12 programs across those districts. This pathway represents about 8-10% of total statewide hires. However these hires can make up a substantive percentage of the teachers hired in participating districts (19.6-40.1% depending on the district).

School districts that are unable to fill an open position with a certified teacher may fill those positions on a case-by-case basis by requesting a two-year conditional certificate for a potential hire who met some but not all of the certification requirements. This pathway represented roughly 10% of total hires in 2012 and 2013 (MSDE, 2014). Since districts cannot leave a classroom without a teacher the rate of conditionally certified teachers could be considered a crude indicator of teacher shortages. In Maryland, two urban districts (Baltimore City, and Prince George's County) and three rural districts (Dorchester, Charles, and Caroline) had a higher percentage of conditionally certified teachers compared to other districts in the state (MSDE 2008-2016). This follows national trends that show urban and rural school districts have a more difficult time finding qualified teachers compared to their suburban counterparts (Lankford, Loeb, & Wyckoff, 2002, Monk 2007). Still, the number of

Figure 4: MAP Enrollment, 2001 to 2014



Source: Maryland Higher Education Trend Data and Program Inventory

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teachers holding a conditional certificate has declined dramatically in the last 10 years, from 7.5% of all teachers in 2006 (MSDE, 2006) to 1% in 2013 (MSDE, 2014). This drop is likely related to school district efforts to meet the federal highly qualified teacher requirements (MSDE, 2012). Given that federal law no longer requires that core teachers achieve highly qualified status, this may change in the future.

Since many teachers receive their teacher training and/or initial license in other states, Maryland offers pathways for graduates from approved out of state programs to receive their initial certificate or transfer their out of state teaching license to Maryland. Maryland has historically been an import state, and as a result these out of state hires account for a significant portion of the total supply of teachers.

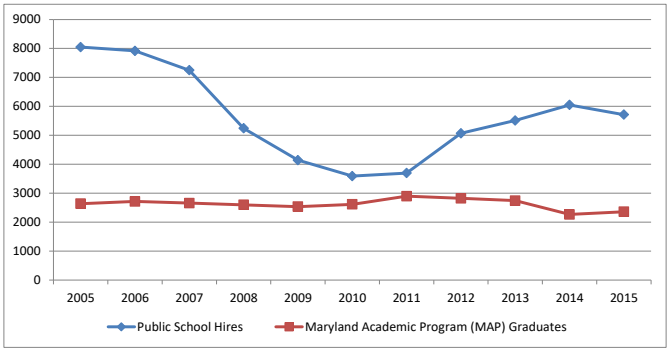
Trends in the Teacher Labor Market in Maryland

Changes in Hiring: The critical question is whether the supply of teachers is sufficient to meet the demand for teachers. This section compares trends in the supply and demand for teachers.

Figure 5 compares the number of teachers hired to the number of MAP graduates. It shows that Maryland hires more teachers than it graduates from MAPs. Between 2006 and 2010 the number of teachers hired dropped dramatically. Teacher hires were highest in 2005 with 8,046 teachers hired. Comparatively, in 2010 public school districts hired only 3,590 teachers statewide for a drop of 55% in 5 years. Since 2010 hiring has increased to 5,714 in 2015. The most recent data shows that in 2015 public school districts hired 5,714 teachers statewide.

Figure 5 also shows the number of students graduating from a MAP. These institutions have graduated roughly the same number of teachers between 2005 and 2015, suggesting that this source of supply has not altered greatly even as hiring trends varied. This is not surprising since it may be difficult for institutions of higher education to expand their capacity in response to short term trends.

Figure 5: Maryland Public School Hiring and MAP Graduates Trends, 2005 to 2015



Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports*

Figure 6: Maryland Hiring Trends (In vs Out of State), 2005 to 2015

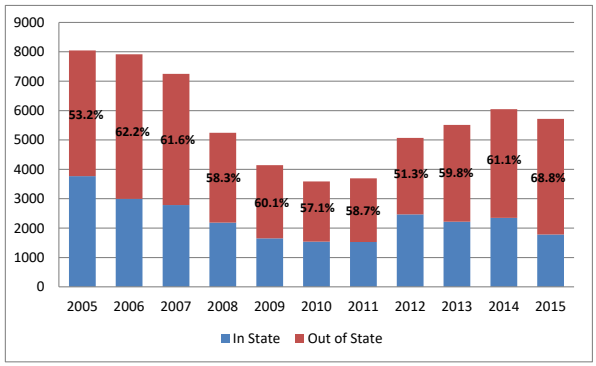


Figure 7: Maryland Hiring Trends (New vs Experienced), 2005 to 2015

Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports*

Maryland is traditionally a teacher import state. As one can see from Figure 6, Maryland hires a larger proportion of their teachers from out of state. Between 2005 and 2015, the proportion of teachers hired from out of state ranged from a low of 51.3% in 2012 to high of 68% in 2015 of total hires.

It is also important to note that the total number of hires is also divided between first time teachers (i.e. new hires) and those with prior teaching experience. Figure 7 shows that new hires make up a larger percentage of total hires than experienced hires (ranging from 51.7% in 2015 to 63.4% in 2011), although in 2015 the hiring pool was almost evenly divided between these two groups (MSDE, 2015).

Figure 8 disaggregates total teacher hires by whether teachers were new or experienced and whether they were hired from in state or out of state. This shows an increase in hiring newly prepared teachers from out of state. In 2015, the percentage of the total hiring pool made up of Maryland prepared new teachers dropped to just 5.5% (figure 8).

As noted earlier the number of teachers produced in Maryland has remained fairly constant (see Figure 5). The percentage of MAP graduates hired by Maryland public schools ranges from 55% in 2005 to 13% in 2015 (Figure 9). In other words, MAPs graduate more students than are actually hired by Maryland school districts. The increase in the percentage of MAP graduates that were hired by school districts between 2011 and 2014 corresponds to an increase in public school enrollment during those years.

Critical Shortage Areas: Referring back to Figure 5, the contribution of MAP graduates to the total supply of teachers in Maryland has remained largely constant since 2005, graduating approximately 2600-2800 students per year. As seen in Figure 10, the number of MAP graduates in most critical shortage areas—ESOL, foreign language, mathematics, science—has also remained relatively constant. However, the number of Special Education teachers graduating from MAPs has varied, increasing between 2005-2010 to a high of 568 and then dropping to a low of 199 in 2014 (MSDE, 2015).

Figure 8: Makeup of Maryland Public School Hires, 2010 to 2015

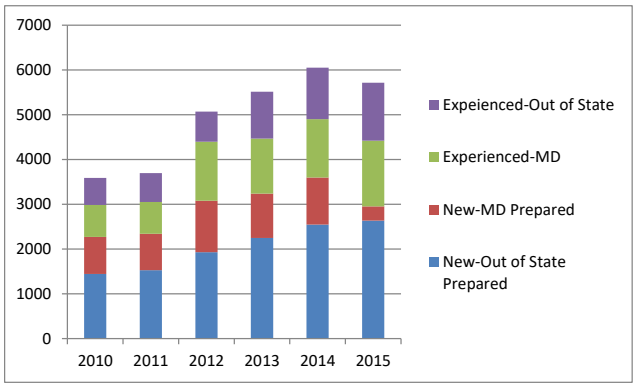


Figure 9: Maryland Public School Hires of MAP Graduates, 2005 to 2015

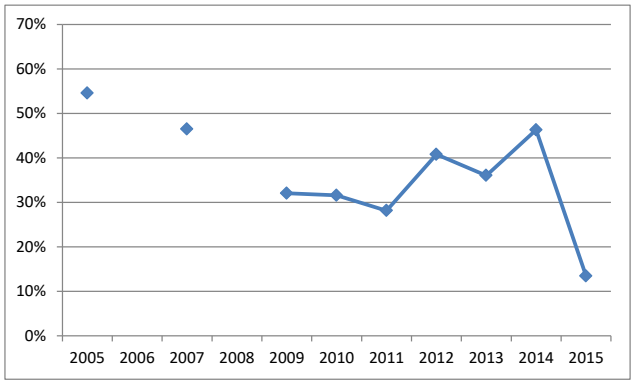
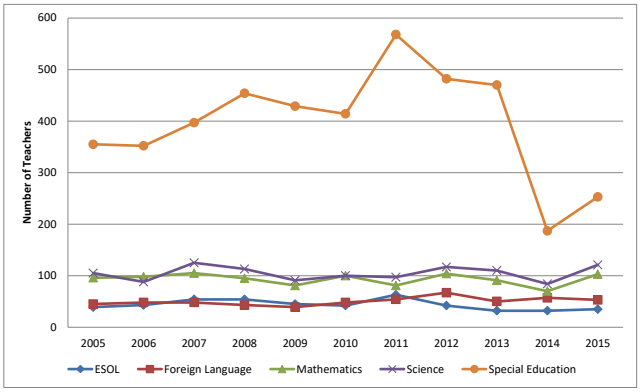


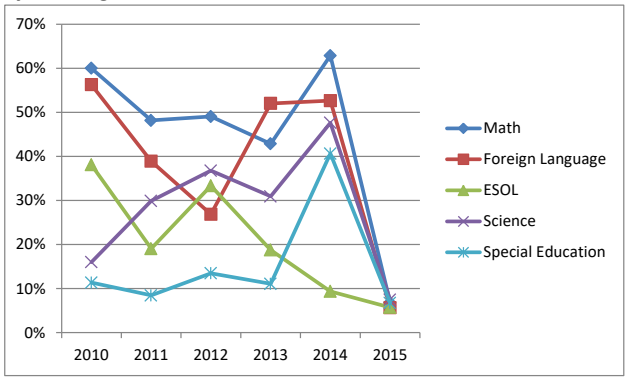
Figure 10: MAP Graduates in Shortage Areas, 2005 to 2015



Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports*

If we look more closely at hire rates for MAP graduates by shortage area, there is considerable variability (Figure 10). Across all content areas, local school districts generally hired less than half of the available MAP graduates, with some exceptions in some years (e.g., math in 2010 and 2014; foreign language in 2010, 2013 and 2014). In Special Education, just over 10% of candidates were hired by a Maryland school district in most years, the exception being 2014 (MSDE, 2015). If the 2015 data on shortage areas hires is correct, local districts hired less than 10% of the available shortage area graduates (MSDE, 2015).

Figure 11: Maryland Public School Hires of MAP Graduates by Shortage Area, 2010 to 2015



Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports*

Summary and Policy Recommendations

Demand:

- Public school enrollment in Maryland increased 2.2% between 2005 and 2015, even as the school age population declined 3.5% between 2005 and 2014.
- Teacher attrition has been relatively static and at 7.0% in 2015, is below the national average of 7.7%.
- The distribution of when teachers leave teaching has changed. Maryland has improved the retention of early career teachers (0-5 years experience) slightly, but attrition has increased among mid-career teachers (5-20 years experience). Teacher's retiring has not changed.
- MSDE continues to identify teacher shortages in some content areas (ESOL, foreign language, mathematics, science, and special education), however this reporting does not take into account out of state hires.

Supply:

- The supply of teachers produced by institutions of higher education in Maryland was relatively constant between 2005 and 2013, but declined in 2014 and 2015. This may be related to a decline in MAP enrollment, which began in 2011.
- The number of teachers hired by Maryland public schools has fluctuated between 2005 and 2015. Teacher hiring declined between 2007 and 2011, followed by an increase that may be leveling off.
- Maryland teacher education programs graduate more teachers than are hired within the state, which may be contributing to a decline in enrollment in colleges of education. Approximately, 30%- 40% of newly prepared Maryland graduates are hired by school districts in the state.
- Maryland has a history of hiring candidates prepared outside the state. The percentage of teachers hired from out of state has increased, accounting for 68% of new hires in 2015.
- The number of Maryland graduates in most content shortage areas is static, with the exception of special education teachers. The number of special education teachers increased between 2011 and 2013, but fell in 2014.
- Across all content shortage areas (math, foreign language, ESOL, science, and special education), local school districts hired less than half of the available MAP graduates, although there is considerable variability across content areas and years.

The outlook for change in the demand for teachers in Maryland is mixed. On the one hand, enrollment in public schools in Maryland increased even as the school age population in the state decreased. This increase in public school enrollment has not translated into increased teacher hiring. Rather, increases and decreases in teacher hiring appear to be driven by the 2008 recession and recovery. On the other hand, there has been little change in teacher attrition rates. Attrition among those with 0-5 years of experience has dropped slightly. This is good news, since a majority of teachers leaving the profession do so early in their career (Gray & Taie 2015). Teacher retirements have stabilized and are unlikely to present a staffing challenge. This analysis also shows that mid-career teachers (6-20 years experience) make up a larger proportion of those leaving teaching, suggesting that while younger teachers may be staying longer, more are now leaving mid-career.

On the supply side, there is little evidence of a teacher shortage in Maryland. Maryland graduates more teachers from its teacher education programs than it hires. Typically, between 30% and 40% of graduates from the state's teacher education programs are hired each year by public schools in Maryland. Maryland continues to hire a majority of its teachers from out of state and this trend has increased in recent years even as the number of Maryland graduates remains virtually unchanged. This excess supply of teacher graduates from Maryland programs may explain recent enrollment declines in Maryland teacher education programs. Likewise, in content areas that are considered "critical shortage areas" by the state, Maryland public schools hire less than half of Maryland graduates certified in those subjects.

Finally, decreased enrollment in teacher preparation programs coupled with increasing enrollment in Maryland public schools suggest that the teacher labor market may change in the future. In addition, MSDE continues to report critical shortages in some content areas. However, the cause of these reported shortages is not clear, especially given the disparities between teachers graduating from Maryland programs and the number of those teachers hired in state.

Given these findings, we offer the following recommendations:

Monitor the regional teacher market. Understanding the intricacies of the teacher supply and demand dynamics in the state of Maryland requires looking beyond our state borders. School districts consistently rely on out of state hiring, and it is likely that MAP graduates also consider positions out of state. Understanding the push and pull factors that may entice candidates to and away from our state may be key in better understanding the teacher labor market in Maryland. In particular, further attention must be paid to the causes of the sharp decline in the hiring of MAP graduates for the 2015-2016 school year.

Improve tracking of critical content area shortages: The current tracking system tends to inflate critical area shortages because it does not take into account the supply of teachers from out of state. While the measure includes data on both in state and out of state hires, the teacher supply data includes only those graduates from Maryland institutions of higher education. Revising this system to take into account teachers prepared out of state will provide a more reliable measure of critical shortage areas. Since districts continue to report shortages in critical content areas via survey reports, it is important to better understand the scope and depth of possible shortages.

Track geographic shortage areas: Maryland needs to develop a more reliable indicator of geographic shortages that is independent of content area shortages. This will help us gain a greater understanding of the within state market for teachers.

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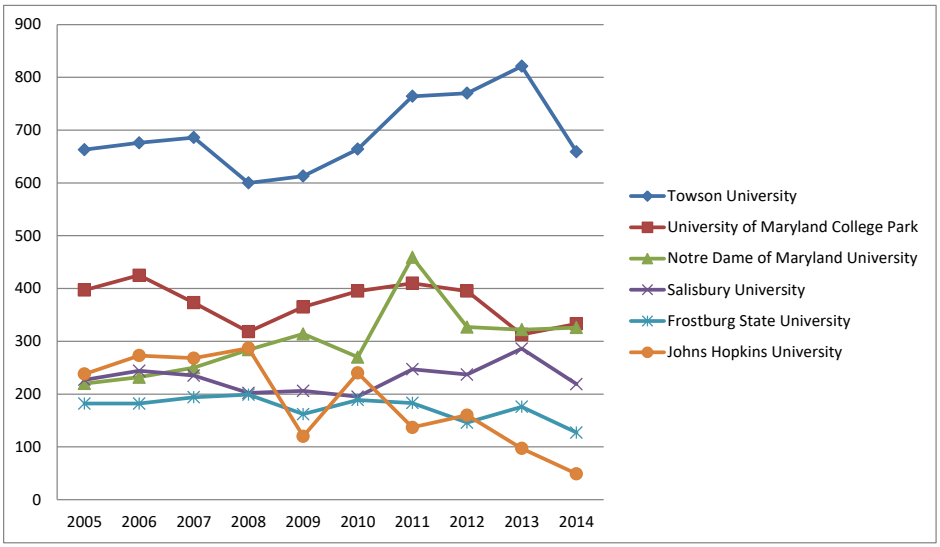
Appendix

Figure A1: MAP Graduates by Institution (Top 6), 2005 to 2014



Source: Maryland State Department of Education, *P-12 Longitudinal Data System Dashboards*

About the Maryland Equity Project

The Maryland Equity Project seeks to improve education through research that supports an informed public policy debate on the quality and distribution of educational opportunities. It conducts, synthesizes, and distributes research on key educational issues in Maryland and facilitates collaboration between researchers and policymakers. The Maryland Equity Project is a program in the Department of Teaching and Learning, Policy and Leadership in the College of Education at The University of Maryland.

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