CHAPTER 2
ENROLLMENT TRENDS AND FORECASTING

BACKGROUND

CURRENT RAPID GROWTH IN ENROLLMENT

Enrollment in Alexandria City Public Schools (ACPS) is currently in a period of rapid growth of approximately 4% per year that began in 2006 and has produced a 35% increase in enrollment over eight years. This growth was preceded by a period of slowly declining enrollment at all grade levels from 2000 to 2006. Growth began when the crisis in housing finance in 2006 abruptly reduced the ability of growing families to move to new housing with more space in the outer suburbs. Although this bump in births and enrollment will gradually work its way through to graduation, a share of this growth is expected to be supported and sustained by more families choosing to live in smaller housing units at higher densities in inner suburbs and central cities. Anecdotal evidence supports the idea that families are choosing urban living for its convenience, cultural richness and lower transportation cost compared to more distant suburbs.

LONG-TERM ENROLLMENT FORECAST

Three potential long-term enrollment scenarios, together with the 2014 ACPS mid-term enrollment projection are shown in Figure 2.1 below. The scenario recommended for use in long-range planning is termed the Recommended Planning Forecast. All three scenarios are based on the city's and the region's current population growth assumptions of the regional cooperative forecasting program through 2040. The birth rate and other assumptions of the recommended planning forecast result in a decline from the recent rapid enrollment

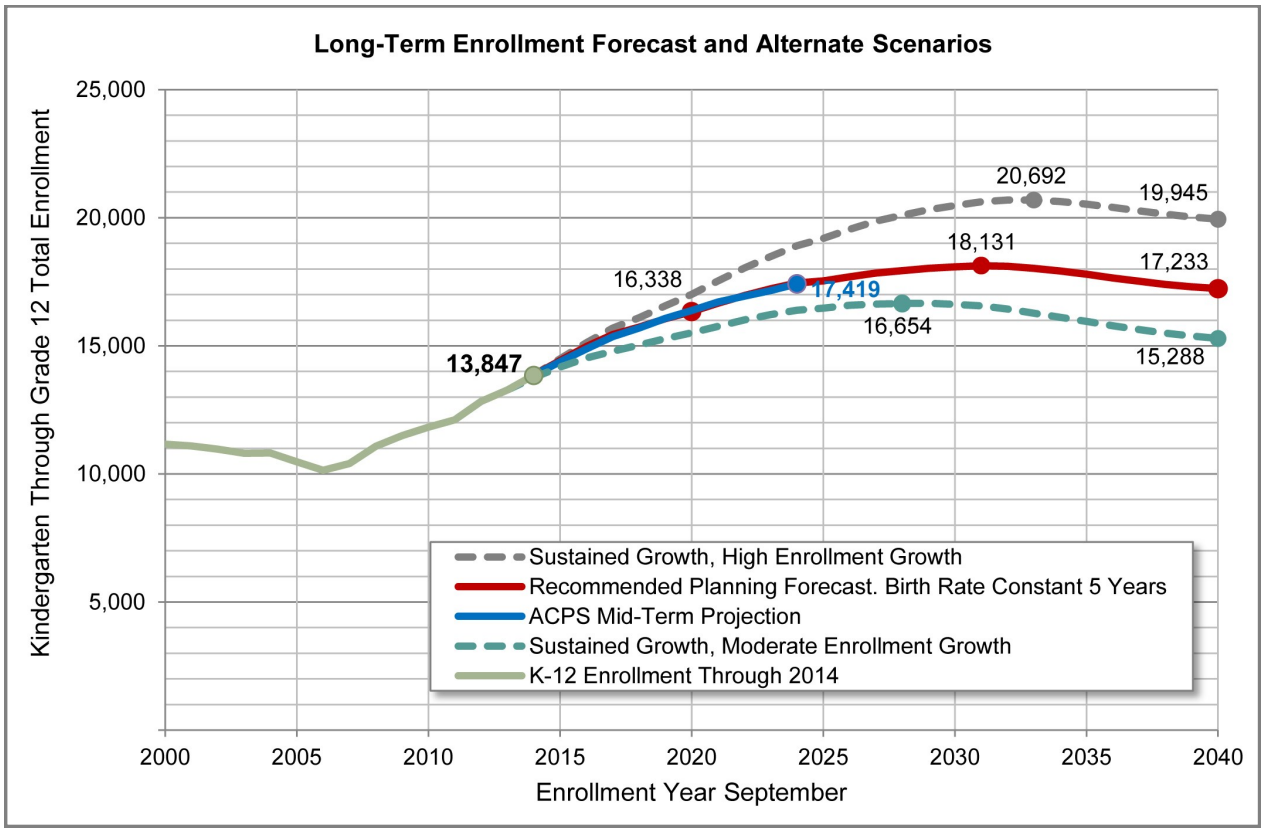


Figure 2.1. Three long-term enrollment scenarios are shown with the 2014 ACPS mid-term enrollment projection. The recommended forecast for use in long-range planning is shown in red.

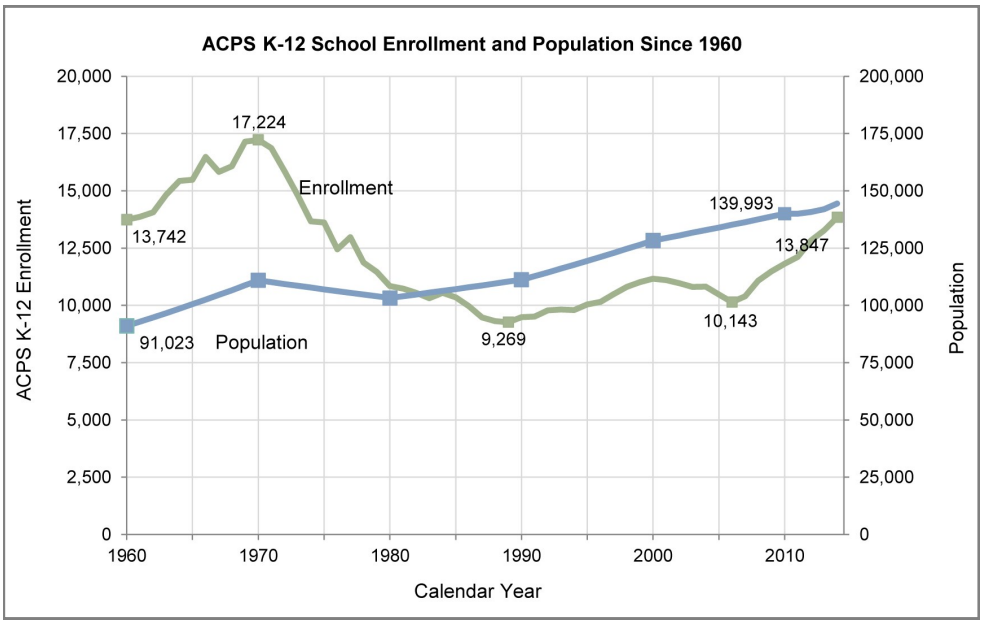


Figure 2.2. Alexandria population and public school enrollment since 1960. School enrollment peaked at over 17,000 students in 1970 as the last of the baby boomers enrolled in first grade.

growth rate over the next 10 to 15 years to a rate that approximates the 1% per year growth of the city's population as a whole. Enrollment is then expected to fall below the city's growth rate, and potentially to decline in absolute numbers slightly each year. In spite of the expected slowing rate of enrollment growth, enrollment is expected to continue to rise to peak at between 18,000 and 19,000 ACPS students in the next 15 to 20 years before declining.

The remainder of this chapter provides background on the history of enrollment in ACPS, the key contributing factors that determine ACPS enrollment each year, and how ACPS short-term projections and the long-term forecasts used to estimate future facilities needs were developed.

ACPS Enrollment History

Figure 2.2 above shows ACPS enrollment since 1960 together with city population. School enrollment peaked in 1970 as the last of the baby boomers reached school age and the earliest baby boomers had recently graduated from college. In spite of a 15% increase in the number of households from 1970 to 1980, the city's population fell that decade by 7%, and enrollment in city schools dropped by nearly 37% as Alexandria's households sent their children off into the world. Some came back to fill a rapidly growing inventory of new apartments in the city, convenient to serve the offices and industries of the region. The city's average household size declined from 2.57 in 1970 to 2.07 in 1980, 2.04 in 1990, and 2.03 people per household in 2000 and 2010, among the lowest of all cities in the U.S.

Forecasting Future Enrollment

Enrollment Dynamics

The basic mechanism by which births in Alexandria become students in school, and how those students

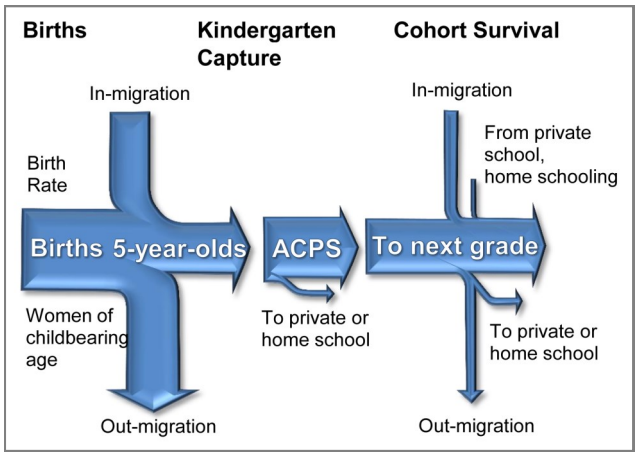


Figure 2.3. Enrollment factors. Because of substantial and variable migration by young families in and out of Alexandria, kindergarten capture is difficult to predict reliably. Once children are in ACPS schools, migration effects are generally lower than between birth and age 5.

progress through the grades is illustrated in Figure 2.3. Enrollment forecasting involves modeling this process mathematically, beginning with the recorded number of births each year. Information on in-migration and out-migration is poor in Alexandria, so these numbers are not modeled directly. Instead, the kindergarten capture rate (the number of kindergarten students each year per birth five years before) is used, with that figure averaged to smooth out random variations from year to year to estimate the future capture rate. Since 1975, that rate has averaged 56% per year, indicating a net loss to out-migration of about 7% to 8% of children born in Alexandria each year before they reach kindergarten. While census data indicates that about 15% to 18% of Alexandria's school-age children attend private school or are home schooled, compared to 9% to 12% in other Northern Virginia jurisdictions, net out-migration plays a much larger role in the low rate of kindergarten capture.

Similarly, the ratio of the number of students enrolled in each grade to the number enrolled the prior year in the earlier grade, termed the cohort survival rate, is used to estimate the enrollment in each grade in the future. Net loss grade-to-grade currently varies significantly by grade, but averages 2% to 3% per grade over all grades. Ninth and 10th grades gain students shifting from private school to ACPS, and show a cohort survival rate of greater than 100%.

Outside factors such as the recent housing market crisis, job prospects, transportation costs, and changes in public perception of the quality of local schools can all change people's decisions on where to live, public vs. private school, and whether or not to have children from year to year. Modeling based on past trends in kindergarten capture and cohort survival does not anticipate such changes. Such modeling also does not reflect changes in the rate or type of new development. In Alexandria's enrollment forecasts, a separate calculation is made of where changes in enrollment are expected based on expected new units to be constructed and existing units to be demolished.

The year 2014-15 enrollment statistics indicate that the total ACPS student enrollment has increased 4.4% compared to school year 2013-14. The average annual growth between September 2006 (FY 2007) and September 2014 (FY 2015) for the division is 4.13%. The highest percentage increase is seen in middle school at 6%, followed by high school at 5.8% and elementary school at 3.2%. The lower rate of increase in elementary enrollment is a change from the initial years of the recent enrollment increase, and is seen as a confirmation that the recent growth in enrollment is likely to slow over the next few years, first presaged by a 6.5% drop in kindergarten enrollment in 2013.

Uncertainty in Enrollment Forecasting

Alexandria's close-in urban location, demographics and housing stock combine to make future changes in enrollment difficult to anticipate. Of the current population of the city, more than 15% has moved into the city in the past year, and about 15% of those who lived here a year ago have moved out. This high rate of geographic mobility each year is more than double the national average of 6.1%. When high mobility is combined with the city's small share of the regional population (less than 3%), small changes in regional or national economic factors can be magnified into big swings in Alexandria's school enrollment.

The drop in enrollment from 2000 to 2006 was not anticipated by school planners, and while the effects of the housing finance crisis and recession on delaying families' moving plans could have been expected, the depth and duration of the economic disruptions resulted in a more significant and longer term effect than was initially foreseen.

In addition, there is at least anecdotal evidence that more families are choosing an urban environment in which to bring up their children, and walkable places like Alexandria with good public

transportation and a wide range of local cultural activities and nearby jobs are the kinds of places many of them seek. Sorting this effect out from recession effects will take more time.

School enrollment statistics are very accurate data, and a leading indicator often used to estimate how population is changing. There are no comparably complete, reliable predictive data that can be used to anticipate changes in direction of school enrollment trends with the precision needed to identify school needs 3 to 4 years in advance, the minimum notice needed to design and build new permanent school facilities.

While the number of births five years ago is used to predict kindergarten enrollment each year, the share of births that become kindergarten students varies widely from year to year in Alexandria because of the high mobility of couples and families throughout the region and the dependence of this mobility on economic conditions. Data on geographic mobility that would be useful in anticipating enrollment is available from the Census Bureau as a 1% sample survey with a large margin of error; however, even that data is not available until approximately one year after the families surveyed have already enrolled their children in school.

Long-Term Enrollment Forecast Scenarios

While we can have some confidence that this growth spurt will not last forever, estimating precisely when the turnaround will take place remains difficult. For this reason, multiple scenarios with different birth rate, cohort survival and kindergarten capture assumptions over time were used to help guide the long-range plan. All the scenarios assume the same background of sustained economic growth in the city and the region over the long term. Scenarios assuming different economic conditions could result in a wider range of enrollment outcomes.

Recommended Planning Forecast Scenario

In the recommended planning forecast scenario we assume that the birth rate in the city will remain at its 2012 level for five years and then begin to decline at 0.3 percentage points per year to the sustained rate that was experienced over the 10 years before the recent rapid increase. Once the birth rate reaches that previous rate, it is assumed to decline more slowly, at the same rate the national birth rate is projected to decline. The kindergarten capture rate and cohort survival rate are assumed to fall slightly each year from their current 2-year or 3 -year average rates. The birth rate per 1,000 residents fell in 2013 for the first time since 2006, so the initial year of data is a first indication that the birth rate may have peaked.

High Enrollment Growth Scenario

The high enrollment growth scenario assumes that the birth rate will continue to rise to peak in 2017, then begin to decline at 0.3 percentage points per year until it reaches the previous sustained rate, followed by slower decline at the rate the national rate declines. Kindergarten capture and cohort survival are assumed to continue at relatively high rates, but lower than the rates experienced from 2006 to 2010.

Moderate Enrollment Growth Scenario

The moderate enrollment growth scenario assumes the birth rate scenario of the recommended forecast, with a constant birth rate for five years, but assumes the kindergarten capture rate and cohort survival rate will fall faster than in the recommended planning forecast scenario.

From Kindergarten to Senior Year in ACPS

Each birth rate assumption in the three principal scenarios is combined with slightly different kindergarten capture and cohort survival assumptions that increase the differences between the scenarios that would result from the birth rate

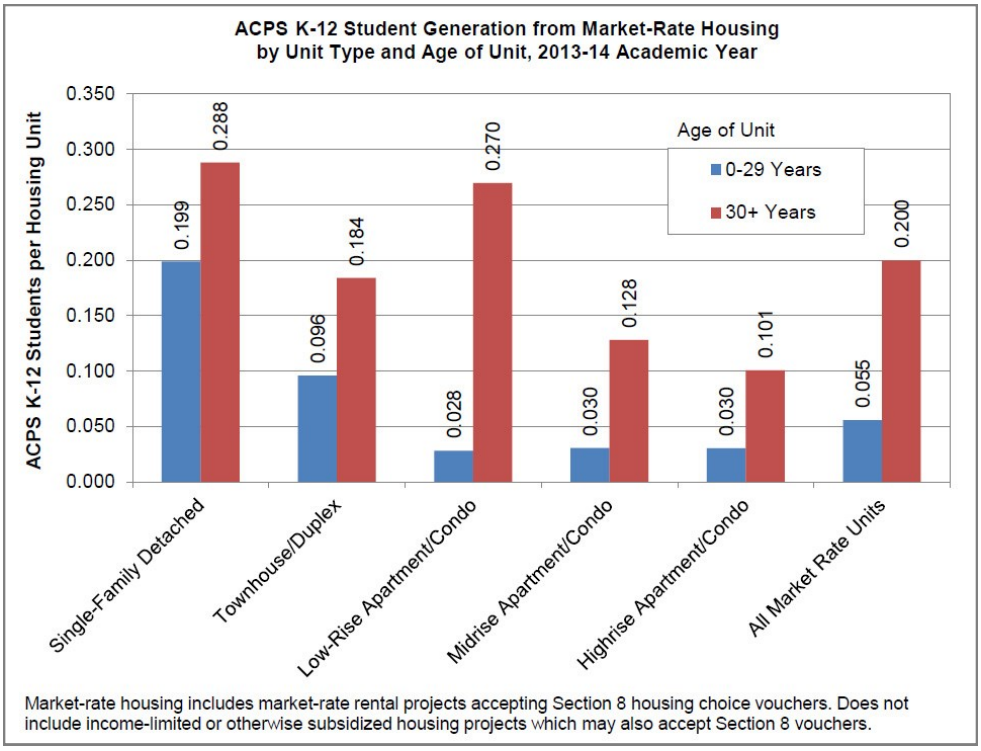


Figure 2.4. Student generation by unit type and age of unit for market-rate housing units Older units generate more students per unit regardless of the type of housing. New single -family detached homes have the most students per dwelling unit, but very few additional single-family detached homes are likely to be built in Alexandria. For older units, single-family homes generated only slightly more students per unit than the city's many low-rise or garden apartments. New apartments and condominiums generate fewer than one student per 30 units until they reach 30 to 40 years old.

assumptions alone. The kindergarten capture rate in the two lower enrollment cases is assumed to fall to the historic average rate of 56% and not below. The cohort survival rate is assumed to remain relatively high, on the assumption that students who enter the Alexandria schools will tend to stay in them at a higher rate than they did during the decline in enrollment from 2000 to 2006, but at a lower rate than that experienced from 2006 to 2010.

Long-term Enrollment Forecast Assumptions

The forces expected to turn around the recent spurt in enrollment growth include local limitations on the ability of Alexandria's housing stock to meet family needs given other choices in the region, and expected national demographic changes. Alexandria's housing stock is dominated by multifamily units with fewer rooms than housing in most surrounding areas, and this stock is not expected to continue to turn over to growing families without running into limits in competition with singles and childless couples. Some growth can be expected to continue through turnover to more families in neighborhoods that fed the baby boom in the 1960s.

The first and most important national demographic factor driving this long-term decline is an expected continued decline in birth rates among all population groups, particularly among those groups with high current birth rates, including recent immigrants and the Hispanic population (*Methodology and Assumptions for the 2012 National Projections*, U.S. Census Bureau, undated). The strength of this effect will depend to some extent on the rate of growth in the Hispanic population in the city. The growth in the Hispanic

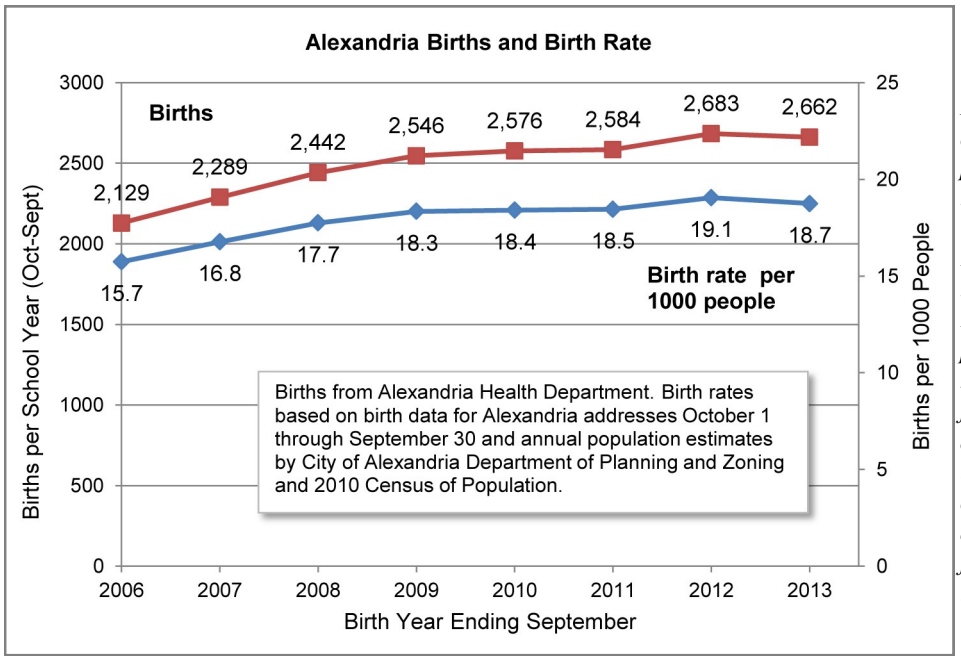


Figure 2.5. Alexandria Births and Birth Rate. After a 10-year period of relatively constant birth rate averaging 16.3 per 1000 people from 1996 to 2006, Alexandria's birth rate began to rise substantially in 2007, reaching 19.1 per 1,000 people in 2012. In 2013 the number of births fell slightly from 2012, resulting in a 1.6% decline in the birth rate. It will take at least a year or two of additional observations to determine whether this is a fundamental change in direction or a temporary variation.

population could outweigh a drop in birth rate in generating ACPS students.

The second factor is the approximate doubling of seniors as a proportion of the total population that will take place between 2015 and 2040 as all those in the baby boom generation pass age 75, and the oldest of them replace those in the low birth years of 1925 to 1940 as the oldest members of the population.

Enrollment from New Development and Re-development

In the current COG Round 8.4 long-term development forecast, the city estimates that the number of housing units in the city will increase by about 25% between 2015 and 2040. While most of this increase is in apartments and condominiums, a significant growth in the number of townhouses is also expected. New townhouses generate approximately three times as many students per unit as new apartments or condominiums in the same age range.

The enrollment forecast includes an estimate of student enrollment from new development as well as reductions in enrollment that may result from demolition of existing housing units. Because new development each year is typically on the order of 1% of the number of existing housing units, and because most new units result in a smaller number of students per unit than older housing, new development has a relatively small impact on enrollment each year. However, new development can have a disproportionate effect on specific schools as major projects such as Potomac Yard and the Beauregard Small Area Plan areas develop over a number of years, so new development is an important consideration in developing the long-term forecast by geographic area of the city. Including new or rehabilitated income-restricted or subsidized affordable family housing in new development can result in substantially more students per unit than market-rate housing.

The current average number of students per unit by type of housing and age of unit for market-rate housing is shown in Figure 2.4 above. New single-family detached housing units currently average about one student for every five units. For townhouses, it's one student for every 10 units. For apartments and condominiums, the number is one student for every 30 units or more for new units, while older units have three to 10 times as many students per unit depending on the type of housing.

Some of the current housing stock that currently produces students at these low rates will age past the 30-year mark during the forecast period, and is assumed in the forecast to produce ACPS students

at the rate of these older buildings. The age effect observed in the current housing stock is closely linked to affordability of older units. As the current housing stock ages, it will be important to track whether this aging effect on student generation remains the same for the current generation of housing.

Background for Forecasting

This section briefly summarizes data reviewed by staff and the Demographics and Forecasting Subcommittee in developing assumptions for the long-term enrollment forecast.

Births and Birth Rates

Births recorded to Alexandria mothers each year are the first data element needed to anticipate future enrollment. Birth data is one of very few statistics available well in advance of the time students appear at fall registration. Changes in the number of births, and the ratio of births to population, can provide early warning of possible future changes in enrollment. Alexandria's birth rate increased significantly from 2006 to 2009 when the housing market placed substantial constraints on people's ability to move, and grew much more slowly from 2009 to 2012. In 2013, the number of births grew only slightly from 2012, and the birth rate fell for the fist time since 2006.

Analysis of birth rates included comparing Alexandria's birth rate trend to that of neighboring jurisdictions and the nation as a whole. Potential factors possibly impacting the number of births and the size of the school-aged population were considered including changes in the:

- Crude birth rate (births per 1,000 population);
- Total fertility rate (average number of births a woman has in her lifetime);
- Age composition affecting the relative size of the female population 15 to 44 years of age; and
- Racial and ethnic composition of the population of women of child-bearing age in the city.

Birth Rate Findings

While the crude birth rate for the U.S. as a whole is declining and is expected to continue to do so for the next 30-40 years, Alexandria's birth rate has recently been increasing until a moderate drop in 2013. From 2006 to 2012, the City of Alexandria's number of births increased 26%, substantially faster than its population as a whole, which grew by an estimated 4.1% over the same period.

Alexandria's birth rate is higher than that of Northern Virginia and the nation as a whole.

On a national scale, the aging of the population will result in a reduction in the percentage of childbearing-aged women, consequently, reducing the crude birth rate. Alexandria, however, has an unusually large proportion of residents aged 20-35 years (prime family-forming and childbearing years), and a somewhat smaller proportion of seniors. As a result, the effect of the aging population in reducing the crude birth rate is expected to be less in the city than in the nation.

Birth rates vary widely in the U.S. among racial and ethnic groups because of differences in age distribution and cultural factors. Nationally, birth rates of racial and ethnic groups currently above the average rate are decreasing. Alexandria's population is comprised of many racial and ethnic groups. The Hispanic population in the U.S. has a relatively high birth rate, and Alexandria has a growing Hispanic population with many young families.

Virginia Department of Education data shows that the Hispanic share of ACPS students has increased from 26.8% in 2002 to 34.6% in 2014, making Hispanic students the largest single racial or ethnic group of students in the division. Over the same

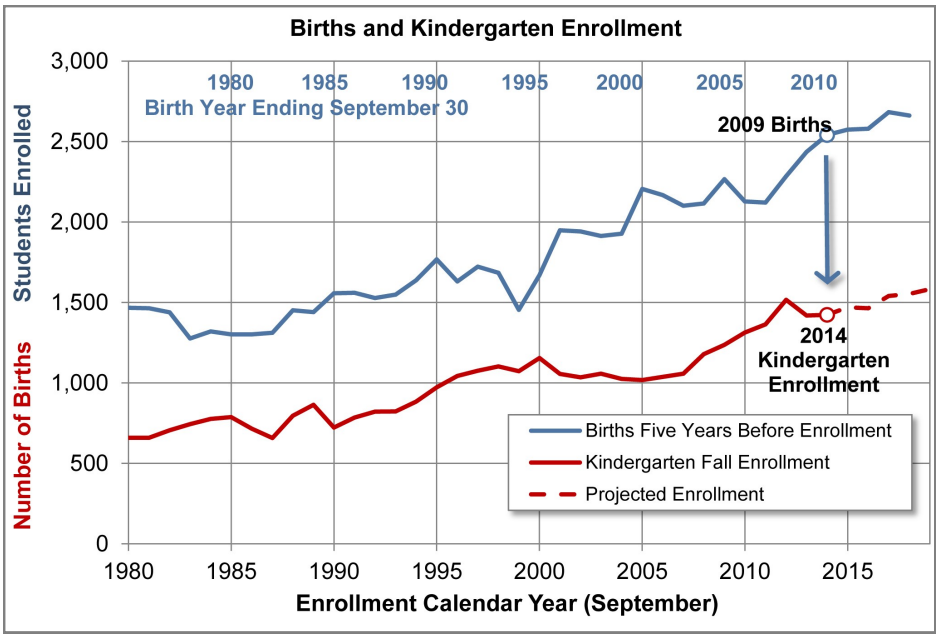


Figure 2.6. Births and kindergarten enrollment. This graph illustrates the concept of kindergarten capture rate showing the kindergarten enrollment since 1980 in Alexandria plotted against the number of births 5 years earlier that would be eligible to enroll in kindergarten that year. Alexandria has an unusually low kindergarten capture rate, based primarily on the age structure of its population, which includes only about 60% as many 5-year-olds as those less than one year old according to 2000 and 2010 Census data.

period, the non-Hispanic White share of students rose from 22.9% to 26.8% of all students, and the Black or African American share fell from 43.6% to 31.0%. Asians and other or mixed-race students make up the remainder of the student body with shares less than 5% each.

The increasing share of the population in Alexandria that is Hispanic, and the declining birth rate among Hispanics, work in opposite directions to change long-term enrollment, so tracking this factor over time will be important in updating the long-range enrollment forecast.

Birth Rate Summary

Based on the findings, the long-term assumption is that declining national birth rate trends could be somewhat offset in Alexandria by its unique urban profile with a smaller share of seniors, an unusually large proportion of residents of prime childbearing-age (20-35 years), and an increasing Hispanic population. The current assumption in all scenarios is that the city's birth rate will ultimately stop increasing and then drop below its current level, resulting in a declining rate of growth in kindergarten enrollment in the long term.

Kindergarten Capture Rate

Kindergarten capture rate refers to the share of births that become Alexandria City Public Schools (ACPS) kindergarten students five years later. As part of its work to forecast the future enrollment of ACPS, the subcommittee analyzed Alexandria's kindergarten capture rate and evaluated how this rate could inform the both ACPS short-term projections and the long-term enrollment forecast.

Kindergarten Capture Background

In Alexandria, the capture rate for ACPS kindergarten students since 2008 has ranged between 54.3% in 2009 and 66.2% in 2012. As we move away from the years affected by the housing finance crisis which substantially altered people's ability to move, the rate has started to fall, and long-term kindergarten capture rate on the order of 55% to 60% seems likely based on historic data. A large increase in kindergarten capture for one year has a big effect on kindergarten enrollment for that year and on that class over the following years, but the effect of such a one-year event on total enrollment is small. If the increase in kindergarten capture is sustained over time, total enrollment will ultimately increase by the percentage increase in kindergarten capture by the time that class reaches 12th grade in 13 years.

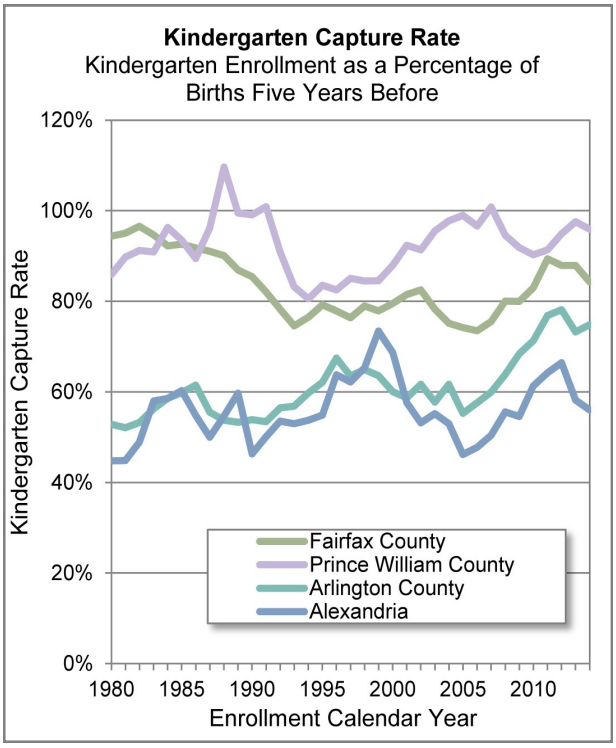


Figure 2.7. Kindergarten capture rate for Alexandria compared to that of other northern Virginia public school systems. Alexandria's capture rate is lower than the others in nearly all years since 1980.

A long-term trend of families choosing urban living could increase this rate. The rate is carefully monitored by ACPS, and the expected future rate is adjusted each year based on the immediate prior years in making school enrollment projections.

Methodology

Analysis included comparing kindergarten capture rate over time within Alexandria and neighboring districts using data from the Virginia Department of Health-Division of Health Statistics and data obtained directly from other school districts.

Alexandria has traditionally had a lower kindergarten capture rate than neighboring jurisdictions. In an effort to understand why families may or may not chose to stay in Alexandria – and if they do, enroll their 5-year old children in ACPS – the subcommittee explored potential factors that could influence parents' enrollment decisions including ACPS facility condition and reputation; availability of preferred alternatives; economic factors impacting migration patterns; the city's available housing stock; and household demographics.

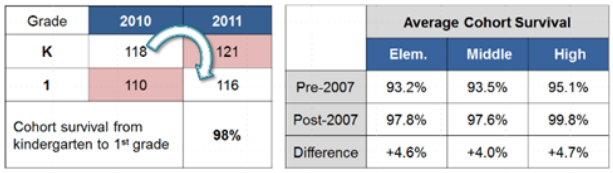
Findings

From 2005 to 2012, the ACPS kindergarten capture rate rose substantially, indicating that more families were remaining in Alexandria until their children reached kindergarten age and chose to enroll in their kindergarten-aged children in ACPS. From 2012 to 2014, the rate fell substantially, and in 2014 fell to the estimated 30-year average of 56%.

While it is difficult to analyze and quantify why families move in and out of Alexandria, it appears that ACPS reputation, economic factors, and Alexandria's housing stock (smaller percentage attractive to families as compared to surrounding jurisdictions) have each played a role, the effects of which can be seen in the capture rate and its changes over time.

Summary

While the data cannot prove a cause-and-effect relationship, it is reasonable to connect the housing bubble that collapsed in 2006 with an outmigration of families with children from Alexandria that resulted in a reduction in student enrollment in ACPS from 2000 to 2006. During this period, many families chose, enabled and encouraged by rapidly rising prices and equity in their homes, to find larger units in the suburbs before they were priced out of the market. Easy access to loans further facilitated such moves. Conversely, the housing finance crisis of 2006-2009 meant that many families were unable to move to larger units as they had expected to as their children grew older and they had more children, pushing enrollments up



Grade	2010	2011
K	118	121
1	110	116
Cohort survival from kindergarten to 1st grade		98%

	Average Cohort Survival		
	Elem.	Middle	High
Pre-2007	93.2%	93.5%	95.1%
Post-2007	97.8%	97.6%	99.8%
Difference	+4.6%	+4.0%	+4.7%

Figure 2.8. Cohort survival diagram. This figure shows the concept of cohort survival. In the illustration, 116 first-grade students in 2011 are compared to 118 kindergarten students in 2010, a cohort survival rate of 98.3%.

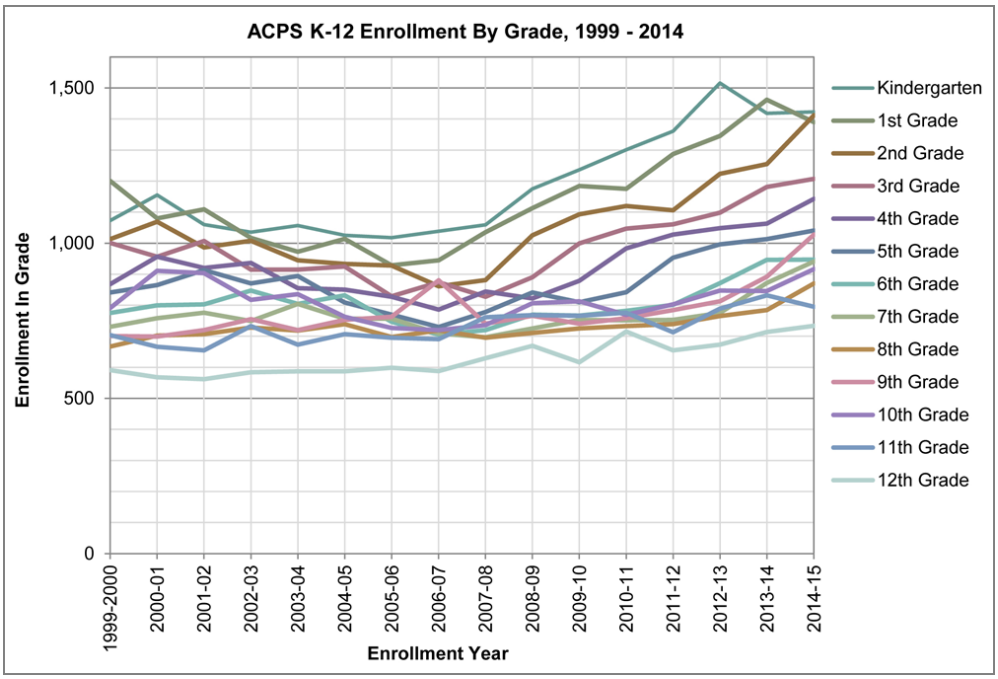


Figure 2.9. ACPS Enrollment by Grade, 1999 through 2014. Kindergarten enrollment grew by nearly 50% from 2006 to its peak in 2012, This increase in kindergarten enrollment has passed to each succeeding grade in turn, and reached 8th grade September, 2014.

from 2007 through 2014 at a rate much higher than the rate of increase in housing stock in the city. Once children enter into ACPS for kindergarten, they are more likely to stay within the system.

Cohort Survival Rate

Background

The cohort survival rate, as the term is used in enrollment forecasting, is the share of students moving from one grade to the next in each grade. In the example in Figure 2.8 below, a school has 118 kindergarten students in 2010. In 2011, 116 students enter first grade, a cohort survival rate of 98% of the previous year's kindergarten class. A rate less than 100% means that more students are leaving Alexandria City Public Schools (ACPS) than coming to ACPS to transition to that next grade. A percent greater than 100% means more are joining APCS than are leaving. During the years of enrollment decline from 2000 to 2006, the average cohort survival rate in primary grades fell from about 96% in 2000 to just over 90% in 2006. If a 90% rate is sustained from second through eighth grade, it means that eighth-grade enrollment will be about 48% of first-grade enrollment. After 2006, the cohort survival rate for primary grades increased to over 100% in 2008, but has since stabilized at about 96% to 97% for lower grades. If sustained at 96.5%, this rate would result in an eighth-grade enrollment about 78% of first-grade enrollment, and about 42% higher overall enrollment in the division as a whole (assuming similar cohort survival ratios for high school) than a 90% cohort survival rate. ACPS typically has a cohort survival rate of greater than 100% into 9th and 10th grades, since many private schools do not continue to high school, and parents move their children to public school at this level. The lowest cohort survival rate of all grades is going into 12th grade. Averaging about 85% historically, this rate has moved closer to 90% in the last three years, and includes factors such as seniors graduating earlier than planned.

A one-percentage-point increase in average cohort survival in all grades from 95% to 96% each year means a little more than a 1% increase in overall enrollment in the first year, but translates to 13% more 12th-graders, and nearly 6% greater total K-12 enrollment if sustained for 12 years until all grades graduate.

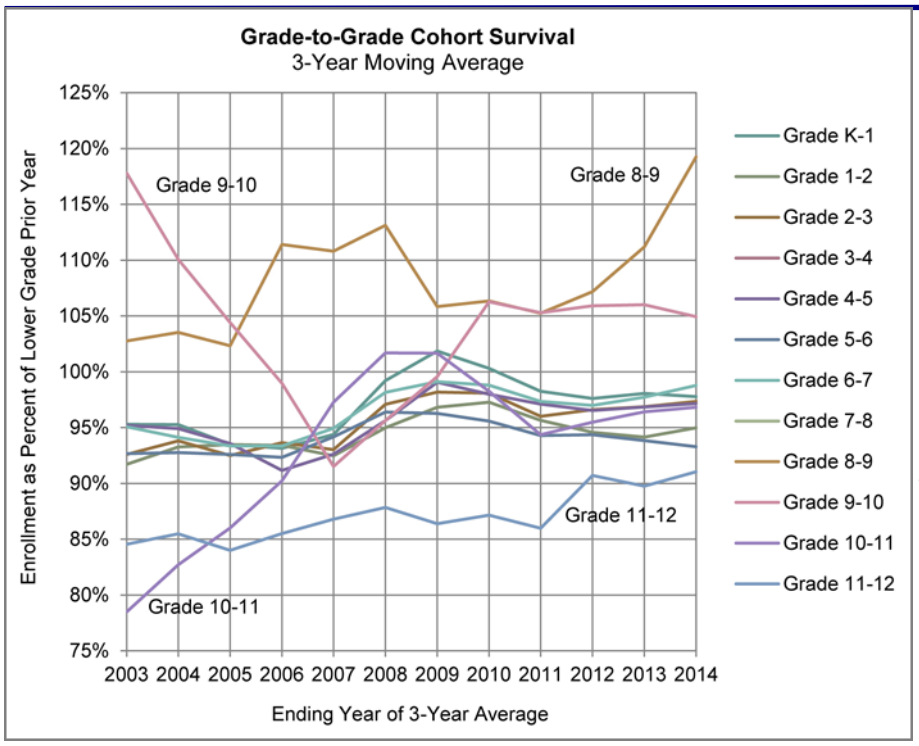
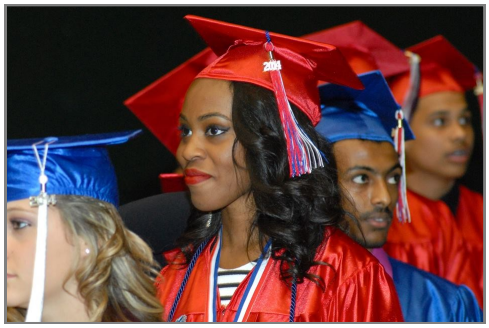


Figure 2.10. Cohort Survival by Grade. This graph shows the changes in the 3-year average of cohort survival from grade to grade from 2003 to 2014. Grades 9, 10 and 12 have unusual cohort survival rates as many students enter ACPS from private schools in 9th grade, and 12th grade enrollment is historically low compared to 11th grade. Most grades are clustered near the center of the graph, with rates between 90 and 95% before 2007 and between 95% and 98% from 2011 to 2014.



The cohort survival rates derived from enrollment statistics include all sources of new students. These rates ignore whether changes in enrollment are due to new development, demolitions of existing housing, change in occupancy of existing housing, or choices between public and private school. Separate analysis of new development, including the type of unit, is conducted in order to anticipate changes in the rate of student generation as rates of new development change, and to anticipate which schools are likely to see enrollment changes from new development.

The graph above shows ACPS enrollment by grade during the years of declining enrollment from 2000 to 2006, and the recent rapid increases in enrollment since 2007. Enrollment in first grade began a rapid rise in 2007, followed by second grade in 2008, third grade in 2009 and so on. This pattern shows the effect of cohort survival from increases in the early grades pushing up enrollment throughout the system over time.

Methodology

ACPS and the City of Alexandria determined the historic cohort survival rate at which students move from one grade to the next, by grade level, by year, by attending school, by neighborhood school and by individual student. In addition, staff analyzed contributing factors to this variable including established trends, new programmatic initiatives, and neighborhood schools. Unlike the dropout rate, which is based on records of individual students, cohort survival tracks aggregate numbers of students.

Findings

Alexandria's cohort survival rate for elementary and middle school grades is almost always less than 100%, reflecting smaller populations in each age cohort in the city through high school age. In high school, cohort survival rates for 9th and 10th grades are typically higher than 100%, reflecting students entering public school from private schools. The decline in student population by grade is generally considered to be a result of the market demand for Alexandria's housing stock, which is further

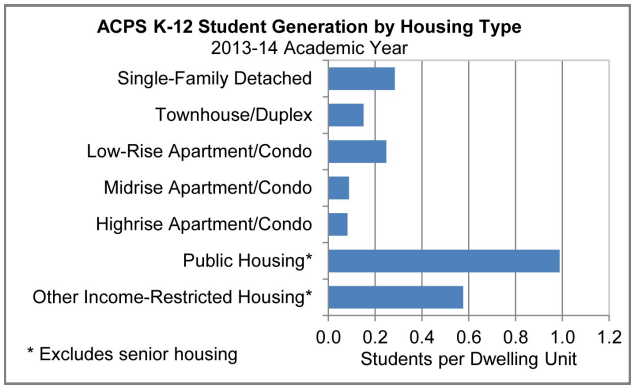


Figure 2.11. Student Generation by Housing Type. Single-family detached, townhouse and low-rise apartment and condo units have the highest student generation rates among market-rate housing units. While public housing and other subsidized or income-limited units have high student generation rates per unit, students from these units make up a small share of total enrollment.

described in the kindergarten capture and student generation rate summaries.

The graph above shows the 3-year moving average of cohort survival rates for all grades since 2003, reflecting the average of rates since 2001. The cohort survival rate for most grades reached a recent minimum in 2005 or 2006, reached historic highs in most grades from 2007 to 2009, and has stabilized at levels somewhat lower than these peaks from 2010 through 2014. The low cohort survival rate reached in 2006 of approximately 92% for elementary grades means a loss of 8% of students at each grade level, resulting in a 9th grade enrollment about half that of a kindergarten enrollment. The recent cohort survival rates of closer to 97% mean in the long term a 9th grade closer to three-quarters the size of the entering kindergarten class each year.

These recent changes can be attributed to the same factors that resulted in similar changes in the kindergarten capture rate over the same period. The combination of the increase in the cohort survival rate, city birth rates, and the kindergarten capture rate has resulted in enrollment growth that is substantially outpacing overall growth in population and housing units in the city.

SUMMARY

After analyzing both the historical student cohort survival rate and the other influencing variables, a 3-year average cohort survival rate was used for the short term enrollment projection. Expectations for

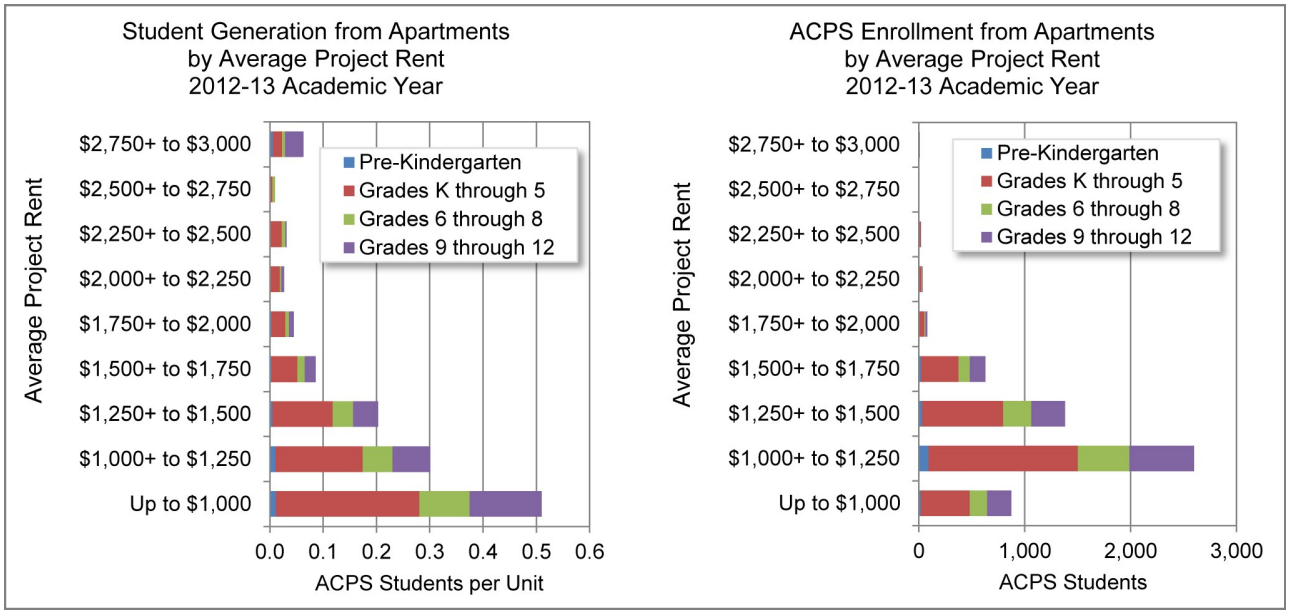


Figure 2.12. Student Generation and ACPS Enrollment by Average Project Rent. This analysis, conducted for the 2012-13 academic year, shows differences in student generation and total enrollment as a function of monthly rent. The graphs are based on rents reported in the Alexandria Office of Housing's annual apartment survey. The survey is limited to apartments of more than 8 units, and participation is voluntary, so not all apartment buildings are included in the survey. Some of the apartments, particularly in the lower rental ranges, are limited to low or moderate-income households. Public housing units are not included in the graphs.

cohort survival will also inform the long range forecast model.

Student Generation Rates

Background

The Alexandria City Public Schools (ACPS) student generation rate is the ratio of the number of students enrolled in ACPS to the total number of dwelling units in the city. The City has identified specific generation rates for various types and affordability classes of housing, and the effect on generation rates for a variety of housing characteristics including building type (single vs. multi-family, low-rise vs.mid-rise and high-rise), tenure (owner or rental), building age, value and rent, whether rent-subsidized or income-restricted, and whether units are restricted to seniors. The generation rate patterns for various types of housing units and unit characteristics assist in predicting future enrollment for the short- and long-term planning horizon as forecasts of demolition and new construction change the expected mix of types of housing in the city over time.

Methodology

Using the address of every ACPS student, staff was able to map nearly all students from Alexandria to a housing type for the 2012 and 2013 school years and analyze generation rates for various types of housing by type, age and affordability class. (Approximately 2% to 3% of students each year cannot be assigned to a specific city residence address and housing type because of insufficient address information or an address that is clearly outside the city.)

In conjunction with this data, staff analyzed multiple factors that might affect student generation based on characteristics including: housing type, housing affordability programs, market affordability, age of housing stock, and home sales.

Findings

The 2013-14 student generation by housing type (Figure 2.11) indicates that detached single family dwelling units, garden apartments, garden cooperatives, and townhomes are the largest student generators by type. Today's snapshot of the mix of housing types in relation to student generation assists in projecting future student enrollment.

Affordability was found to be a key determinant of student generation for most housing types. For market-rate housing, student generation is highest

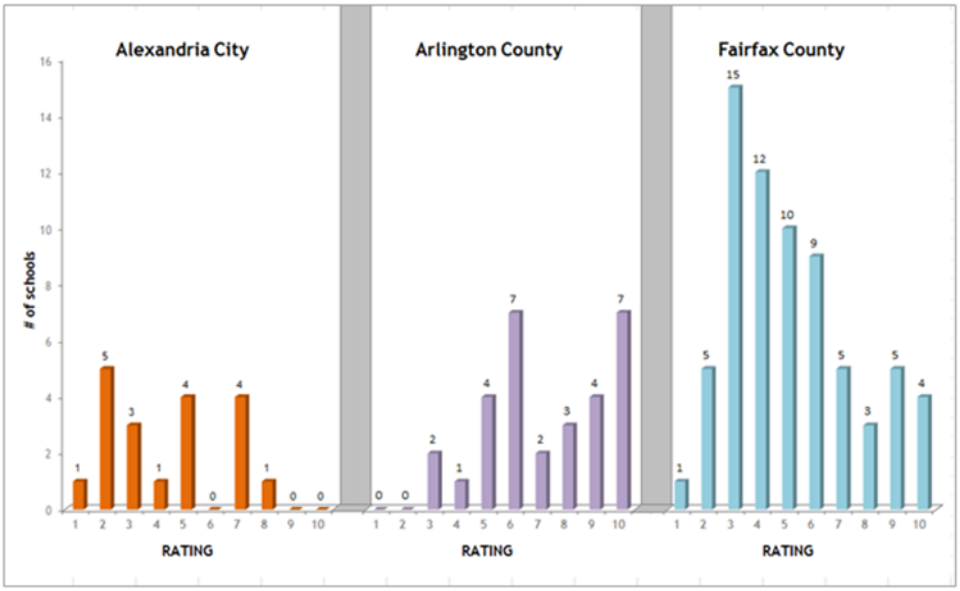


Figure 2.13. School Ratings In and Near Alexandria. These graphs show the number of public schools with various greatschools.org ratings in Alexandria and within 10 miles of Alexandria in Arlington County and Fairfax County. 1 is the lowest rating and 10 is the highest on this scale.

for housing with the lowest values and rents as reflected in the ACPS Student Generation by Average Project Rent column graph at the top of the following page. This applies to both programmed affordable housing (subsidized and income-restricted) and market-rate dwellings. The findings from this analysis indicate that future student generation may depend in part on changes in the affordability of the city's housing stock over time. To the extent that less expensive housing is eliminated through redevelopment, rehabilitation, or price or rent increases, households with school-age students are likely to choose housing in other areas. As the existing housing stock and newly developed housing becomes more affordable as it ages, the city will continue to provide housing that families find affordable and will see student growth parallel population growth. To the extent that the city continues to support income-limited and subsidized housing and encourages such housing to be provided in new developments or through voluntary affordable housing contributions, the share of students from such units will remain similar to that today with the growth in housing units and population.

The ACPS Enrollment by Average Project Rent graph at right above shows the total ACPS enrollment from rental units with various average rents listed in the Office of Housing's annual apartment survey. (Average rent in the analysis was based on a single number for each project and not based on individual unit rents. Average project rent was based on the weighted average of the midpoints of the range of rents for efficiencies, 1-bedroom, 2-bedroom and 3-or-more-bedroom units in each project.)

Rental units with rents averaging $1,750 per month or more generated less than 0.05 students per dwelling unit. At rents up to $1,500 per month, rental units generated an average of 0.2 students per dwelling unit or more.

Condominiums, even at low assessed value, generate substantially fewer students per unit than single-family attached (townhouses), detached or duplex units. At valuations greater than $200,000 per unit, condominiums generated less than 0.05 students per unit (1 student per 20 dwelling units). All other ownership units combined generated more than 0.15 students per dwelling unit up to a valuation of $1.5 million. All condominium units are classified as ownership units in the analysis, whether or not the individual condominium unit is rented.

Townhouses with values above $450,000 generate 0.1 students per unit or less except for a very few high-value townhomes. This is substantially fewer students per unit than single-family detached housing units, which generate more than 0.2 students per unit up to an assessed value of $1.5 million.

Income-limited and subsidized housing units, public housing units, and cooperative apartments generate the highest number of students per dwelling unit in the city, in part because such limits and subsidies are often focused on housing affordability problems of families with children. Public housing family units were found to generate nearly one student per dwelling unit, while subsidized and income-limited apartments were found to generate approximately 0.65 students per dwelling unit.

Based on analysis conducted by ACPS and the City of Alexandria, comparing new students and real estate data on home sales, whether a home had been recently purchased did not directly influence student generation.

Student generation varies depending on the area of the city because of the variation in housing type and rent. Redevelopment planned in the West End is

expected to result in a reduction of students because the housing to be demolished has a relatively high student generation. The new units are expected to generate at a much lower rate for many years. New development in Potomac Yard will generate new students to the division since no units will be demolished. The net effect across the city was determined to be approximately neutral in the 2012 short-term enrollment projection. However, since reductions were expected in some parts of the city balanced by increases in other areas, it is important for projections of school enrollment to use individual school enrollment areas as the level of analysis.

Summary

As the mix of housing types evolves within the City, such as through the conversion of garden apartments to mid-rise or high-rise units, and the overall increase of multifamily units, ACPS and the City of Alexandria can utilize updated generation rate calculations to track and forecast division-wide and site-specific changes in the student population.

Changes in kindergarten capture and cohort survival affect the generation rates of all units over time, but may change generation rates in some types of units more than others.

School Reputation Influence on Student Enrollment

School Reputation Background

This research element provides a qualitative snapshot of the perception of school quality in Alexandria. It's important to note that the information presented does not in any way assess the actual quality of the school system, but rather is provided to highlight some of the perceptions that residents and potential residents have about Alexandria City Public Schools (ACPS), and how those perceptions could impact school enrollment in the future.

Methodology

The City of Alexandria's planning staff conducted two focus group sessions, in early 2014, with Alexandria-based real estate professionals from McEnearney & Associates, and Long & Foster. The topics of discussion ranged from housing choice trends of families buying and selling in Alexandria, to the role and weight of school reputation in the residential real estate market. The discussions were limited to the home ownership market, so the findings do not reflect trends in the rental market. In addition to the focus groups, planning staff researched school ratings from greatschools.org to gauge public perception of all Virginia public schools within a 10-mile radius of Alexandria.

Findings

There were four key takeaways from the focus group discussions and online research:

Growing urban preference

There is a growing interest in urban lifestyle for families with children. Alexandria's urban profile and amenities are a major draw for this demographic. Many areas within the city are in a position to capture some of this demand along with other inner-suburban and inner-core neighborhoods in the region.

Importance of school reputation

Despite this urban preference, school reputation often plays a larger role in real estate decisions of families, and currently, this is working against Alexandria. In general, families perceive schools to be better in neighboring jurisdictions, and many are choosing not to buy a home in Alexandria, or are selling their existing home in Alexandria, to move to other jurisdictions based on these perceptions. There are a few exceptions within ACPS, particularly among the elementary schools. The real estate group noted that families are willing to pay a premium, as much as $100,000 to $150,000 more, to live in the more desirable school attendance areas within Alexandria.

Perceptions

The real estate professionals noted that most of their clients with children rely on various websites that rate individual schools. The website greatschools.org was one in particular that is widely used (their ratings are displayed on zillow.com). Interestingly, the rating system used by greatschools.org puts a heavy emphasis on

individual student test scores. Communities like Alexandria, which have a diverse population, and high level of mobility, are at a disadvantage under this rating system because many students who are just starting to learn English do not perform as well on the standardized tests. In addition, the real estate professionals felt that there are many positive aspects of ACPS that are not widely known, and that the school system could improve promoting this message to the community.

Comparisons with other jurisdictions

An examination of greatschool.org ratings supports real estate professionals' observations about the perception of Alexandria schools. Recently, ACPS has jumped from having no schools with ranking of 6 or better, (two years ago) on a scale of 1 to 10, to now reflecting 5 with rankings of 6 or better on greatschools.org. Figure 2.13 illustrates how Alexandria schools are perceived relative to schools in neighboring Arlington County and Fairfax County. The fact that there are so many options for highly regarded schools proximate to Alexandria but outside of its borders will likely have a dampening effect on school enrollment. An improvement to the reputation could shift this trend and put upward pressure on enrollment. However, even with a better school reputation, there is a limit to the number of families Alexandria could capture because the proportion of single-family homes is much lower than in neighboring jurisdictions, and is not likely to increase.