WILL CHILDREN OF CURRENT MILLENNIALS BECOME FUTURE PUBLIC SCHOOL STUDENTS?

By Chelsea Coffin

ABSTRACT

D.C. families are choosing traditional public and public charter schools at higher rates, and the District must plan to invest in public education and address future demand. If current trends continue, there will be a large enrollment increase of about 21,100 students by school year 2026-27. Middle and high school grades will see the highest growth rates. Given housing prices and population forecasts, most growth will be from students who live outside of the Wilson High School boundary, including some neighborhoods that have seen a decline in the school-age population. The extent of the enrollment increase depends on whether Millennials choose to live in D.C. and send any children to public schools. The implication of these findings is that improving the attractiveness of schools for future middle and high school students is essential to continuing enrollment growth.
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Acknowledgments

We are grateful to the Walton Family Foundation and Education Forward DC for their generous support of the Education Policy Initiative. The paper benefited from helpful feedback and input from Jeannette Chapman, Matt Chingos, Jennifer Comey, Steven Glazerman, Dawn Leijon, Sara Mead, Arthur McKee, Ginger Moored, and Jon Valant. At the D.C. Policy Center, Yesim Sayin Taylor and Kathryn Zickuhr offered crucial guidance, and Simone Roy produced the estimates from Census microdata.

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WILL CHILDREN OF CURRENT MILLENNIALS BECOME FUTURE PUBLIC SCHOOL STUDENTS?

HOW D.C.’S YOUNG FAMILIES MAY SHAPE PUBLIC SCHOOL ENROLLMENT

by Chelsea Coffin, Director of the Education Policy Initiative, D.C. Policy Center

EXECUTIVE SUMMARY

With its population rapidly increasing, the District of Columbia must plan for how it will invest in public education to address future demand for schools. Children are already attending D.C.‘s traditional public and public charter schools at higher rates. If current trends continue, D.C.‘s public schools\(^\text{1}\) will see a large increase in enrollment in ten years. This report examines which grades are likely to grow by the most and where students could potentially live, focusing on those in pre-kindergarten through grade 12. The analysis shows that if students stay in public schools at the rates they currently do, enrollment growth will largely come from upper grades. Additionally, given housing prices and population forecasts in the city, most of this growth will be from students who live outside of the Wilson High School boundary, including some neighborhoods that have seen a decline in the school-age population. This is an important consideration when thinking about where to create more capacity for students.

Given current trends, D.C. public schools will add an estimated 21,100 seats by school year 2026-27. Of these, 11,600 will be in middle and high school grades. Almost all of the growth in middle school would occur by school year 2021-22, and the high school growth would occur between 2021-22 and 2026-27 (see Executive Summary Figure 1). These future growth estimates are the result of slightly higher proportions of students who transitioned between earlier grade bands in recent years aging into middle and high school grades, and starting to stay in greater proportions in middle and high school as well. Higher enrollments in upper grades would represent a change in enrollment patterns, as enrollment in these grades declined over the previous ten years.

\(^{1}\) Here and throughout, public schools include both traditional public and public charter schools.
EXECUTIVE SUMMARY Figure 1. In ten years, enrollment is estimated to increase

![Graph showing enrollment growth](image)

<table>
<thead>
<tr>
<th></th>
<th>2016-17</th>
<th>2021-22</th>
<th>2026-27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>20,090</td>
<td>21,098</td>
<td>22,702</td>
</tr>
<tr>
<td>Elementary</td>
<td>32,264</td>
<td>37,722</td>
<td>39,194</td>
</tr>
<tr>
<td>Middle</td>
<td>14,024</td>
<td>19,206</td>
<td>19,464</td>
</tr>
<tr>
<td>High</td>
<td>17,113</td>
<td>17,726</td>
<td>23,265</td>
</tr>
</tbody>
</table>

Source: D.C. Policy Center analysis and Office of the State Superintendent for Education (OSSE)’s enrollment audits.

However, the District will not achieve this estimated enrollment growth unless children born in D.C. enroll in public schools at much higher percentages. The percent of children born in D.C. who stay from birth to middle school would increase by 12 percentage points (up from the 2017-18 rate of 56 percent), and the percent staying through high school would increase by 7 percentage points (up from the 2017-18 rate of 47 percent). These numbers require growth in upper grades, which have not yet experienced the growth expected from increases in enrollment at the elementary level. Improving the attractiveness of schools for future middle and high school students is essential to continued growth in public school enrollment — and most of this will happen outside of the Wilson HS boundary. This is significant because the Wilson HS boundary is the only area of the city where students overwhelmingly attend their in-boundary school (Coffin, 2018).
PUBLIC SCHOOL ENROLLMENT WILL CONTINUE TO GROW IF THE DISTRICT CONTINUES TO BE THE HOME OF MILLENNIALS

D.C. added more than 105,000 residents from 2000 to 2016, and about half of this growth has come from residents who were between the ages of 20 and 34 in 2016 (today’s Millennials³), which is an increase of 38 percent for this age range (see Executive Summary Figure 2). The influx of Millennials is important for education policymakers because, at 51 live births per 1000 women, this age group has higher fertility rates than others in D.C. (United States Census Bureau, 2016). In part due to more births, enrollment in kindergarten through grade 12 at D.C.’s public and public charter schools already increased by over 8,000 from 2006-07 to 2016-17. Millennials’ decisions to continue to stay in the city and enroll any children in the District’s public schools could significantly alter the city’s fiscal picture, both in terms of tax revenue it can collect and in terms of resources necessary to provide public services, especially in the District’s public schools.

Two separate dynamics can put positive pressure on public school enrollment in D.C. First, natural changes that come with having a larger population and more children born to mothers² living in the District could lead to a larger base number of young children likely to enter the school system. Second, a stronger preference for public schools because of expanded pre-kindergarten and improved school quality⁴ could mean that more of these children stay in public schools. Both factors signal that D.C.’s public school enrollment could increase in the coming years.

² This is aligned with the Pew Research Center’s definition of those born between 1981 and 1996 (Dimock, 2018). We use 34 years old as an upper bound instead of 35 years old to align with commonly reported age groups on the American Community Survey.

³ Mothers are referenced instead of families because the data are tracked by residence of the mother, not the family.

⁴ In absence of a common performance metric for all schools, student achievement is the best available measure of district-wide school quality. D.C. public school students made steady gains of 19 percentage points in Math and Reading combined over seven years on the previous state assessment, DC-CAS (Office of the State Superintendent for Education (OSSE), 2014). Since switching to the PARCC assessment in 2014-15, D.C. public school students’ scores have increased by nine percentage points in English Language Arts and seven percentage points in Mathematics.
BIRTHS ARE HIGHER

There were a thousand more births in 2016 compared to 2007, with the largest increase occurring between 2013 and 2016 (see Executive Summary Figure 3). Births to white mothers account for most of the annual increase at 859 more births per year in 2016 than in 2007, which is already shifting the demographics of the District’s youngest children. And women are having children at older ages, with births to women aged 35 and over up by 42 percent compared to an increase of 14 percent for women aged 20 to 34 (Centers for Disease Control and Prevention, 2016). This may indicate that the District has yet to see the bump in public school enrollment that may occur from the large increase in Millennials.

**EXECUTIVE SUMMARY FIGURE 3. BIRTHS ARE ON THE RISE**

![Births by group over time chart]

Sources: Center for Disease Control (CDC), WONDER database.
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PREFERENCES FOR D.C.’S PUBLIC SCHOOLS ARE STRONGER

Enrollment preferences are shifting toward D.C.’s public schools, especially in early grades, as on net, a lower proportion of families are moving out of the District or choosing private schools. For example, cohort change ratios, or enrollment as a percentage of children born in D.C. in an earlier year, show that 73 percent of the number of children born in 1998 enrolled in a public District kindergarten five years later in 2003 (see Executive Summary Figure 4). For those born in 2010, this figure rose to 80 percent. Similarly, 61 percent of children born in 1998 enrolled in grade 5 ten years later in 2008, and this rose to 69 percent for children born in 2007. In D.C., African American families’ preferences have shifted the most toward D.C.’s public schools, while only slightly increasing for white families (see Executive Summary Figure 5). Figures for the 1998 cohort may seem low, but D.C. kept more students than other cities with a high degree of public school choice and growing populations like Oakland, New Orleans, and Boston.
EXECUTIVE SUMMARY FIGURE 4. AFTER 2007, MORE FAMILIES ARE STAYING IN D.C. OVER TIME

In addition to beginning their education in the public school system, an increasing proportion of students are staying in the city’s public schools between grade levels. Cohort transition ratios, or the net proportion of students who finished the previous grade band and are still enrolled in public schools at the end of the next
grade band, show increases in each grade, even small increases in students remaining in middle and high school grades (see Executive Summary Figure 6).

EXECUTIVE SUMMARY FIGURE 6. MORE STUDENTS ARE STAYING IN PUBLIC SCHOOLS BETWEEN GRADE BANDS IN RECENT YEARS

<table>
<thead>
<tr>
<th>Cohort Transition Ratios from One Grade Band to Another in Recent Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to Kindergarten</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>73%</td>
</tr>
<tr>
<td>83%</td>
</tr>
</tbody>
</table>

Sources: Center for Disease Control (CDC), WONDER database; Office of the State Superintendent for Education (OSSE)'s enrollment audits; and the National Center for Education Statistics (NCES)'s Public Elementary/Secondary School Universe Survey Data.

Note: Years on the table are aligned with enrollment in the later grade in each transition. D.C. Policy Center dcpolicycenter.org

OVER THE NEXT TEN YEARS, PUBLIC SCHOOL ENROLLMENT MAY TURN AROUND IN MIDDLE AND HIGH SCHOOL

If students continue to transition between grade bands as they have in recent years, public school enrollment is slated to increase by the most in upper grades over the next ten years. Estimates of enrollment in 2026-27 that use the number of births in 2016 and assume current conditions, or cohort transition rates in recent years, show that public schools would see the highest enrollment increases in grade 8 (about 1,800 students) and grade 12 (about 1,500 students) over enrollment in 2016-17 (see Executive Summary Figure 7). This would be a dramatic shift over the previous ten years, D.C. public schools saw a decline in the number of students in grade 8 of almost 500, and almost no change in the number of students in grade 12. These future growth estimates are the result of slightly higher proportions of students transitioning between earlier grade bands in recent years aging into middle and high school grades, and starting to stay in greater proportions in middle and high school as well.
EXECUTIVE SUMMARY FIGURE 7. PUBLIC SCHOOL ENROLLMENT OVER THE NEXT TEN YEARS SHOWS GROWTH MAY BEGIN IN MIDDLE AND HIGH SCHOOL GRADES

Projected growth in 2026-27 compared to growth over previous ten years

Source: D.C. Policy Center analysis and Office of the State Superintendent (OSSE)'s enrollment audits.

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Under current conditions, total public school enrollment could increase by about 21,100 students in 2026-27 (see Executive Summary Table 1). These estimates extrapolate findings for one grade to all grades in a relevant grade band. This would be a much larger increase than growth of 14,402 students that the city experienced over the previous ten years. Although enrollment would continue to increase in all grades, the need for seats in middle and high schools would be especially great compared to the previous period, when enrollment in both of these grade bands decreased. Meeting these estimates relies on quality options to draw students and families back into public schools in upper grades.

5 For example, kindergarten enrollment is expected to grow by 871 students. To get the total enrollment in its grade band that includes three grades (pre-kindergarten for children aged three, pre-kindergarten for children aged four, and kindergarten), this estimate is multiplied by three to get growth of 2,612 for the grade band.
EXECUTIVE SUMMARY TABLE 1. PUBLIC SCHOOL ENROLLMENT GROWTH THROUGH 2026-27 SHIFTS TOWARD MIDDLE AND HIGH SCHOOL

<table>
<thead>
<tr>
<th>Grade band</th>
<th>Future estimated growth in grade band from 2016-17 to 2026-27</th>
<th>Historical growth by grade band from 2006-07 to 2016-17</th>
<th>Difference between historical and estimated future growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early (pre-kindergarten to kindergarten)</td>
<td>2,612</td>
<td>8,585</td>
<td>-5,973</td>
</tr>
<tr>
<td>Elementary (grades 1-5)</td>
<td>6,930</td>
<td>7,537</td>
<td>-607</td>
</tr>
<tr>
<td>Middle (grades 6-8)</td>
<td>5,440</td>
<td>-713</td>
<td>6,153</td>
</tr>
<tr>
<td>High (grades 9-12)</td>
<td>6,152</td>
<td>-1,007</td>
<td>7,159</td>
</tr>
<tr>
<td>Total</td>
<td>21,135</td>
<td>14,402</td>
<td>6,733</td>
</tr>
</tbody>
</table>

Source: D.C. Policy Center analysis.

For these ten-year estimates to hold, students must stay through middle and high schools at higher proportions than they did in 2017-18. For example, in grade 8, 68 percent of children born 13 years earlier need to stay in D.C. and its public schools on net by 2026-27 compared to the rate of 56 percent of children enrolled in 2017-18 (see Executive Summary Figure 8). And in grade 12, 54 percent of children born 17 years earlier need to stay by 2026-27 compared to the rate 47 percent of children enrolled in grade 12 in 2017-18.

EXECUTIVE SUMMARY FIGURE 8. STUDENTS WILL NEED TO STAY IN MIDDLE AND HIGH SCHOOLS AT HIGHER PROPORTIONS TO MEET THESE ESTIMATES

![Change between cohort change ratios in 2017-18 and estimated for 2026-27](image-url)
MOST FUTURE PUBLIC SCHOOL STUDENTS ARE LIKELY TO LIVE AND POTENTIALLY ATTEND SCHOOLS OUTSIDE THE WILSON HIGH SCHOOL BOUNDARY

Population forecasts and housing prices indicate that most of the growth in the school-age population is likely to occur outside of the boundaries for Wilson High School and its feeder schools. The D.C. Office of Planning's population forecasts, which take into account new developments, indicate that the greatest growth by Neighborhood Cluster will occur in neighborhoods north of the center of the city and the south (see Executive Summary Figure 9). Looking at the existing housing stock, some single-family homes with a capacity of four in the affordable price range for Millennial couples without children earning at least median income are located in these neighborhoods as well (none are available to those with income in the 25th percentile). Many houses in this price range are located along the northeast and southeast borders, and 24 percent are owned by senior citizens; as they turn over, it’s possible that school-age population will increase. In fact, many school systems say housing turnover in neighborhoods with empty-nesters is having the biggest impact on enrollment (Shaver, 2018). These areas include some neighborhoods that have seen their school-age population decline in recent years.

---

6 Since boundaries changed in 2015-16.

7 Neighborhoods north of the center of the city with largest increases include Brightwood Park, Crestwood, Petworth, Columbia Heights, Mount Pleasant, Pleasant Plains, and Park View.

8 Neighborhoods in the south with largest increases include Congress Heights, Bellevue, and Washington Highlands.

9 Neighborhoods that have experienced decline but may increase their school-age populations include Eastland Gardens, Kenilworth, Twining, Fairlawn, Randle Highlands, Penn Branch, Fort Davis Park, and Fort Dupont.
EXECUTIVE SUMMARY FIGURE 9. MOST GROWTH IN SCHOOL-AGE POPULATION MAY OCCUR OUTSIDE WESTERN D.C.

Looking at prices of single-family homes gives an indication of where enrollment growth might occur, but it has two limitations. First, 39 percent of homes in D.C. are owner-occupied (United States Census Bureau, 2016). Apartments provide additional options in other neighborhoods, where rents are likely to be cheaper than the costs of owning a home, but it is difficult to know which apartments can accommodate families because reliable capacity data by unit are not available. Second, the presence of school-age population alone does not determine where spots at schools will be needed as just 27 percent of D.C.’s public school students attend their in-boundary school (Office of the Deputy Mayor for Education, 2017). However, it does give some indication of future demand because students attend schools that are on average a 10- to 16-minute drive from home, depending on their grade (Blagg, et al., 2018).

TAKEAWAYS

- If current preferences for public schools in D.C. continue, enrollment could grow by about 21,100 students through 2026-27 – and most of it is likely to occur outside of the boundaries of Wilson High School and its feeder schools. This is the only area of the city where the overwhelming majority of students attend their in-boundary school. Looking at population forecasts from D.C.’s Office of Planning, the school-age population will increase most in the north of the center of the city and the far south by 2025. Single-family homes in the price range that millennial couples (who are most likely to
be new parents) with income at the median or 75th percentile might be able to afford are predominantly located east and south of the Wilson HS boundary.

- **About half of the growth expected by 2026-27 might be needed in upper grades** – 6,200 more high school seats and 5,400 more middle school seats. This growth is estimated to occur as the base cohort grows due to natural growth from more births in the city, and because more students are staying in public schools, even between middle and high school. The need for more middle and high school seats is important to consider because this will represent a shift in grades with growing enrollment toward grades 6 to 12. The increasing trust in public schools in earlier grades has not yet translated to higher enrollment in upper grades, as public school enrollment in grades 6 through 12 decreased over the last ten years. The momentum of the cohort born in 2007 who attend public schools at higher rates through grade 5 will have to continue through these upper grades to meet these estimates.

- **For this growth to come to pass, D.C.’s public schools—especially middle and high schools close to where Millennials are likely to live—must be attractive to a wide range of families.** Just as specialized programs, especially at the elementary level in dual language, have driven demand, innovative and strong schools at the middle and high school levels in the majority of the city where students don’t attend their in-boundary school will be necessary to encourage enrollment in these levels through the next stage of D.C.’s public school growth.

- **Finally, schools where families want to enroll their children must have additional capacity to accommodate more students** – more space could be available by filling vacant seats, adding seats to an existing school as it grows, or opening new schools. In 2016-17, there were an estimated 14,844 vacant seats at schools that could serve pre-kindergarten to grade 12 students. This includes seats at some schools that are adding grades as well as seats at other schools that have remained empty from year to year. Even assuming that each of these vacant seats are filled, about 6,300 students would still need space at D.C.’s public schools if these growth estimates are realized.

---

10 For example, out of the ten schools with the highest waitlists in 2017-18, six offered dual language programs (D.C. Public Charter School Board, 2017) (D.C. Public Schools, 2017).

11 This excludes from enrollment and capacity eight DCPS schools that were missing capacity information and assumes that schools will fill to 95 percent of their capacity, which is a threshold for District of Columbia Public Schools (DCPS) that requires a plan to ensure that a facility does not suffer from overcrowding.
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ONE GROWTH IN POPULATION IS LARGELY FROM MILLENNIALS

The District of Columbia grew by at least 105,000 residents from 2000 to 2016, after decades of population decline (United States Census Bureau, 2000-2016). This growth began in 2006 and accelerated in 2009, the year President Obama took office and in the middle of the Great Recession. During this time, with a significant stimulus package and resilient government employment, the city’s job growth outperformed that of the rest of the country (Chapman, 2017) and attracted new residents. From 2010 to 2017, net migration into D.C. accounted for 64 percent of population growth, with newcomers arriving from abroad and other areas of the country in roughly equal measure (Swaim, 2018). D.C.’s net domestic migration has resulted in inflows even as the rest of the metro region has experienced outflows since 2012, which is the opposite of what much of the country’s suburbs and cities are experiencing (Maciag, 2017). Indeed, a substantial proportion of D.C.’s new residents do come from the region and choose the city over its suburbs: 31 percent of domestic migration to D.C. comes from Prince George’s County, Montgomery County, Arlington County, Fairfax County, and Alexandria (Rabinowitz, 2017).

D.C.’s growing Millennial population

The District has attracted many Millennials as part of its population growth: young adults aged 20 to 34 in 2016 grew by 58,000 from 2000 to 2016, accounting for about half of D.C.’s population growth over this time (see Figure 1). The height of this growth occurred from 2006 to 2013 (see Appendix Figure 1). The increase in young adults was especially large in many of D.C.’s central neighborhoods on either side of North Capitol Street, where the proportion of young adults aged 22 to 34 grew by 6 to 10 percent, and Navy Yard saw the greatest increase at more than 10 percent (Rabinowitz, 2017). The population aged 20 to 34 now comprises 31 percent of the population, more than 27 percent of the population in 2000 (United States Census Bureau, 2000-2016).

Instead of a natural increase occurring due to current residents growing older, many residents in this age group moved into the Washington region. The area experienced a net gain from population aged 20-29 moving to the area from other parts of the country in recent years (Chapman, 2017). And within the region, young adults are more likely to live in the city than the surrounding area, as 31 percent of D.C.’s residents are 20 to 34 years old compared to 22 percent in nearby counties.
This population increase is significant because Millennials could have a large impact on future public school enrollment. Public school enrollment is affected by the number of births in the city, in- and out-migration, and preferences to attend public school over private options. If Millennials continue to stay in the city and have children who attend public schools, public school enrollment could rise by more than it has in the past.

**D.C.’s population aged 20 to 34 has changed from 2000 to 2016**

Population characteristics show that Millennials differ from the previous generation of likely parents, which means that they may make different decisions about living in the city and having any children attend public schools. For example, a lower proportion of Millennials were born in D.C.: 27 percent of Millennials in 2016 were born in D.C., compared to 36 percent of those aged 20 to 34 in 2000 (see Figure 2). This could mean that D.C.’s current young adult residents are more likely to leave the city to be closer to family as they grow older.

---

12 Surrounding Maryland counties include Prince George’s and Montgomery, and surrounding Virginia counties include Alexandria City, Arlington, Fairfax City, Fairfax, and Falls Church City.

13 Public schools include both traditional public schools (District of Columbia Public Schools, or DCPS) and public charter schools.
FIGURE 2. D.C.’S POPULATION AGED 20 TO 34 HAS SHIFTED

The racial composition of this age group also changed. By 2016, the proportion of the population aged 20 to 34 who was African American declined to 35 percent from 46 percent in 2000, and the proportion of this age group who was white increased to 47 percent from 36 percent in 2000 (see Figure 2 above). The proportion of this age group who is Latino did not change significantly. This demographic shift in young adults likely to be parents could mean similar changes in D.C.’s public school enrollment as well.\footnote{14} There were around 9,600 more African American residents aged 20 to 34 in 2016 than there were in 2000, but the number of white residents increased by around 48,000 over this time period, which reversed the 2000 distribution by race (see Appendix Figure 2).\footnote{15}

This age group is more highly educated in 2016 than in 2000. The proportion with a graduate degree has doubled from 13 percent to 26 percent, and the proportions with less than a high school diploma and only a high school diploma have decreased (see Figure 3). A similar proportion has a college or Associate’s degree.

\footnote{14} However, a larger proportion (68 percent) of the public school student body is African American than the Millennial population.

\footnote{15} Even in 2000, young adults aged 20 to 34 were less likely to be African American than the city (42 percent compared to 60 percent of all residents) and more likely to be white than the total population (37 percent compared to 28 percent of all residents) according to American Community Survey 1-Year Estimates in 2000.
Along with this increase in education levels, median incomes have increased for residents aged 20 to 34 with no children from around $28,000 to around $36,000 (see Figure 4). Higher incomes could mean that Millennials have more resources available for housing and staying in the city, but higher levels of education could also mean more student debt.

The current cohort aged 20 to 34 also differs from the previous cohort as they have children at older ages. This may mean that the bump in public school enrollment will come later from this generation. Overall home ownership rates are similar for this group as a whole in 2000 and 2016, but the proportion with children is much lower in 2016, decreasing to 15 percent from 24 percent in 2000 (see Figure 5). All three stages of marriage, home ownership, and having children happen later, but only the rates for having children decreased significantly for the younger half of the cohort (aged 20 to 27).
FIGURE 5. D.C.’S POPULATION AGED 20 TO 34 ARE HAVING CHILDREN AT OLDER AGES

Summary

Millennials were a large part of D.C.’s population growth from 2000 to 2016, which is of interest to education and other policymakers as this age group is most likely establishing the base for future public school enrollment. The characteristics of the population aged 20 to 34 changed since 2000: in 2016, they were more likely to have been born outside of D.C., had higher education levels and incomes, and delayed having children. These differences may mean that current young adults will act differently when it comes to staying in the city and enrolling any children in public schools.
TWO | IMPACT ON PUBLIC SCHOOLS FROM MORE FAMILIES

Public school enrollment is already growing due to a higher number of births, a larger number of families with children staying in the city, and education preferences that are shifting toward public options. If these trends continue, the influx of young adults to D.C. could mean that enrollment continues to rise.

More children attend public schools as the school-age population increases

Enrollment in D.C. public schools grew by about 8,000 students (or 13 percent) in kindergarten through grade 12 from 2006-07 to 2016-17 (see Figure 6).16 This growth in enrollment was driven both by a higher population aged 5 to 17, which grew by about 3,000 children (4 percent) over the same period, as well as higher estimated public school attendance rates among that age group, up to 92 percent in 2016-17 from 85 percent in 2006-07 (see Appendix Figure 3).17 As the child population has grown, its characteristics have changed. The share of children who live in middle- or higher-income households is higher today than previously,18 even though most children still live in low-income households (Moored, 2016). And the number of children under age six has increased even faster than the school-age population since it began its increase in 2012 (Sayin Taylor, 2016), which means that the school-age population may rise even more rapidly in coming years. Interestingly, the population aged 5 to 17 started to increase in 2012, and public school enrollment increased two years earlier. This could be the result of policy changes, such as more kindergarteners staying in public schools after access to free pre-kindergarten was expanded in 2008.

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16 Enrollment in pre-kindergarten increased by 6,400 students over this same period, but has been excluded because the Pre-K Enhancement Act of 2008 dramatically expanded access to these grades. The expansion of pre-kindergarten may have led to higher enrollment in kindergarten in 2010 from children who stayed in public schools, and therefore increases in overall enrollment.

17 The American Community Survey (ACS) estimates show different results for the percentage of the school-age population that attends private school, which would presumably be close to the percentage of students living in the city and not attending public schools. For example, the ACS estimate for the percent of the population enrolled in private school in 2016 is 11 percent, compared to around 8 percent in this analysis. This is due to a different data source for enrollment and large margins of error (up to 30 and 40 percent of the ACS estimates of enrollment numbers in some cases).

18 Comparing 2014 to 2010.
FIGURE 6. INCREASES IN PUBLIC SCHOOL ENROLLMENT ARE AlIGNED WITH SCHOOL-AGE POPULATION INCREASES

The number of children born to mothers who live in D.C. also show signs that the school-age population is slated to increase. Births have increased by 11 percent between 2007 and 2016, and there were 994 more births per year in 2016 compared to 2007 (see Figure 7). If families continue to enroll children in public schools at similar rates as they have in the past, this increase in births will lead to higher enrollments. Most of this growth is driven by an increase in births of children born to white mothers (859 more births per year), while births of children born to Latina or African American mothers combined per year have decreased since 2007.\(^{20}\)

\(^{19}\) Mothers are referenced instead of families because the data are tracked by residence of the mother, not the family.

\(^{20}\) Births to African American mothers represent half of all births.
Women in D.C. are having children at older ages, which may indicate that most of the bump in public school enrollment expected from the large increase in the population aged 20 to 34 is still to come. Millennials are still the most likely age group to be new parents: 69 percent of all births in 2016 were to women aged 20 to 34 in 2016 (Centers for Disease Control and Prevention, 2016). However, fertility rates have increased for women aged 35 to 50 since 2009 while decreasing for younger women (Smith, 2017). This has meant that the number of births to mothers over 35 years old increased by 773 per year (42 percent) over the last ten years, compared to an increase of 824 (14 percent) for those aged 20 to 34 (see Figure 8). In addition, the average mother’s age has been steadily increasing in D.C., from 28.2 years in 2007 to 30.2 years in 2016 (Centers for Disease Control and Prevention, 2016).
FIGURE 8. MOTHERS ARE OLDER AT TIME OF BIRTHS IN D.C.

More children attend public schools as a share of the school-age population

D.C. families are staying in the city and in public schools at higher rates in recent years. Cohort change ratios, or the net proportion of a group still enrolled a certain number of years after birth, have increased since the 1998 birth cohort (see Appendix II for detailed methodology). And in more recent years, students have been transitioning between grade levels at higher rates as well. Education is not the only driver of moves, as families may leave the city for many reasons, including housing, jobs, or commute duration. However, schools could be an influential factor if families are moving out of the District when their children approach school-age without changes in other parts of their lives.

Staying in the city after birth

For the cohort of children born in 1998, families decided early on whether to leave the city or public schools. The greatest drop in the cohort born in 1998 to mothers living in D.C. occurred when children left D.C.

21 These measures are net of student movement as calculations, and cannot distinguish between in- and out-migration without access to student-level data.
between birth and kindergarten or enrolled in private schools for kindergarten. These five years eliminated 27 percent of the cohort born in 1998, and another large drop of 12 percentage points occurred between kindergarten and grade 5 (see Figure 9). There was a smaller decrease of five percentage points between grade 5 and grade 8, which suggests that if children completed elementary school, most families committed to public schools in D.C. through middle school. High school provides a limited look at cohort changes as enrollment may drop off as more students go to private school or leave the city, but also for other reasons that do not indicate a shift away from preferring public schools—students may attend alternative high school programs that do not follow a traditional grade structure, or they may drop out. By contrast, the school-age population decreased at similar rates through grade 8, although the gap between the school-age population and public school enrollment widens in grades 5 and 8, suggesting that private school enrollment increases at the end of elementary and in middle school.22

**FIGURE 9. IN 1998, FAMILIES WERE MOST LIKELY TO LEAVE THE CITY BEFORE KINDERGARTEN**

The District actually retains more students in earlier grades than other similar cities, with 73 percent of D.C.’s 1998 cohort in the city’s public schools for kindergarten. Comparing D.C. to Boston, Denver, New Orleans, and Oakland—four cities identified as having high degree of public school choice (Campbell, Heyward,

22 The population aged 17 increases for grade 12, which could represent first-year students at D.C.’s eight public and not-for-profit universities.
& Gross, 2017) with high population growth from 2000 to 2016 and consistent city boundaries – shows that D.C.’s overall pattern is not an outlier, and it is very similar to Oakland’s (see Figure 10). D.C. kept a relatively higher proportion of students from birth to kindergarten (73 percent) on net, even before access to free pre-kindergarten was expanded in 2008. Boston lost the highest proportion before kindergarten (53 percent of children born enrolled in kindergarten 5 years later), and Denver retained the highest proportion of students through grade 8 (65 percent). New Orleans did lose students after Hurricane Katrina in 2005, but recovered and had a similar grade 12 enrollment as a proportion of births compared to D.C. and other cities (37 percent).

**FIGURE 10. D.C. RETAINS CHILDREN AT HIGHER RATES THAN SOME OTHER SIMILAR CITIES**

After kindergarten, African American and white children born in 1998 left the city or its public schools at similar rates (see Figure 11). Most of the declines for both groups occurred between birth and kindergarten, although white students decreased by much more (64 percent) compared to African American students (18 percent). After kindergarten, the proportion enrolled in public school for both of these groups decreased at similar rates up to grade 12 at which point public schools lost more African American students. The cohort in
public schools declined on net for each of the three groups after birth, although higher numbers of African American students left compared with other groups.\textsuperscript{23} Over a thousand white children left public schools or the city after birth as a net effect, leaving 180 students by grade 12.

\textbf{FIGURE 11. PUBLIC SCHOOL ENROLLMENT DECLINES FOR EACH GROUP'S COHORT}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure11}
\caption{Public school enrollment declines for each group’s cohort.}
\end{figure}

\textsuperscript{23} African American students also comprise the majority of D.C.’s public school students, at 68 percent of pre-kindergarten to grade 12 enrollment in 2016-17 (Office of the State Superintendent for Education (OSSE), 2016).

Cohorts born in D.C. stayed in early grades at D.C.’s public schools at higher rates beginning with those born in 2007 (see Figure 12). Cohort change ratios in early grades increased for those born in 2007 and 2010, which retained 79 and 80 percent (respectively) from birth to kindergarten instead of 73 percent of the 1998 cohort. Out of the cohort born in 2007, 69 percent were enrolled in grade 5 ten years later, compared to 61 percent of the 1998 cohort. Cohort change ratios decreased for kindergarten for those born in 2001 and 2004, when the school-age population was still decreasing in the city. It is too soon to tell whether these cohorts born in 2007 and 2010 will stay through middle and high school at higher rates as they have in elementary school.
By race and ethnicity, cohort change ratios have increased the most in early grades for African American students and have steadily but slowly increased after an initial decrease for white students (see Figure 13). There are no consistent changes for Latino students. The shift for African American students could reflect less private school enrollment or less out-migration by African American families. The decrease in cohort change ratios in 2001 and 2004 for white students could reflect a lag between higher levels of white children born in the city and higher levels of enrollment of white students in public schools. Over this period white children made up a higher proportion of births (for example, rising from 17 percent of births in 1998 to 25 percent of births in 2004), but this did not lead to a commensurate shift in public school enrollment.
FIGURE 13. COHORT CHANGE RATIOS HAVE INCREASED THE MOST FOR AFRICAN AMERICAN STUDENTS

Staying in the city between grade levels

Cohort transition ratios, or the net proportion of students who finished the previous grade band and are still enrolled in public schools at the end of the next grade band, show the extent to which students are staying in public schools in more recent years, especially in upper grades. Similar to cohort change ratios, this is only a net measure of in- and out-migration, as it is made without access to student-level data that would allow researchers to track individual students’ enrollment patterns. Based on the proportion of students who transition from one grade band to another (not staying from birth), a higher proportion of students are staying in public schools in recent years (2014-15, 2015-16, 2016-17) compared to the 1998 cohort, even in upper grades (see Figure 14). This indicates that public middle and high school enrollment may be starting to turn a corner toward more growth.
FIGURE 14. COHORT TRANSITION RATIOS ARE INCREASING IN RECENT YEARS

Summary

More children are born in D.C. in 2016 compared to 2007, and they are staying in the District and its public schools at higher rates after birth and between grade bands. Although births of white children have increased by the highest numbers, African American students remain in public schools between birth and kindergarten at the highest rates. Children now stay through kindergarten and elementary schools at higher rates, and there has been a slight increase in middle and high school as well.
THREE | CHANGES IN FUTURE PUBLIC SCHOOL ENROLLMENT

Given the rise in births and the higher proportion of students staying in public schools, public school enrollment in pre-kindergarten to grade 12 is likely to continue to increase. This growth is likely to be especially large in middle school through the next five years and in high school over the next ten years, as D.C. has typically struggled to retain students in these grades.

To create the estimates, the analysis incorporates the number of births in D.C., public school enrollment in previous years, and transition rates between grade bands. The kindergarten estimates use the number of births in 2016 as a base for five-year projections and the number of projected births24 in 2021 for ten-year projections. For other grades, the five-year projections (for 2021-22) use enrollment in previous years,25 and the ten-year projections use enrollment projected for 2021-22. The analysis focuses on one grade per grade band (kindergarten for early grades, grade 5 for elementary, grade 8 for middle, and grade 12 for high). Each estimate is compared to previous growth and population forecasts.

Three scenarios for D.C.’s future public school enrollment incorporate cohort transition ratios for those born in 1998 and for those enrolled in the three most recent years to estimate enrollment in key grades (see Appendix Table 3 and Appendix Table 4 for calculations). The conservative growth scenario assumes that students will transition between grade bands at the same rate as they did for the cohort born in 1998. The current conditions growth scenario assumes that students will transition between grade bands at the same rates they did on average in the most three recent years (2014-15, 2015-16, and 2016-17). The maximum growth scenario assumes that students will stay in public schools at even higher rates, doubling the increase in these rates between 1998 and recent years. Finally, each current conditions growth estimate is extrapolated to an estimate for all grades in its grade band.

Five-year enrollment estimates

Over the previous five years, enrollment growth was strongest in kindergarten and grade 5, and weaker in grades 8 and 12. From 2011-12 to 2016-17, enrollment in kindergarten grew by the most at 1,269 students, and grade 5 enrollment grew by 771 students (see Figure 15). Over this same period, grade 8 enrollment grew by just 146 students and grade 12 by 329 students. These enrollment patterns reflect the increase in families

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24 The birth projections assume that average annual growth from 2006 to 2016 in births continues at the same rate (see Appendix Table 1 for calculations).

25 Grade 5 for 2018-19 was not available, so this value was projected using average annual growth for the previous three years (see Appendix Table 2) for calculations.
with children staying in D.C. and its public schools after birth, resulting in larger levels of growth in the younger and middle grades, but these cohorts have not aged into high school yet.

The current conditions growth scenario would result in some increases in each grade between 2016-17 and 2021-22. If families continue to stay in public schools between grade bands as they have in recent years, D.C.’s public school enrollment will increase by a relatively small amount in kindergarten (about 300 students), by more in grade 5 (about 1,100 students), and by the most in grade 8 (about 1,700 students). Grade 12 would increase slightly (about 150 students). This would represent a shift in which grades are growing – enrollment rose by more students in kindergarten and grade 5 than grade 8 over the previous five years. Compared to the D.C. Office of Planning’s five-year population forecasts, these projections look low in kindergarten and high in other grades.

**FIGURE 15. ENROLLMENT OVER NEXT FIVE YEARS WILL INCREASE FASTER FOR MIDDLE SCHOOL THAN PAST GROWTH**

By comparison, the conservative growth scenario would mean a slight decrease in kindergarten (about 300 fewer students), no change in grade 12, and increases in grades 5 and 8 between 2016-17 and 2021-22. However, this reversal in recent years’ enrollment growth for kindergarten seems unlikely, given that children born in 2007 and 2010 have already stayed through kindergarten at higher rates; such a decrease would also run counter to the positive change forecasted for the population aged 5 by 2021-22. Even if enrollment rates remain consistent with those of the 1998 cohort, grade 5 enrollment would still increase by approximately 700 students. The city would see a large enrollment increase in grade 8 of about 1,600 students, compared to 146 students over the previous five years.
The maximum growth scenario estimates that public school enrollment would increase by large amounts in kindergarten (about 1,000 students) and grade 5 (about 1,500 students), as well as grade 8 (about 1,900 students) over the next five years. Grade 12 would see a small increase (about 300 students). Because these estimates require aggressive increases in transitions between grades over the next five years, this could be considered an upper bound for future public school enrollment.

The current conditions growth scenario could indicate growth of approximately 12,300 students for all grades (pre-kindergarten through grade 12) from 2016-17 to 2021-22 (see Table 1). This estimate of enrollment increases in all grades extrapolates growth in a single grade to the entire grade band. The total estimated growth over the next five years is similar to the growth over the previous five years (2011-12 to 2016-17), but enrollment growth begins to occur in middle school grades in 2021-22 compared to the increase in early childhood and elementary enrollment that occurred over the previous five years.

### TABLE 1. PUBLIC SCHOOL ENROLLMENT GROWTH THROUGH 2021-22 SHIFTS TO MIDDLE SCHOOL

<table>
<thead>
<tr>
<th>Grade</th>
<th>Future estimated growth in grade band from 2016-17 to 2021-22</th>
<th>Historical growth by grade band from 2011-12 to 2016-17</th>
<th>Difference between historical and estimated future growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early (pre-kindergarten to kindergarten)</td>
<td>1,008</td>
<td>3,020</td>
<td>-2,012</td>
</tr>
<tr>
<td>Elementary (grades 1-5)</td>
<td>5,458</td>
<td>7,236</td>
<td>-1,778</td>
</tr>
<tr>
<td>Middle (grades 6-8)</td>
<td>5,182</td>
<td>883</td>
<td>4,299</td>
</tr>
<tr>
<td>High (grades 9-12)</td>
<td>613</td>
<td>524</td>
<td>89</td>
</tr>
<tr>
<td>Total</td>
<td>12,261</td>
<td>11,663</td>
<td>598</td>
</tr>
</tbody>
</table>

Source: D.C. Policy Center analysis.

### Ten-year enrollment estimates

From 2016-17 to 2026-27, estimates from the current conditions growth scenario indicate that public schools will add even more students, especially in grade 12 (about 1,500 students, see Figure 16). This large increase in upper grades would represent a turnaround compared to the past ten years, as grade 8 enrollment decreased by 468 students and grade 12 enrollment only increased by 19 students over this time period, and population forecasts indicate that these age groups will increase by fewer children. The conservative estimate for 2026-27 is 12,927 students, which is a 5.6% increase over the 2016-17 enrollment.

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26 For example, estimated total growth in elementary school grades (grades 1 to 5 in this analysis) is calculated as the estimated growth in grade 5 (1,092 students) multiplied by the number of grades in the grade band (5 grades) to get growth of 5,458 students in grades 1-5.
growth scenario is more measured for grade 12, showing an increase of about 1,200 students. Lastly, the maximum growth scenario shows the possibility for much more growth in grade 12 (about 1,900 students).

**FIGURE 16. OVER NEXT TEN YEARS, ENROLLMENT WILL START TO INCREASE IN HIGH SCHOOL**

Over the next ten years, the current conditions growth estimates could mean that public school enrollment grows by about 21,100 students and shifts toward more high school students (see Table 2). This would be a much larger increase than occurred over the previous ten years, especially in middle and high school grades. High school enrollment would grow by about 6,200 students (after shrinking by 1,007 in the previous ten years), and middle school enrollment would increase by about 5,400 students (after decreasing by 713). Growth in pre-kindergarten through kindergarten would slow, which is plausible as D.C.’s schools have already seen a large increase of 8,585 students related to 80 percent of children born in D.C. staying through early grades in recent years. These estimates use 2016 births and growth in births in previous years as a base, but enrollment in these early grades could increase further if the number of children born in the city increases even more dramatically in future years.
TABLE 2. PUBLIC SCHOOL ENROLLMENT GROWTH THROUGH 2026-27 SHIFTS TOWARD HIGH SCHOOL

<table>
<thead>
<tr>
<th>Grade band</th>
<th>Future estimated growth in grade band from 2016-17 to 2026-27</th>
<th>Historical growth by grade band from 2006-07 to 2016-17</th>
<th>Difference between historical and estimated future growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early (pre-kindergarten to kindergarten)</td>
<td>2,612</td>
<td>8,585</td>
<td>-5,973</td>
</tr>
<tr>
<td>Elementary (grades 1-5)</td>
<td>6,930</td>
<td>7,537</td>
<td>-607</td>
</tr>
<tr>
<td>Middle (grades 6-8)</td>
<td>5,440</td>
<td>-713</td>
<td>6,153</td>
</tr>
<tr>
<td>High (grades 9-12)</td>
<td>6,152</td>
<td>-1,007</td>
<td>7,159</td>
</tr>
<tr>
<td>Total</td>
<td>21,135</td>
<td>14,402</td>
<td>6,733</td>
</tr>
</tbody>
</table>

Source: D.C. Policy Center analysis.

Summary

D.C.’s public schools can expect enrollment to increase especially for middle school grades over the next five years, followed by an increase in high school grades over the coming ten years. This means that the city might start to experience higher enrollments in middle and high school grades after seeing it in early childhood and elementary grades over the previous five to ten years. However, current population forecasts do not predict that D.C.’s school-age population will grow as quickly as these estimates do, especially for the cohorts who would attend grades 5, 8, and 12. Still, higher enrollments in upper grades is possible as students are starting to stay in public schools at higher rates in middle and high school grades (see Figure 14 above).

However, for these ten-year estimates to hold, students must stay in public schools through middle and high school at higher rates than they did in 2017-18. In grade 8, 68 percent of children born 13 years earlier need to stay in D.C. and its public schools on net by 2026-27 when only 56 percent of the comparable cohort enrolled in grade 8 in 2017-18 (see Figure 17). And in grade 12, 54 percent of children born in D.C. 17 years earlier need to stay by 2026-27 compared to 47 percent of children born in D.C. previously who enrolled in grade 12 in 2017-18.
FIGURE 17. STUDENTS WILL NEED TO STAY IN MIDDLE AND HIGH SCHOOLS AT HIGHER PROPORTIONS TO MEET THESE ESTIMATES

Change between cohort change ratios in 2017-18 and estimated for 2026-27

Source: D.C. Policy Center analysis, Office of the State Superintendent for Education (OSSE)'s enrollment audits, and Center for Disease Control (CDC) WONDER database.

D.C. Policy Center | dcpolicycenter.org
FOUR | WHERE IS THE SCHOOL-AGE POPULATION LIKELY TO LIVE?

If children continue to enroll in public schools by kindergarten and transition between grade bands at the same rates as they do today, D.C. could have about 104,600 students in pre-kindergarten through grade 12 by 2026-27 (an estimated 21,135 additional students based on current conditions in addition to the 83,491 enrolled in 2016-17). Looking at where this population is likely to live will give a sense of where more school spaces may be needed. The presence of a school-age population alone does not determine where spots at schools will be needed, as just 27 percent of D.C.’s public school students attend their in-boundary school (Office of the Deputy Mayor for Education, 2017). However, it does give some indication of future demand because students attend schools that are on average a 10- to 16-minute drive from home, depending on their grade (Blagg, et al., 2018). Population forecasts and the school-age population.

Population forecasts and the school-age population

The D.C. Office of Planning’s population forecasts suggest that the largest school-age population increases by Neighborhood Cluster will occur to the north of the center of the city and to the far south between 2015 and 2025 (see Figure 18). The neighborhoods with the largest forecasted increases of 1,300 or more from 2015 to 2025 include Cluster 2 (Columbia Heights, Mount Pleasant, Pleasant Plans, Park View), Cluster 18 (Brightwood Park, Crestwood, and Petworth), and Cluster 39 (Congress Heights, Bellevue, and Washington Highlands). These population forecasts take into account planned developments as well as other factors. Most of the neighborhoods with previous growth in the school-age population are forecast to have similar growth in future years; in fact, these three areas with the largest future increases also increased by the most from 2010 to 2015.
FIGURE 18. FORECASTED INCREASES IN THE SCHOOL-AGE POPULATION

Housing prices and the school-age population

Single-family homes in the price range that corresponds with Millennial income at the median and 75th percentile show that the school-age population could also increase along the northeast and southeast borders of the city. This analysis focuses on single-family homes (instead of apartments, condos, or co-ops) due to data constraints and income for Millennial couples because no houses would be affordable at the median income for a Millennial individual with no children.

Many Millennials will rent instead of buy, but this analysis focuses on single-family homes because of available data on capacity and assessments. However, comparing data from Zillow on median two-bedroom rents with housing costs from the D.C. Policy Center’s Taking Stock database suggests that rental prices are likely to be similar to housing costs in neighborhoods where a two-bedroom single-family home costs less than $3,400 per month (see Appendix Figure 6). In more expensive neighborhoods, comparison of housing and rental costs shows is likely to be cheaper to rent than buy. However, it is not possible to ascertain apartment capacity per unit with the data currently available, limiting a full analysis of the rental market. If Millennials do opt for apartments instead of single-family homes, enrollment growth could happen in neighborhoods with higher housing costs as well as neighborhoods with many large apartments highlighted in the map below.
Although 56 percent of D.C.’s children live in single-parent households (United States Census Bureau, 2016), the analysis below of single-family homes focuses on income for a household with a couple (and theoretically two incomes) instead of a household headed by an individual. Unfortunately, only two homes would be available to an individual earning the median income for Millennials with no children. A closer look with better data on apartments is needed to identify housing that is potentially affordable to individuals.

**Millennial incomes and implications for housing choices**

The median Millennial individual with no children has an annual income of around $36,443 as of 2016 (see Figure 19). Doubling this individual income to $72,886 estimates income for a Millennial couple with no children who may be looking for a single-family home to accommodate a family.\(^ {27}\) By comparison, Millennials in the 75th percentile of income earn about $68,000 per year individually, or $136,000 per couple.\(^ {28}\)

This income can be compared to the amount necessary to afford existing single-family homes\(^ {29}\) in D.C. as calculated for *Taking Stock of the District’s Housing Stock* (Sayin Taylor, 2018).\(^ {30}\) This methodology first generates an estimated market value by dividing the assessment value by the average assessment to market value ratio for available properties by neighborhood. It then divides the estimated market value by a capitalization rate published by the Office of the Chief Financial Officer for income-generating properties by geographic area to estimate the annual housing cost. Finally, the annual housing cost is divided by 30 percent

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\(^{27}\) This is similar to the income of $82,049 for a millennial household without children (United States Census Bureau, 2016), but this may include other non-millennial earners.

\(^{28}\) For Millennials who do have children, there is a large divide in household income by marital status. Median income of an unmarried Millennial head of household with two children is $25,042, compared to $102,077 for married counterparts (see Appendix Figure 4). This wide gap puts many housing options out of reach for some families.

\(^{29}\) For the purpose of this analysis, single-family homes include detached, row, and semi-detached.

\(^{30}\) For more information, see the *Taking Stock of the District’s Housing Stock: A methodology write-up.*
(a standard threshold for housing affordability) to determine the income necessary to own a home. This gives a sense of where homes might be in the affordable price range for D.C.’s Millennials.

However, Millennials may not have the necessary savings to afford a down payment, or they may have other expenses to consider, such as student loans or childcare. D.C.’s young adults in 2016 had higher levels of education than their counterparts in 2000, and a Millennial with student loans may pay as much as 10 percent of Adjusted Gross Income (AGI)\(^1\) in loan payments if he or she is enrolled in an Income-Based Repayment Plan (Federal Student Aid, U.S. Department of Education, 2018). In addition, the average annual cost of child care at a center in D.C. for an infant was $23,089 as of 2016 (Child Care Aware of America, 2017). These constraints make it more difficult to afford housing in D.C.\(^2\)

**Location of single-family homes potentially in the price range for Millennials**

Looking at the existing stock of single-family homes with a capacity of four, very few are potentially in the affordable price range for Millennials — and not all will be available on the market in the coming years. Out of approximately 74,000 single-family homes that can accommodate four or more people in D.C. (at least a three-bedroom home),\(^3\) 16 percent are potentially affordable to Millennial couples without children making the median income and an additional 45 percent are potentially available to Millennial couples with incomes in the 75th percentile (see Figure 20). None are available to Millennial couples without children at the 25th percentile. The remaining 39 percent of homes are only in reach for those in the highest income quartile.

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\(^1\) On any income above 150 percent of the poverty level, which is $25,100 for a family of four in 2018 (United States Department of Health and Human Services, 2018).

\(^2\) As an example, a married millennial couple with one child and a household income of $72,886 pays an estimated $9,999 in federal income tax (Internal Revenue Service, 2017) and an additional $4,593 in D.C. income tax (D.C. Office of Tax and Revenue, 2017), leaving $58,294 for other expenses. If they claim three exemptions at $4,050 each, their AGI would be around $60,736 ($23,086 over the exempted amount of 150 percent of the federal poverty level in the calculation of an income-driven student loan payment), resulting in potential student loan payments of $2,308 per year. After factoring in the cost of childcare for one child, this leaves about $33,000 for housing and other expenses.

\(^3\) Out of all single family homes in the Taking Stock database, 37 were dropped because they were missing bedroom data to estimate capacity consistently and two were dropped as outliers.
At the median income point, a Millennial couple could potentially afford a house with an estimated market value of between $150,000 and $358,000, which rises to an estimated market value of up to $755,000 at the 75th percentile of income.

**FIGURE 20. A LOW PROPORTION OF HOMES ARE AVAILABLE TO THE MEDIAN MILLENNIAL COUPLE**

Most homes in the price range for the median Millennial couple to house a family of four are in wards 7 and 8 (see Figure 21). Looking at the 75th percentile of Millennial couples shows several areas in northeast and the central corridor that have single-family homes in an affordable price range. If families move to these areas in greater numbers and replace households without children, the school-age population in these neighborhoods would grow. And turnover in these single-family homes may yield more school-age children as 24 percent of these homes are currently owned by senior citizens (compared to 18 percent of all homes) claiming a property tax exemption, although adults over the age of 65 live throughout the city (Squires, 2018).

---

34 Location of potentially affordable housing would mean migration within D.C. for Millennials, as the population is currently concentrated in the center of the city, with over half the total population in the school boundaries for Ross ES, Cleveland ES, and Walker-Jones ES (see Appendix Figure 5).

35 Data on where some Senior Citizens live comes from the Senior Citizen Property Owner Tax Relief data in the Office of the Chief Financial Officer’s (OCFO) Integrated Tax System Public Extract Property Sales dataset. If a property owner is over the age of 65, owns more than half the unit, lives in home, and has an income lower than the required amount ($130,550 as of 2018), he or she can file for this exemption.
FIGURE 21. HOMES POTENTIALLY AFFORDABLE TO MILLENNIAL COUPLES MAY CHANGE SCHOOL-AGE POPULATION GROWTH TRENDS

The areas with the most homes in the affordable price range do not always overlap with the Neighborhood Clusters where the school-age population has grown from 2010 to 2015. If single-family homes in the price range of a median Millennial couple with no children begin to house more families with young families, the school-age population may increase in some neighborhoods where it has been recently decreasing, such as Cluster 29 (Eastland Gardens, Kenilworth) and Cluster 34 (Twining, Fairlawn, Randle Highlands, Penn Branch, Fort Davis Park, Fort Dupont).

In contrast, the D.C. Office of Planning’s population forecasts do not show much growth in school-age population along the northeast border of the city. This discrepancy could reflect the difference between existing housing stock examined in this report, and new development coming online that partly drives Office of Planning’s forecasts (Office of Planning, 2015).

Data are not available on the proportion of school-age children who live in apartments nor the capacity of apartments, but larger apartment buildings with more than five units may indicate affordable options for Millennials in additional neighborhoods. Many D.C. residents rent, as 39 percent of D.C.’s housing units are owner-occupied (American Community Survey 1-Year Estimates for 2016). Larger apartment buildings are available in neighborhoods in Northwest that have few, if any affordable single-family homes for D.C. Millennial
couples earning median income (see Figure 22). These apartments could allow for growth in the school-age population in these areas.

**FIGURE 22. APARTMENT BUILDINGS ACROSS THE CITY**

![Map of apartment buildings across the city](image)

**Summary**

The school-age population from 2015 to 2025 is forecasted to increase by the highest numbers of children north of the center of the city and to the far south. However, looking at the District’s existing housing stock shows that there are many homes located along the northeast and southeast borders in the affordable price range for a Millennial couple without children earning the median or 75th percentile of income (many of these are homes that may become available if senior citizens downsize). The D.C. Office of Planning’s forecasts do not show increases in the school-age population along the northeast border, which could mean that not much new development is planned for these areas. Comparing to previous growth in school-age population, some areas may reverse their school-age population decline.
FIVE | WHAT COULD LIMIT FUTURE PUBLIC SCHOOL ENROLLMENT?

Although D.C. was ranked the second most desirable metropolitan area in the country for Millennials in 2018, it is not clear whether Millennials will remain in the area over time: 54 percent of surveyed Millennials said they plan to leave the D.C. area in the next five years (Leijon, Carmel, & Boonchuwong, 2017). Although Millennials aged 26 to 35 are six percentage points less likely to stay in the city than those of all ages (see Figure 23), in- and out-migration trends have remained fairly consistent over the last five years. However, high housing prices and slow enrollment growth in upper grades might encourage Millennials to leave and prevent D.C. from realizing the full estimated increase in public school enrollment.

FIGURE 23. MIGRATION IN D.C. FOR MILLENNIALS AND ALL AGES

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This is up slightly from 48 percent being likely to move in the 2015 survey.

These are the ages available in the IRS data.

Out-migration decreased in 2014-15, but returned to previous levels in the following year.
Housing prices are high

Finding affordable housing near schools, transit, and jobs may become difficult as this generation starts families. For example, a couple jointly earning the Area Median Income (AMI) of $89,000 can afford a one-bedroom at the average monthly rent of $1,966 (Josephson, 2018), but will find it difficult to find options with additional bedrooms for children. Housing is already a concern for people who leave the city: between 2000 and 2014, housing was the most common reason for moving out of the District, cited as the main factor in 36 percent of moves, whereas jobs were the most common reason why people moved to the District, cited as the main factor in 32 percent of moves (Sayin Taylor, 2015).

Enrollment growth in upper grades has been slow

Although enrollment in lower grades has grown, upper grades have not experienced the same increases yet. From 2007-08 to 2017-18, enrollment in kindergarten increased by 2,347 students, and grade 5 increased by 1,557 students (see Figure 24). However, enrollment in grade 8 actually decreased by 376 students, and grade 12 enrollment only grew by 37 students. As of 2014-15, many students still exited D.C.’s public schools as they approached middle school (Moored, 2015). However, the cohort that was born in 2007 and started attending kindergarten and grade 5 at higher rates hasn’t reached grade 8 yet. If stronger middle and high schools can keep them in the system, D.C. may start to see more students enrolled in grades 8 and 12.

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39 This assumes that housing costs should be no more than 30 percent of income and uses average rent data from myapartmentmap.com.
FIGURE 24. ENROLLMENT HAS NOT GROWN IN GRADES 8 AND 12 AS IT HAS IN LOWER GRADES

Source: Office of the State Superintendent (OSSE)'s enrollment audits.
D.C. Policy Center | dcpolicycenter.org
SIX | CONCLUSIONS

Millennials (young adults between the ages of 20 to 34 in 2016\(^40\)) have accounted for about half of D.C.’s population growth since 2000. This population could have large implications for D.C.’s public school enrollment in two ways. First, more children could attend public school as Millennials give birth to additional children and the school-age population increases. Second, more children could attend public school if enrollment preferences continue to shift toward public schools.

Public school enrollment has been on the rise since 2010. Higher proportions of families are choosing to stay in the city and send their children to D.C.’s public schools: more children are enrolled in public schools through kindergarten and grade 5 as a proportion of those who were born five and ten years prior, respectively. In the last three years, more students are staying in the public school system through the upper grades as well: a higher proportion of students stayed through grade 8 or grade 12 compared to students who completed the previous grade band.

If current conditions continue, public school enrollment could increase more than it has over the last ten years, especially in middle and high school grades. An estimate based on the number of births in 2016 and historical enrollment could mean a total increase of 21,100 students by 2026-27, with growth shifting toward middle school (around 5,400 students) and high school (around 6,200 students) grades.

The neighborhoods to the north of the center of the city and to the far south are forecasted to have the largest increases in the number of school-age residents, but the existing housing stock tells a slightly different story. Many homes potentially in the affordable price range for a Millennial couple earning the median or 75th percentile of income are located along the northeast and southeast borders, and about a quarter are owned by senior citizens. This could mean that turnover could lead to large increases in the school-age population that are not included in the population forecasts. Areas especially likely to be affected by this type of turnover include some neighborhoods that have seen their school-age population decline in recent years. However, housing prices make single-family homes out of reach for many: just 16 percent of currently existing single-family houses are potentially affordable for Millennial couples making the median household income in D.C.

\(^{40}\) This is aligned with the Pew Research Center’s definition of those born between 1981 and 1996 (Dimock, 2018). We use 34 years old as an upper bound instead of 35 years old to align with commonly reported age groups on the American Community Survey.
TAKEAWAYS

- If current conditions of enrollment in public schools in D.C. continue, enrollment could grow by about 21,100 students through 2026-27 — and most of it is likely to occur outside of the boundaries of Wilson High School and its feeder schools. This is the only area of the city where the overwhelming majority of students attend their in-boundary school. Looking at population forecasts from D.C.’s Office of Planning, the school-age population will increase most in the north of the center of the city and the far south by 2025. Single-family homes in the price range that millennial couples (who are most likely to be new parents) with income at the median or 75th percentile might be able to afford are predominantly located east and south of the Wilson HS boundary.

- About half of the growth expected by 2026-27 might be in upper grades — 6,200 more high school seats and 5,400 more middle school seats. This growth is estimated to occur as the base cohort grows due to natural growth from more births in the city, and because more students are staying in public schools, even between middle and high school. The need for more middle and high school seats is important to consider because this will represent a shift in grades with growing enrollment toward grades 6 to 12 (away from early and elementary grades). However, the increasing trust in public schools in earlier grades has not yet translated to higher enrollment in upper grades, as public school enrollment in grades 6 through 12 decreased over the last ten years. The momentum of the cohort born in 2007 who attend public schools at higher rates through grade 5 will have to continue through these upper grades to meet these estimates.

- For this growth to come to pass, D.C.’s public schools—especially middle and high schools close to where Millennials are likely to live—must be attractive to a wide range of families. Just as specialized programs, especially at the elementary level in dual language, have driven demand, innovative and strong schools at the middle and high school levels in the majority of the city where students don’t attend their in-boundary school will be necessary to encourage enrollment in these levels through the next stage of D.C.’s public school growth.

- Finally, schools where families want to enroll their children must have additional capacity to accommodate more students — more space could be available by filling vacant seats, adding seats to an existing school as it grows, or opening new schools. In 2016-17, there were an estimated 14,844 vacant seats at schools that could serve pre-kindergarten to grade 12 students. This includes seats at some schools that are adding grades as well as seats at other schools that have

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41 For example, out of the ten schools with the highest waitlists in 2017-18, six offered dual language programs (D.C. Public Charter School Board, 2017) (D.C. Public Schools, 2017).

42 This excludes from enrollment and capacity eight DCPS schools that were missing capacity information and assumes that schools will fill to 95 percent of their capacity, which is a threshold for District of Columbia Public Schools (DCPS) that requires a plan to ensure that a facility does not suffer from overcrowding.
remained empty from year to year. Even assuming that each of these vacant seats are filled would mean that about 6,300 students would still space at D.C.’s public schools if these growth estimates are realized.

The coming years will reveal whether Millennials stay in D.C. and enroll any children in D.C.’s public schools at the same rates as recent years. More students staying in D.C.’s public schools in recent years demonstrates restored faith in the city’s public schools, but high housing costs and reluctance to continue with upper grades may encourage families to leave the District or its public schools. A stronger understanding of why families are leaving the District would shed light on which factors will more strongly influence future public school enrollment.
APPENDIX I | ADDITIONAL FIGURES AND TABLES

APPENDIX FIGURE 1. D.C. POPULATION INCREASED ESPECIALLY FROM 2006 TO 2013

D.C.'s population, by age group

Source: U.S. Census Bureau, Population Estimates.
D.C. Policy Center | dcpolicycenter.org

APPENDIX FIGURE 2. D.C.'S WHITE POPULATION AGED 20 TO 34 INCREASED BY THE MOST

Demographics of those aged 20 to 34, population count

Source: American Community Survey 1-Year Estimates.
D.C. Policy Center | dcpolicycenter.org
APPENDIX FIGURE 3. HIGHER PROPORTIONS OF POPULATION ARE ATTENDING PUBLIC SCHOOLS OVER TIME

Enrollment in kindergarten through grade 12 as a percentage of population aged 5 to 17

Source: Office of the State Superintendent for Education (OSSE), enrollment audits; U.S. Census Bureau, Population Estimates.

D.C. Policy Center | dcpolicycenter.org
APPENDIX FIGURE 4. MILLENNIAL INCOME BY CHILDREN AND MARITAL STATUS

Sources: American Community Survey 1-year Estimates for 2016.
D.C. Policy Center | dcpolicycenter.org
APPENDIX FIGURE 5. MILLENNIAL POPULATION IS CONCENTRATED IN THE CENTER OF THE CITY
APPENDIX FIGURE 6. ZILLOW RENTAL DATA COMPARED TO THE COST OF OWNING A HOME

Comparing rental to ownership costs

APPENDIX TABLE 1. PROJECTIONS FOR BIRTHS IN 2021

<table>
<thead>
<tr>
<th>Birth projection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2016 births</td>
<td>9,858</td>
</tr>
<tr>
<td>2006 births</td>
<td>8,523</td>
</tr>
<tr>
<td>Average annual change</td>
<td>134</td>
</tr>
<tr>
<td>Projected 2021 births</td>
<td>10,526</td>
</tr>
</tbody>
</table>

Source: Center for Disease Control (CDC), WONDER database.

APPENDIX TABLE 2. GRADE 5 PROJECTIONS FOR 2018-19

| Grade 5 average change from 2014-15 to 2017-18 |  |  
|-----------------------------------------------|---|---|
| Year                                          | Grade 5 enrollment | Annual change |
| 2014-15                                       | 4,784             | .             |
| 2015-16                                       | 5,199             | 415           |
| 2016-17                                       | 5,531             | 332           |
| 2017-18                                       | 6,095             | 564           |
| Average change                                | .                 | 437           |
| Projected 2018-19                             | .                 | 6,532         |

Source: Office of the State Superintendent for Education (OSSE) enrollment audits.
### APPENDIX TABLE 3. DETAILED CALCULATIONS FOR FIVE-YEAR PROJECTIONS

#### Five year projections (2016-17 through 2021-22)

<table>
<thead>
<tr>
<th>Grade for projection</th>
<th>Previous year</th>
<th>Data</th>
<th>Cohort transition ratio for 1998</th>
<th>Projection for 2021-22</th>
<th>2016-17 enrollment</th>
<th>Change from 2016-17 to 2021-22</th>
<th>2011-12 enrollment</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>2016 births</td>
<td>9,858</td>
<td>73%</td>
<td>7,216</td>
<td>7,561</td>
<td>-345</td>
<td>6,292</td>
<td>1,269</td>
</tr>
<tr>
<td>Grade 5</td>
<td>2016 kindergarten</td>
<td>7,561</td>
<td>83%</td>
<td>6,256</td>
<td>5,531</td>
<td>725</td>
<td>4,760</td>
<td>771</td>
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<tr>
<td>Grade 8</td>
<td>Estimated 2018 grade 5</td>
<td>6,532</td>
<td>93%</td>
<td>6,072</td>
<td>4,473</td>
<td>1,599</td>
<td>4,327</td>
<td>146</td>
</tr>
<tr>
<td>Grade 12</td>
<td>2017 grade 8</td>
<td>4,451</td>
<td>76%</td>
<td>3,368</td>
<td>3,370</td>
<td>-2</td>
<td>3,041</td>
<td>329</td>
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</table>

#### Base case – five years

<table>
<thead>
<tr>
<th>Grade for projection</th>
<th>Previous year</th>
<th>Data</th>
<th>Average cohort transition ratio for 2015, 2016, 2017</th>
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<td>1,092</td>
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<td>771</td>
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<td>4,473</td>
<td>1,727</td>
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<tr>
<td>Grade 12</td>
<td>2017 grade 8</td>
<td>4,451</td>
<td>79%</td>
<td>3,523</td>
<td>3,370</td>
<td>153</td>
<td>3,041</td>
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#### High case – five years

<table>
<thead>
<tr>
<th>Grade for projection</th>
<th>Previous year</th>
<th>Data</th>
<th>Continuation of increase between 1998 and recent years</th>
<th>Projection for 2021-22</th>
<th>2016-17 enrollment</th>
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<td>6,292</td>
<td>1,269</td>
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<tr>
<td>Grade 5</td>
<td>2016 kindergarten</td>
<td>7,561</td>
<td>92%</td>
<td>6,989</td>
<td>5,531</td>
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<td>4,473</td>
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<td>Grade 12</td>
<td>2017 grade 8</td>
<td>4,451</td>
<td>83%</td>
<td>3,679</td>
<td>3,370</td>
<td>309</td>
<td>3,041</td>
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## APPENDIX TABLE 4. DETAILED CALCULATIONS FOR TEN-YEAR PROJECTIONS

### Ten year projections (2016-17 through 2026-27)

**Low case - ten years**

<table>
<thead>
<tr>
<th>Grade for projection</th>
<th>Previous year projection</th>
<th>Data</th>
<th>Cohort transition ratio for 1998</th>
<th>Projection for 2026-27</th>
<th>2016-17 enrollment</th>
<th>Change from 2016-17 to 2026-27</th>
<th>2006-07 enrollment</th>
<th>Change from 2006-07 to 2016-17</th>
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</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>2021 births</td>
<td>10,526</td>
<td>73%</td>
<td>7,704</td>
<td>7,561</td>
<td>143</td>
<td>5,404</td>
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<td>Grade 5</td>
<td>2021 kindergarten</td>
<td>7,216</td>
<td>83%</td>
<td>5,970</td>
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<td>439</td>
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<td>Grade 8</td>
<td>2021 grade 5</td>
<td>6,256</td>
<td>93%</td>
<td>5,815</td>
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<td>4,594</td>
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**Base case - ten years**

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<th>Grade for projection</th>
<th>Previous year projection</th>
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<th>Average cohort transition ratio for 2015, 2016, 2017</th>
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<td>4,824</td>
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<td>1,538</td>
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**High case - ten years**

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<tr>
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<td>2,299</td>
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<td>1,861</td>
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APPENDIX II | METHODOLOGY

Our study analyzes the relationship between Millennials,\(^{43}\) housing values, migration, and past public school enrollment in D.C. to consider implications for future public school enrollment. We compare D.C.’s Millennials to their 2000 counterparts, examine trends in public school enrollment, estimate future public school enrollment, and identify areas of the city where Millennials are likely to live. Our key research questions include:

- Can changes in the parent cohort inform public school enrollment changes? How do Millennials represent a departure from the cohort of the same age who lived in D.C. as today’s Millennials were coming of age?
- Given trends in cohort changes of public school students and recent migration patterns, will growth in public school enrollment continue?
- If Millennials stay in the city when they have children, where are Millennials with families likely to live?

1. Who are D.C.’s Millennials, and are they different from the previous cohort?

To provide more context on why public school enrollment may change, we examine the characteristics of Millennials, who are most likely to be today’s parents, and compare them to their counterparts who were the same ages in D.C. in 2000. We consider Millennials to be anyone who is 20 to 34 years old in 2016. This adjusts the Pew Research Center’s definition of those born between born between 1981 and 1996 by one year to allow us to take advantage of age groups commonly reported by the American Community Survey.\(^{44}\) We will first present a profile of D.C.’s Millennials in 2016. How many live in the District, and where do they live by school boundary?\(^{45}\) Were they born in D.C.? How many have had children already? What is their racial and ethnic composition? In terms of economic opportunity, what are average incomes, home ownership rates, and educational attainments?

\(^{43}\) We focus on millennials because they are the most likely to be having children and because they have moved to D.C. in greater numbers in recent years.

\(^{44}\) Nationally, millennials comprise the most racially and ethnically diverse generation to date, and share coming of age experiences that include the 9/11 terrorist attacks, President Obama’s historic election, entering the workforce during an economic recession, and adjusting to constant availability of technology and the internet (Dimock, 2018).

\(^{45}\) We will use Block Groups to map millennials to school boundaries using a methodology developed for the D.C. Policy Center report, Schools in the Neighborhood: Can Neighborhood Characteristics Explain Enrollment at In-Boundary Schools? (Coffin, 2018).
We then examine if these characteristics differ statistically for members of the previous generation who were the same ages in 2000. We will use American Community Survey (ACS) 1-year estimates when they are available. When the estimates are not published, we will calculate estimates using the Public Use Microdata Sample (PUMS) and use person or household weights to calculate standard errors. ACS estimates are commonly published for the 20-34 age range, so we will use these ages when we analyze the microdata to be consistent. We will also look at in- and out-migration using IRS data on migration by income and age\(^{46}\) in 2011 through 2016 to see if migration trends are changing over time.

2. Will public school enrollment continue to climb?

We first establish the extent to which families have historically stayed in the District on a net basis using cohort change ratios,\(^{47}\) calculated as the number of children in D.C.’s public schools divided by the number of births to mothers living in D.C. the relevant number of years in the past. This is a net measure, and does not track individuals or separate in- and out-migration, nor movement to private schools. We focus on ages and “gateway grades” that allow for transition into school or the next grade band: kindergarten (age 5), grade 5 (age 10), grade 8 (age 13), and grade 12 (age 17). We follow the cohort born in 1998 in D.C. through high school in school year 2015-16 to see how many are living in D.C. and attending public schools in each gateway grade (see Table 1 below for calculations of the 1998 cohort). Using 1998 as a birth year for this cohort simulates how the children of the Millennials’ counterparts living in D.C. around the year 2000 stayed in the District’s schools. It also allows us to follow the cohort through high school and compare to ACS population estimates. We follow up with cohorts every three years (born in 2001, 2004, 2007, and 2010) to see any changes over time. We also compare the 1998 cohort change ratios to those in similar cities that have a high degree of public school choice (Campbell, Heyward, & Gross, 2017), rapidly growing populations, and consistent city borders: Boston, Denver, New Orleans, and Oakland.\(^{48}\) Finally, we compare cohort changes over time by race and ethnicity.

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\(^{46}\) The IRS publishes data for the age group 26 to 35 by income level.

\(^{47}\) This Hamilton-Perry cohort change ratio method is commonly used to project population.

\(^{48}\) All provide choice to families through traditional public and public charter schools and hold those schools accountable for meeting performance standards.
Table 1. Calculations of cohort change ratios

<table>
<thead>
<tr>
<th>Gateway grade</th>
<th>Enrollment cohort change ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten, early grades</td>
<td>Students enrolled in kindergarten in 2003 / Births in 1998</td>
</tr>
<tr>
<td>Grade 5, Elementary</td>
<td>Students enrolled in grade 5 in 2008 / Births in 1998</td>
</tr>
<tr>
<td>Grade 8, Middle</td>
<td>Students enrolled in grade 8 in 2011 Births in 1998</td>
</tr>
<tr>
<td>Grade 12, High</td>
<td>Students enrolled in grade 12 in 2015 / Births in 1998</td>
</tr>
</tbody>
</table>

Sources: Office of the State Superintendent for Education (OSSE)’s enrollment audits, U.S. Department of Education National Center for Education Statistics (NCES), and the Center for Disease Control (CDC), WONDER database.

To see whether these patterns are changing, we calculate cohort transition ratios for transitions between gateway grades in recent years (2015, 2016, and 2017) and in 1998. For example, we calculate how many students are in grade 12 in 2015 compared to students in grade 8 four years earlier (see Table 2 below for calculations).

Table 2. Calculation of cohort transition ratios (2015 example)

<table>
<thead>
<tr>
<th>Transition</th>
<th>Cohort transition ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to kindergarten</td>
<td>Students enrolled in kindergarten in 2015 / Births in 2010</td>
</tr>
<tr>
<td>Kindergarten to grade 5</td>
<td>Students enrolled in grade 5 in 2015 / Students enrolled in kindergarten in 2010</td>
</tr>
<tr>
<td>Grade 5 to grade 8</td>
<td>Students enrolled in grade 8 in 2015 / Students enrolled in grade 5 in 2012</td>
</tr>
<tr>
<td>Grade 8 to grade 12</td>
<td>Students enrolled in grade 12 in 2015 / Students enrolled in grade 8 in 2011</td>
</tr>
</tbody>
</table>

Next, we use this information to make assumptions about the extent to which D.C.’s public school enrollment will continue to grow. We produce three five- and ten-year estimates of public school enrollment growth in key gateway grades based on births in 2016. First, we will assume that families will stay in public schools at the same rates that they did historically, using cohort transition ratios of those born in 1998. Second, we will assume that families will stay in D.C. based on the average of cohort transition ratios in the three most recent years. Third, we will assume that the rate at which families stay in D.C. continues to increase by the same amount that it has between 1998 and the three most recent years. We estimate growth by grade for the relevant future year based on births or current enrollment (estimates for 2021-22 inform the 2026-27 estimates). Growth is then annualized and calculated for school years 2021-22 and 2026-27. Finally, growth for one grade is extrapolated to the full grade band to estimate total growth.

3. Where are Millennials with children likely to live?

First, we look at D.C.’s Office of Planning population forecasts. This shows areas of the city with a school-age population that is likely to grow as a reference.
Next, we combine information on Millennials’ income with housing data to identify areas of the District that where Millennials with families would be able to buy a home. To estimate which properties families can buy, we first calculate household income at the median and 75th percentiles for Millennial individuals without children. We combine income data with a housing dataset compiled for the D.C. Policy Center’s report, Taking Stock of the District’s Housing Stock (Sayin Taylor, 2018) to connect to data on capacity and income necessary to afford a home. We use the number of bedrooms to calculate capacity for all single-family homes using the Taking Stock methodology. We assume that each bedroom can comfortably accommodate 1.5 persons, rounded up to the next whole. For example, a one-bedroom can hold two persons, and a two-bedroom can hold three. We exclude single-family units listed with more than one unit (21 units out of 93,255) for simplicity, and an additional 58 units where data on the number of bedrooms were missing. We focus on single-family houses with a capacity of four to accommodate a family.

We then turn to the income necessary to afford a home as calculated for Taking Stock. This methodology first generates an estimated market value by dividing the assessment value by the average assessment to market value ratio for available properties by neighborhood. Then, it divides the estimated market value by a capitalization rate published by the Office of the Chief Financial Officer for income-generating properties by geographic area to estimate the annual housing cost. Finally, the annual housing cost is divided by 30 percent (a standard threshold for housing affordability) to determine the income necessary to own a home.

Given housing capacity and income necessary to own a home, we highlight areas of the city with many units that current Millennials could afford. We focus on values for single-family homes in our analysis because the data on estimated housing values (and therefore costs of home ownership) require fewer assumptions than apartments, condos, and co-ops. To reference rentals in our analysis, we compared rents for multifamily units using November 2017 multifamily rental data from Zillow (the same month as the most recent data in the housing dataset) to get a sense of how estimated housing costs per month compare. For the 36 neighborhoods with a match in both datasets, there is a strong correlation between costs of owning a single-family home and renting a unit until the owning cost of $3,400 per month, at which point the correlation becomes weak. For neighborhoods where the monthly cost of ownership is less than $3,400, the ratio of data on rents from Zillow to cost of home ownership is 1.2.

We then perform a few checks on these estimates. As a check on affordability, the analysis includes estimates of other potential costs, including student loans, taxes, and childcare. We also compare these areas to where the highest increases in school-age population have occurred over the previous five years to identify areas of overlap and where population is forecast to grow. We will also identify areas of potential future turnover given downsizing patterns for senior citizens aged 65 and older.

49 For more information, see the Taking Stock of the District’s Housing Stock: A methodology write-up.
Data sources

This analysis will answer our three key questions, which will connect demographic changes in the District to future and current trends in enrollment and child populations. Our core datasets include:

Table 3. Core data sources

<table>
<thead>
<tr>
<th>Data</th>
<th>Source</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millennial characteristics</td>
<td>U.S. Census Bureau’s American Community Survey 1-Year Estimates and Public Use Microdata Sample (PUMS)</td>
<td>2000 and 2016</td>
</tr>
<tr>
<td>Housing data</td>
<td>Taking Stock of the District’s Housing Stock dataset that combines information from eight publicly available datasets</td>
<td>2016</td>
</tr>
<tr>
<td>Apartment data</td>
<td>Zillow Rent Index for multifamily units</td>
<td>2016</td>
</tr>
<tr>
<td>Births by race and ethnicity</td>
<td>Center for Disease Control and Prevention (CDC) WONDER database</td>
<td>1998 - 2016</td>
</tr>
</tbody>
</table>
See Table 4 below for details on ACS data.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Source for 2016 (for ages 20-34)</th>
<th>Source for 2000 (for ages 20-34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual income for Millennials (no children, single parents and married/two parent couple families)</td>
<td>2016 ACS PUMS: (Personal income, past 12 months)</td>
<td>2000 ACS PUMS: (Personal total income, past 12 months)</td>
</tr>
<tr>
<td>Race and ethnicity of Millennials</td>
<td>2016 ACS PUMS: HISP (Recoded detailed Hispanic origin); RAC1P (Recoded detailed race code). Calculate Hispanic, African American non-Hispanic, white non-Hispanic, and other</td>
<td>2000 ACS PUMS: HISPAN (Hispanic or Latino Origin); RACE1 (Race Recode 1). Calculate Hispanic, African American non-Hispanic, white non-Hispanic, and other</td>
</tr>
<tr>
<td>Educational attainment of Millennials</td>
<td>2016 ACS PUMS: SCHL (Educational attainment). Calculate percent with no high school diploma, high school diploma or GED or some college, Associate’s, Bachelor’s, above Bachelor’s</td>
<td>2000 ACS PUMS: EDUC (Educational Attainment). Calculate percent with no high school diploma, high school diploma or GED or some college, Associate’s, Bachelor’s, above Bachelor’s</td>
</tr>
<tr>
<td>Millennials born in D.C.</td>
<td>2016 ACS PUMS: POBP (Place of birth recode). Calculate percent in DC</td>
<td>2000 ACS PUMS: POB5 (Place of Birth for 5% file)</td>
</tr>
<tr>
<td>Millennial home ownership</td>
<td>2016 ACS PUMS: TEN (Tenure). Calculate percent owned with a mortgage or owned free and clear</td>
<td>2000 ACS PUMS: TENURE (Home Ownership)</td>
</tr>
<tr>
<td>Millennials by elementary school boundary location</td>
<td>2016 ACS Estimates for Block Groups: Table B01001 (Sex by Age, only available for 20-34 and by year for under 20)</td>
<td>Sex by Age [79] for Block Groups, Universe: Total population, Census 2000 Summary File 3 (SF 3) – Sample Data (Sex by Age, only available for 20-34 and by year for under 20)</td>
</tr>
<tr>
<td>Marital status of Millennials</td>
<td>2016 ACS 1-year Estimates: Table B12002 (Sex by Marital Status by Age for the Population 15 and over, only available for 20-34)</td>
<td>Table PCT007: Sex by Marital Status by Age for the Population 15 Years and Over [163], Universe: Population 15 years and over, Census 2000 Summary File 3 (SF3)-Sample data, only available for 20-34</td>
</tr>
<tr>
<td>Number of children with Millennial parents</td>
<td>2016 ACS PUMS: NOC (Number of own children)</td>
<td>2000 ACS PUMS: NOC (Number of own children)</td>
</tr>
<tr>
<td>Number of children by marital status</td>
<td>2016 ACS PUMS: NOC (Number of own children) and MAR (Marital status); AGEP (Age)</td>
<td>2000 ACS PUMS: NOC (Number of own children) and MARSTAT (Marital Status)</td>
</tr>
</tbody>
</table>
APPENDIX III | REFERENCES


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