City of Alexandria
Department of Planning and Zoning
301 King Street, Room 2100
Alexandria, VA 22314

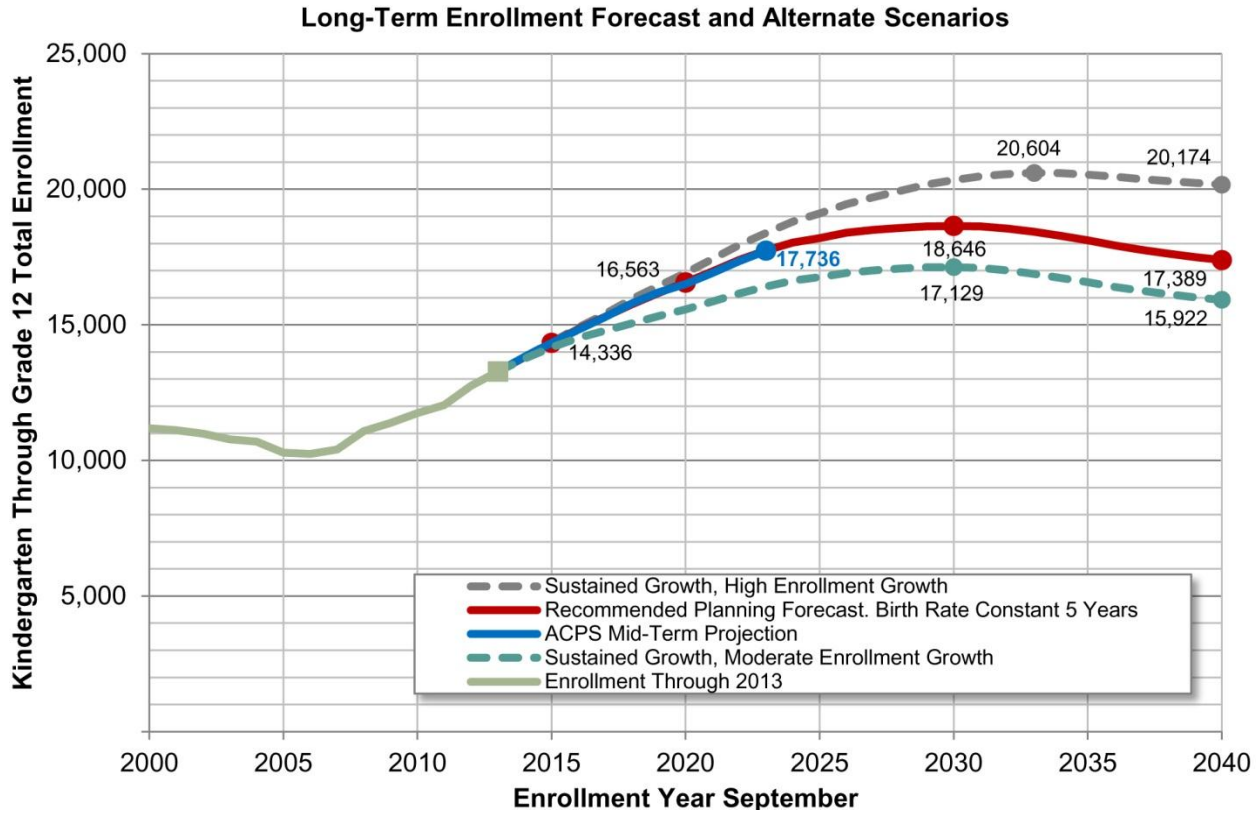
January 10, 2014

Long-Term School Enrollment Forecast

Draft for Enrollment and Forecasting Subcommittee Discussion

The long term enrollment forecast is actually a set of forecasts, one of which is recommended to guide education facilities planning over the long term. The forecasts also include two alternate scenarios based on different assumptions about economic conditions and families' responses to them over the long-range planning period through 2040. These alternate scenarios illustrate the sensitivity of the forecast to changes in basic assumptions.

The recommended forecast, shown below as a red line, has enrollment continuing to increase at a steady rate until 2020, after which growth will decelerate. Peak enrollment is forecast to occur in 2030 at approximately 18,650 students, a 40% increase over today's enrollment of 13,278 and almost double the enrollment of 2006. Enrollment is then expected to decline to about 17,400 students by 2040.



The recommended forecast assumes the current birth rate remains steady for the next five years before declining and that the rate of families with children moving from Alexandria, while remaining low, will increase to its previous long-term average over the next decades. This forecast closely matches the ACPS mid-term projection through its horizon year of 2023.

The two most significant inputs to the forecast are answers to the following questions:

- **Will Alexandria birth rates, now on the rise, continue to increase? And if so, for how long?** After holding steady for about a decade, Alexandria's birth rates began to rise in 2007 and have continued to rise. Alexandria's birth rate is much higher than that of the nation as a whole because we have a higher proportion of our population in the child-bearing age range. Even so, this local "baby boomlet" will eventually recede. Local and national demographic trends indicate that birth rates are likely to peak within the next five years and then retreat. Even after birth rates begin to decline, the number of actual births will remain fairly high even after the "boomlet" is officially over because the city will continue to have a high share of its population in the peak childbearing age group. *The recommended forecast assumes birth rates will hold steady for the next five years and then decline to the pre-2007 average of 16.3 per 1000 population by 2028. After that, the birth rate will decline more slowly, in line with national averages.*

- **How many families with children will move out of Alexandria before entering or completing public school?** The 2000-2006 housing bubble induced a historically high rate of out-migration of families with children from the City of Alexandria. Relatively cheap mortgages and less strict loan requirements encouraged Alexandria families with children to move out of the City to locations where single-family homes are more plentiful. The housing market correction in 2007 brought a sudden and dramatic conclusion to that out-migration – with an immediate impact on school enrollment. While the housing market has improved somewhat, enrollment has continued to increase. *Over the forecast period it is likely that some family out-migration will resume since Alexandria has a limited amount of housing for families, but the recommended forecast assumes that the rapid out-migration of the 2000-2007 period will not fully return because the financial conditions that prompted it will not return, and because it appears that families are placing a higher value on raising children in urban environments than they have in the past.*

In order for enrollment to be lower than the recommended forecast, either the City's baby boomlet would have to end in the next 1-3 years and birth rates would have to decline at a faster pace than is assumed for the recommended forecast, or family out-migration would have to resume at an accelerated pace. The latest data show birth rates as rising (not falling) and do not show evidence of increasing family out-migration, so we have not yet seen evidence that such a change has begun.

An increase in the rate of family out-migration compared to the recommended forecast is the assumption that forms the basis of the Moderate Enrollment Growth Scenario, shown as the teal (or blue-green) dashed line below the recommended forecast. The Moderate Enrollment Growth Scenario peaks in 2030 at about 17,100 students and declines slowly to about 15,900 students by 2040.

The gray dashed line above the red recommended forecast is a high enrollment forecast that assumes Alexandria birth rates will continue to rise for the next five years, and that only a very slow increase in the rate of family out-migration will take place through 2040. All other inputs are the same as those of the recommended forecast. This scenario shows an enrollment peak of 20,600 in 2033 followed by slow decline to below 20,200 in 2040. Alexandria's birth rate has been increasing for the past five years and though the rate of increase has moderated, the rate has not yet started to decline. Continued growth is increasingly unlikely, given anticipated changes in the size and composition of the cohort of Alexandrians in the child-bearing age range.

The table on the following page summarizes the assumptions for key factors used to estimate future enrollment on which the various forecast scenarios are based. Additional work to refine the forecasts and to allocate forecasts to different geographic areas of the city will be undertaken in 2014.

ACPS Projections, Long-Term Forecast and Alternate Scenarios Compared

Forecast or Projection	Horizon Year	Population Growth Assumption	Birth Rate Assumption Births per 1000 People	Kindergarten Capture, Percent of Births 5 years Ago	Cohort Survival, Percent by Grade
ACPS Short-Term Projection	6 years (2019)	Used to estimate enrollment from new development only	Projected trend in average number of births of 5-year and 8-year averages to 2014	3-year average (60.7%)	3-year average by school by grade
ACPS Mid-Term Projection	10 years (2023)	Used to estimate enrollment from new development only.	Projected trend in average number of births of 5-year and 8-year averages to 2018	3-year average (60.7%)	3-year average by school by grade
ACPS/COA Long Term Forecast and Alternate Scenarios. Not all scenarios are illustrated. (color for a scenario indicates change from the scenario listed above it)					
Sustained Growth, High Enrollment Growth	2040	Sustained Growth (COG Round 8.2). 2040 population 191,000	2012 birth rate increases 0.3/1000 per year for five years, stable 1 year, then declines at 0.3/1000 until 16.3/1000 is reached, then declines at rate national birth rate declines.	60% falls to 58% gradually over forecast period	3-year average by grade falls gradually by 1 percentage point over forecast period
Sustained Growth, Recommended Enrollment Forecast	2040	Sustained Growth (COG Round 8.2). 2040 population 191,000	2012 birth rate steady for five years, then declines at 0.3/1000 until 16.3/1000 is reached, then declines at rate national birth rate declines.	60% falls to 58% in 5 years, then gradually to 56% in 2040	3-year average by grade falls gradually by 1 percentage point over forecast period
Sustained Growth, Moderate Enrollment Growth	2040	Sustained Growth (COG Round 8.2). 2040 population 191,000	2012 birth rate steady for five years, then declines at 0.3/1000 until 16.3/1000 is reached, then declines at rate national birth rate declines.	60% falls to 58% in two years, then falls gradually over forecast period to 56% in 2040	3-year average by grade falls by 2 percentage points in 2 years, then 2 percentage points gradually to 2040
Sustained Growth, Low Enrollment Growth (not shown)	2040	Sustained Growth (COG Round 8.2). 2040 population 191,000	2012 birth rate falls now at 0.3/1000 each year until 16.3/1000 is reached, then declines at rate national birth rate declines.	60% falls to 58% over two years, then falls gradually over forecast period to 56% in 2040	3-year average by grade falls by 2 percentage points in 2 years, then 2 percentage points gradually to 2040
Weak Economy, Low Enrollment Growth (not shown)	2040	Weak Economy, 2040 population 177,000	2012 birth rate falls now at 0.3/1000 until 16.3/1000 is reached, then declines at rate national birth rate declines.	Falls to 58% over 5 years	Falls by 1 percentage point in each grade over 5 years

Enrollment Forecast Assumptions Summary

The enrollment forecasts integrate:

- Short- and long-term demographic and economic trends shaping the City of Alexandria, the region, and to a limited extent, the nation, with
- The capacity for growth and change due to development and redevelopment.

The analysis of demographic and economic trends – particularly those that directly translate into changes in student enrollment – is used to make assumptions about the three key elements of any school enrollment forecasting model:

- Births: the number of births to mothers living in the City of Alexandria (regardless of the location of the birth event)
- Kindergarten capture rate: the number of enrolled ACPS kindergarteners as a percentage of the number of births five years earlier
- Cohort survival: the number of ACPS students in a grade level (for example: 1st grade) as a percentage of the number of students in the previous grade (in this example: kindergarten) a year earlier.

As a reality check on the enrollment forecast results, the enrollment forecast is compared to student generation from the expected future mix of housing types based on the city's long-term development forecast.

- Student generation: the number of ACPS students living in a particular housing unit type (for example: townhouses) divided by the number of housing units of that type in the City.

In order to incorporate all of the information gathered over the past year and to cross-check assumptions, staff looked at the forecasts from a number of different perspectives:

- A perspective based on forecast of the City's population growth, with demographic and economic factors informing birth rates and migration of families with children in and out of the City.
- A perspective based upon the expected change in the City's housing stock over time, with demographic and economic factors informing how student generation rates may change over time.
- A perspective for the mid-range based on the idea that we already know a lot about the next ten years because so many of the students who will be enrolled ten years from now are already living in Alexandria.
- A perspective based on the historic number of ACPS students per 1,000 people in the city, and by comparison, in surrounding jurisdictions.

In most cases, looking at enrollment from these different perspectives resulted in forecasts that were very similar. Where there were differences based upon reasonable assumptions, those differences were used to create the high and low scenarios in the recommended forecast.

The balance of this memorandum summarizes the key variables in the forecasts, the trends that inform them, and how they were used in the enrollment forecasts.

Population

The City of Alexandria forecasts the City's population in five-year increments to 2040. These forecasts are done in coordination with the other jurisdictions in the region through the Metropolitan Washington Council of Governments (MWCOG) and, as in the other MWCOG jurisdictions, constitute the "official" population forecasts for the City.

The City's population forecast assumes that the Washington, D.C. metropolitan region, particularly inside the Beltway, will experience sustained growth over the forecast period, so that the city will continue to attract residents to existing housing and planned development projects. Under this forecast, population in the city is expected to continue to grow at a rate of approximately 1% per year, from a 2010 population of 140,000 to a 2040 population estimated at 191,000. This rate of growth continues the city's average growth rate experienced from 1980 to 2010.

Lower rates of population growth were studied but have not been included in the long-term forecast. The rate of population growth is much less likely to diverge from long-term trends than other factors, such as births and rates of out-migration.

Enrollment Forecasting Model.

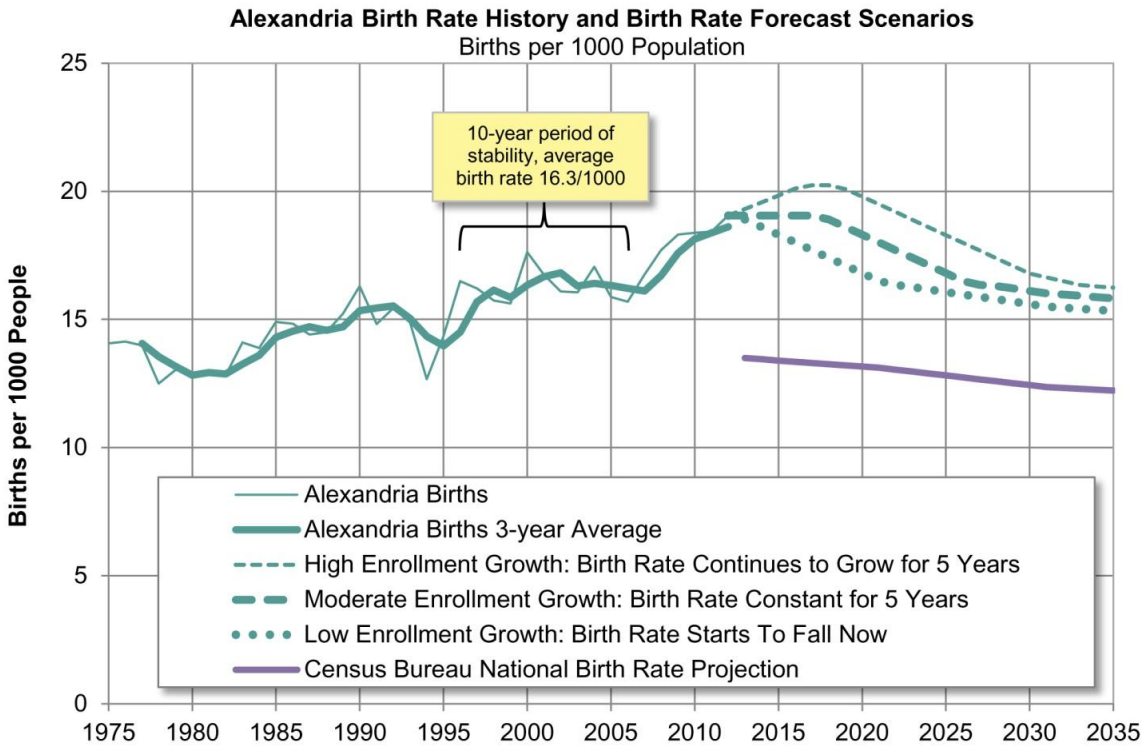
Virtually all school demographers use the same basic process to model and forecast school enrollment. What are different from jurisdiction to jurisdiction are the inputs to the model. The enrollment model uses actual births in the city, estimates of what percentage of these births will appear as kindergarten students 5 years later, and estimates of how many of these students will proceed through each grade of school to graduation. Among the reasons this model is the standard for forecasting:

- The model reflects the process by which students enter the population, enroll in school, and proceed through the grades.
- For these inputs (births, kindergarten capture, and cohort survival), we have timely and very precise data with a long historical record.

While economic and demographic factors do affect each of the primary enrollment inputs, in general data on these factors is much less precise at the city scale, data is not as timely, and these factors affect enrollment indirectly. For example, the 2000s housing price bubble and the housing finance crisis certainly affected enrollment over the past decade. However, it would be difficult if not impossible to develop an accurate enrollment forecasting model that uses housing market indicators as explicit inputs since the local housing market is affected by many factors, not all of which are easily tracked.

Births and Birth Rate

The figure below shows the birth rate per 1,000 people in Alexandria since 1975. Data have been corrected to include births that occurred to Alexandria mothers but not births to mothers living in the "Alexandria" portion of Fairfax County or elsewhere, or births that took place in Alexandria to mothers who live elsewhere.



This graph shows that the birth rate per 1000 people in the city has been slowly increasing since 1975, with a significant recent increase starting in 2007. In 2006, the birth rate was 15.7 per 1,000 people; since then it has increased by 3.4 per 1,000 people to 19.1 per 1,000 people. Alexandria's birth rate per 1,000 people is substantially higher than the U.S. national average, primarily because the city has an unusually high percentage of its population in the 25-39 year age group, the age group with the highest rate of births.

The increase of more than 3 per 1000 population reflects a combination of factors. Two of the most important are the significant in-migration for employment and the significant increase in the Hispanic population of Alexandria in the 2000s. Many of the young people attracted to the Washington region for employment have aged into the prime family-forming years, resulting in a local "baby boom" that is reflected in increased enrollments in many school districts in the region. The Hispanic population nationally has the highest birth rate of any major racial or ethnic group, and the decade of the 2000s saw Alexandria's Hispanic population increase by 19%, twice as fast as the population as a whole. The share of Hispanic students in APCS schools has grown by 29% since 2000 to almost one-third of the total enrollment, according to the Virginia Department of Education.

Birth Rate Forecast

In all forecast scenarios, birth rates are expected to peak and then decline over the long term for two reasons:

- The local "baby boom" is assumed not to continue indefinitely because job growth has moderated locally and local economies in other regions have recovered. The long-range forecast recommended as a planning guideline assumes that birth rates are at their peak, but that this rate will continue for approximately five years before declining. The high enrollment scenario assumes that the birth rate will continue to increase for five more years; the low enrollment scenario assumes that the birth rate is peaking now. In all cases, the peak is followed by a gradual decline to return to Alexandria's birth rate prior to the recent increases. This would mark the end of the "local baby boom."

- Once the local baby boom has ended, birth rates are expected to continue to decline at the same rate of decline as that of the national birth rate projection of the U.S. Census Bureau. This birth rate projection considers changes in race and ethnicity, changes in birth rates by race and ethnicity, in- and out-migration, and changes in the age distribution of population. The assumption is that these factors will affect Alexandria's birth rate over time in the same way they affect the national birth rate.

The figure on the previous page shows these long-term forecast assumptions of the birth rate together with the trend in the national birth rate from the Census Bureau's long-term projection (2012, central estimate).

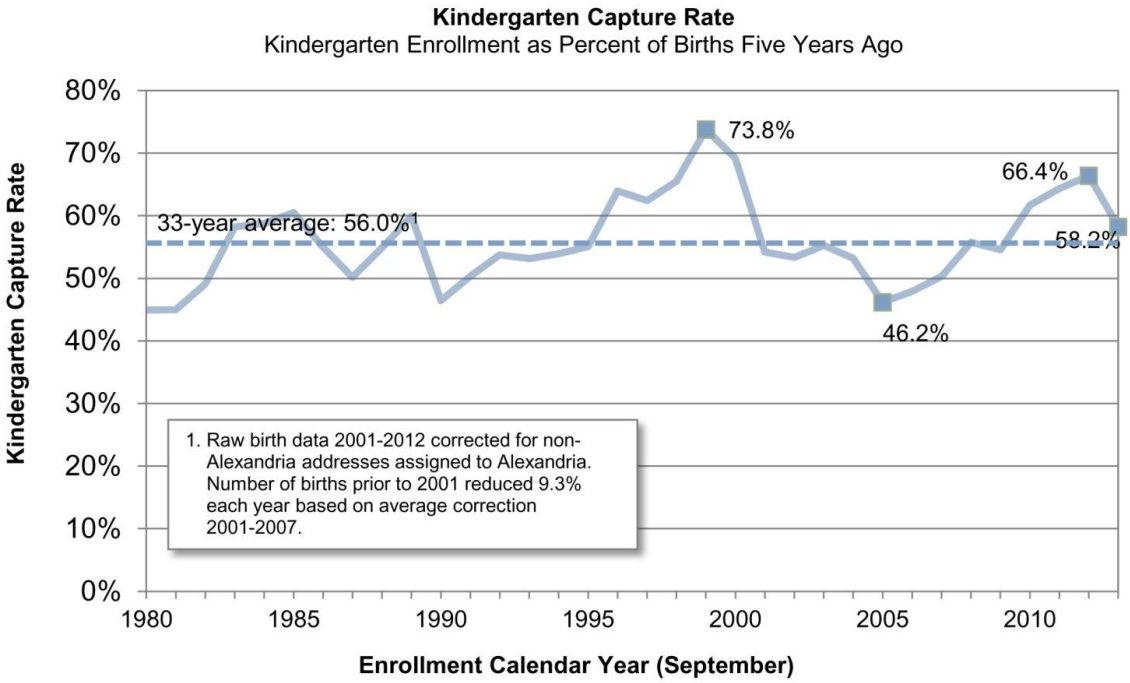
Sensitivity of Enrollment Forecast to Birth Rate. The recent increase in birth rates of approximately 3 births per 1000 people has the potential to add approximately 3000 students to ACPS enrollment if the current birth rate remains in place over the entire forecast period. A change in the birth rate begins to affect enrollment 5 years later. The change has full impact by 17 years later and beyond, when the effect has reached all grades. Much of the difference in enrollment among the forecast scenarios in the intermediate years of the forecast results from the difference in their birth rate assumptions over time. Because of the delayed impact of birth rate on enrollment, the city and ACPS have early warning of future impacts from this change in time to plan and construct facilities if needed.

Birth rate effects on enrollment can be moderated by families with children moving out of Alexandria, either prior to starting school (reflected in the kindergarten capture rate) or after starting school but prior to graduation (affecting cohort survival rates).

Kindergarten Capture

The next step in the enrollment forecast model is to estimate the percentage of Alexandria births that will enter ACPS kindergarten five years later. The figure on the following page shows the ratio of births to kindergarten enrollment in the city since 1980, based on births since 1975.

The kindergarten capture rate of enrollments compared to births five years prior has varied from less than 50% to almost 75% over the period from 1980 to 2012. After declining during the 2000 to 2005 period, the kindergarten capture rate has steadily increased in ACPS schools from 46.2% in 2005 to 66.4% in 2012. In 2013, the rate dropped substantially to 58.2%. The long-term average since 1980 is 56.0%.

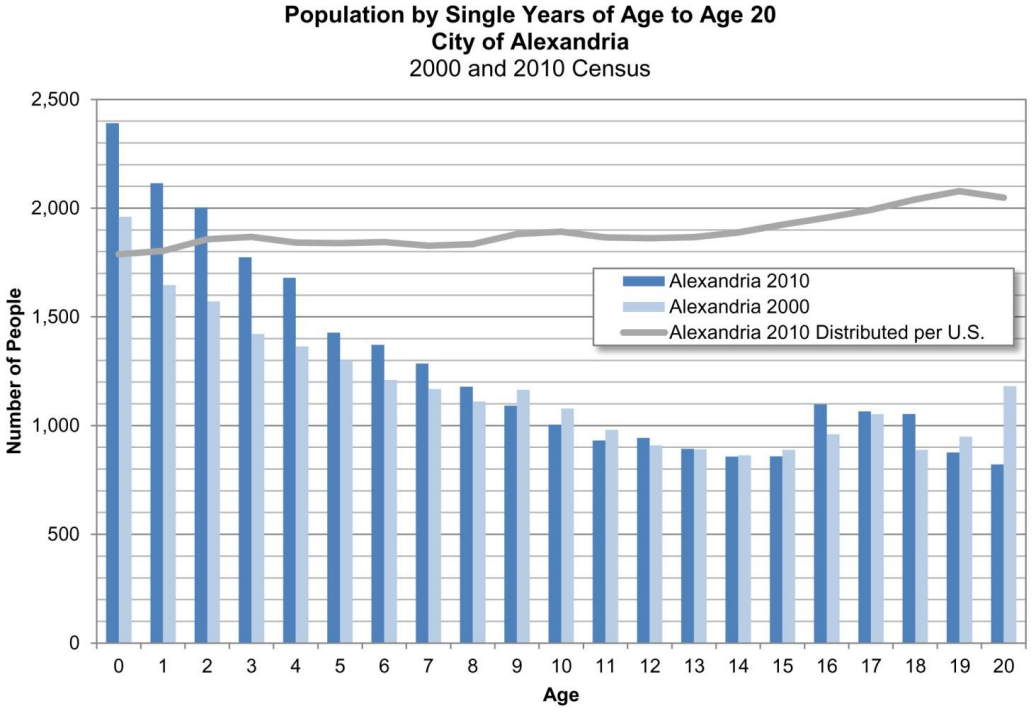


Alexandria's kindergarten capture rate of substantially less than 100% means that people are moving out of the community before their children reach kindergarten age or are sending their children to private schools.

- Both the 2000 and 2010 Censuses show that between birth and at least age 15, the size of each Alexandria age cohort is smaller than any of the age cohorts that precede it. For example, in 2010 there were about 2,000 children age 2, under 1,800 age 3, and under 1,700 age 4, and so forth, to 850 children age 15.. The figure on the following page shows the population of the city by single years of age through age 20 for 2000 and 2010. In 2010, Alexandria's 5-year-old population was just 60% of the population of those under one year, and the 10-year-old population was 70% of the 5-year-old population. In 2000, Alexandria's 5-year-old population was 66% of the population of those under one year, and the 10-year-old population was 83% of the 5-year-old population. For the U.S. as a whole, the 5-year-old population was 103% of the population under

one year, and the 10-year-old population was 103% of the 5-year-old population. The gray line on the graph shows what Alexandria's population by age would be if its 2010 population were distributed by age the same way the national population was distributed by age in 2010.

- Consistently over time, the Census shows that between 12% and 15% of Alexandria's school-age children are enrolled in private school (not including population in residential schools in the city who are counted as residents). This percentage is similar to that of other jurisdictions in the region, and is not assumed to change significantly over the forecast period.



Kindergarten Capture Rate Forecast.

The kindergarten capture rate is expected to decline from the current 3-year average rate in the long term under all forecast scenarios.

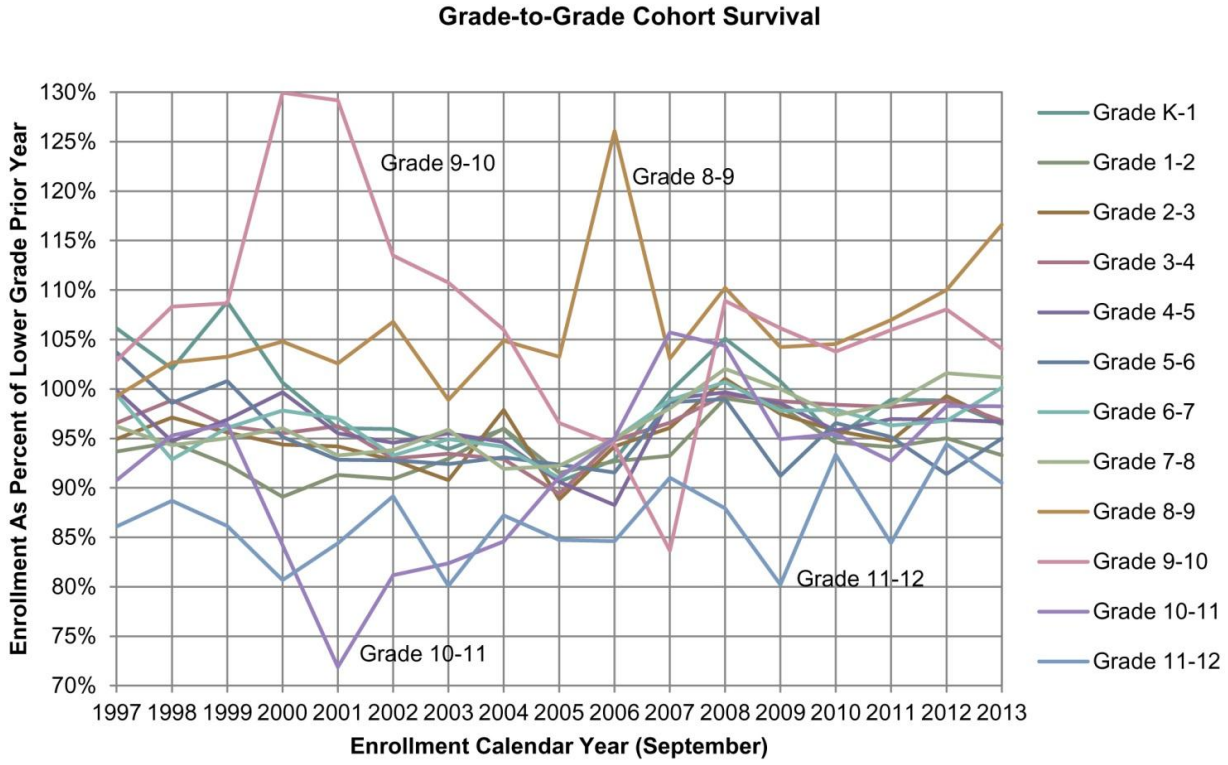
The kindergarten capture rate reflects the share of Alexandria families who choose to stay in the city and send their children to public school after having children. More families choosing urban living means a higher kindergarten capture rate. While the evidence of more people making this choice in recent years is primarily anecdotal, a number of factors are expected to be encouraging families to choose urban living now and in the future. These factors include increasing energy prices that discourage long commutes; a widening range of transportation choices including carsharing, rapid bus, bus rapid transit and streetcars within the Beltway; less emphasis on the back yard for play and recreation and greater emphasis on group activities at public and private facilities; and a desire to take advantage of the broader array of cultural opportunities for children in urban areas. There are some factors that will dampen the trend of more families raising children in Alexandria; the two most notable being higher housing prices than suburban areas, and a high proportion of housing units in Alexandria that are small multifamily units less desired by most families. Nearly all growth in housing units forecast for the future is in multifamily projects, and increases in this share are expected to reduce the city's kindergarten capture rate in the long term.

Based on these factors, the kindergarten capture share in the recommended forecast is assumed to drop from 60% to 58% in 5 years, then drop to 56% by 2040. The capture rate throughout the period is lower than the current 3-year average kindergarten capture rate of 60.7% but until the end of the forecast period is higher than the past long-term average of 56% since 1975. The kindergarten capture rate for the moderate and low enrollment scenarios is assumed to decline to 58% over two years and to further decline gradually to the long-term average of 56% by 2040.

Sensitivity of Enrollment Forecast to Kindergarten Capture Rate. A change in kindergarten capture rate has an immediate impact on enrollment, initially at the kindergarten level. As these students pass through the grades, the change in rate ultimately affects the entire enrollment, with its full effect felt in 13 years. Assuming 60% kindergarten capture in the high enrollment scenario rather than the past long-term average of 56% is responsible for about 7% of the total enrollment forecast for 2026, or about 1,000 students, the year when the change has affected all grades. This 7% effect then continues throughout the remainder of the forecast period.

Cohort Survival

Cohort survival rate is the term that compares the number of students at a grade level to the number of students who were in the previous grade in the previous year. For example, the cohort survival rate for kindergarten to first grade in 2013 is the number of first grade students in 2013(1,462) compared to the number of kindergarten students in 2012 (1,516), or 96.4%. This means that 96.4% as many students showed up in first grade in 2013 as were enrolled in kindergarten in 2012. The graph below shows Alexandria's cohort survival rates since 1997 by grade.



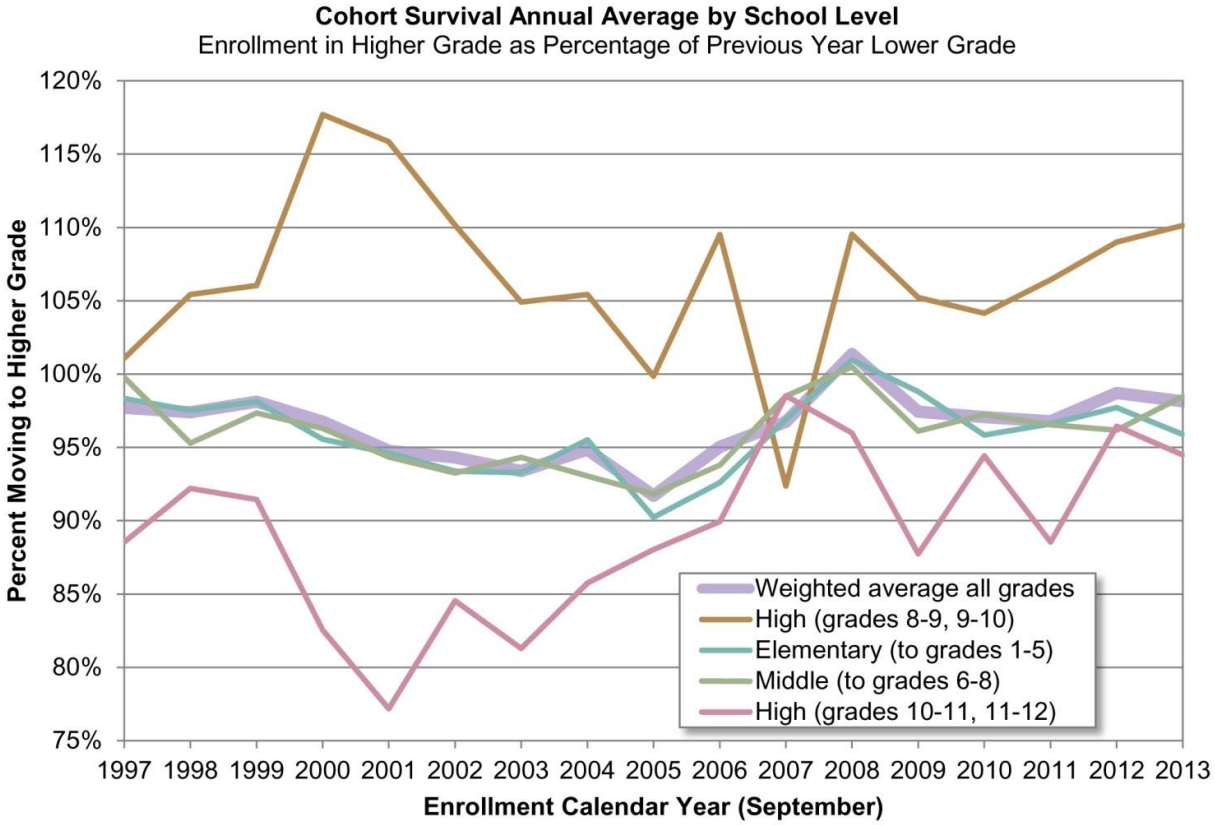
Over the 17-year period since 1997, the ACPS cohort survival rates for elementary and middle school grades have clustered together, averaging between 93.7% (1st to 2nd grade) and 98.4% (kindergarten to 1st grade). Cohort survival rates by grade and for individual elementary schools and middle schools have much wider variation. 9th and 10th grades see a substantial influx from private schools, and these grades have cohort survival rates of greater than 100% in nearly all years. 12th grade typically has a lower cohort survival rate than any other grade, exceeding 90% in only four years since 1997, all of which were in the last seven years.

Alexandria's cohort survival rate reflects a high rate of migration into and out of the region, and within the region among different communities. It reflects students moving in and out of private schools each year. The city's steady growth in population also affects the cohort survival rate, making it slightly higher than it would be with no net annual increase in population.

A cohort survival rate of 90% means 10% fewer students enroll in the grade above than were in the grade below last year. A cohort survival rate of 90% in all grades would result in a 12th grade class that includes

only 28 students for every 100 in the kindergarten class entering school. A cohort survival rate of 95% would mean that 54 students would enter 12th grade for each child entering kindergarten. Over the past 10 years, the 12th grade class has ranged from a minimum of 44.4% of the incoming kindergarten class in 2012 and 2013 to a maximum of 61.1% in 2005, indicating that cohort survival has ranged around approximately 95% from grade to grade for these graduating classes.

The figure below shows the average cohort survival rate by school level, averaging elementary, middle and high school grades. Grades 9 and 10 typically have higher than 100% cohort survival, and grades 11 and 12 have much lower cohort survival, so these grades are averaged separately. Also shown on this graph is the weighted average cohort survival rate for all grades, with the cohort survival rate for each grade weighted by the number of students in that grade to determine the overall average.



In the past, cohort survival rates by grade have varied up and down substantially for periods of a few years, but have returned to an overall average rate near 95% for the elementary and middle school years over time. Cohort survival is particularly sensitive to changes in housing markets as we have seen in the 2000-2013 period. During the housing price bubble, cohort survival rates declined substantially, reaching lows in most grades in 2005 well under 95%. When the housing finance market suddenly collapsed in 2006, and people were less able to move, cohort survival for these grades rapidly increased to rates near 100% in 2008. As housing finance and the housing market have normalized since 2008, cohort survival has fallen to just above 95% for most elementary and middle school grades.

Cohort survival rates tend to vary up and down over time together for all grades, and to vary in the same way kindergarten capture rate varies over time. Since the rates all are a function of migration in and out of the city by age, it makes sense for these rates to vary together.

Alexandria has a lower cohort survival rate than most school systems through most grades. The city's population in the 2010 Census showed only 70% as many 10-year-olds as 5-year-olds, while the nationwide population has 3% *more* 10-year-olds than 5-year-olds. Alexandria's housing stock has an unusually small share of single-family units, and an unusually high share of units with four rooms or less compared to most communities in the Washington, D.C. Metropolitan Area. Because of this small share of housing units with characteristics that are more desirable to families, many families move out of the city as their children grow older or as their families grow larger.

Cohort Survival Forecast

Cohort survival is assumed in the high enrollment and recommended forecasts to begin at the current 3-year average cohort survival rate in each grade, and to decline by one percentage point for all grades very slowly over the entire period of the forecast. This slow decline is based on the assumption that the shift in housing types to more multifamily units over time will result in a smaller percentage of families choosing to stay in Alexandria once they have children and as they have more children or their children get older, in spite of an overall trend to more families choosing urban living. If current average cohort survival rates were to continue over the forecast period, total enrollment would be approximately 2-3% higher by 2030 and 4-5% higher by 2040..

The moderate and low enrollment scenarios assume family out-migration resumes to a greater extent so that the cohort survival rate falls two percentage points over the next two years, then two additional percentage points through the end of the forecast period. This change in cohort survival results in a reduction in total enrollment of about 13% over the forecast period compared to using the current average cohort survival rates.

Sensitivity of Enrollment Forecast to Cohort Survival Rate. At the current level of enrollment, with all other enrollment inputs (birth rate, population, and kindergarten capture rate) kept constant, an immediate increase in the average cohort survival rate of one percentage point in all grades would increase enrollment by about 1,000 students in 13 years when the higher enrollment in lower grades has worked its way fully through all grades.

Enrollment Model Forecasts in Perspective

The discussion below outlines how the enrollment model forecast was reality-checked against some other ways of viewing student enrollment trends.

Student Generation by Housing Type.

Student generation by housing type is a method often used by school districts to identify potential school needs associated with new development. Existing enrollment patterns by housing type are used to estimate future enrollment from new construction. In Alexandria, the types of housing that are found in most new development have been found to generate very few students, at least until such housing is 30 years old or older. Recent increases in enrollment are associated with higher numbers of students living in existing housing of all types rather than high occupancy of new housing. Very low numbers of students, on the order of one per 10 units or one per 20 units, are found from new apartments and condominiums, housing types that make up most new development. Townhouses and single-family detached homes do not generate substantially lower numbers of students in new units, though older low-priced townhouses

have higher student generation than new townhouses. Building data is not readily available to analyze student generation for more than the past four or five years, so a long-term trend of student generation by building type is not available for comparison. However, a range of realistic generation factors is available based on recent years, and neighboring jurisdictions also maintain records of student generation by housing type that can be compared.

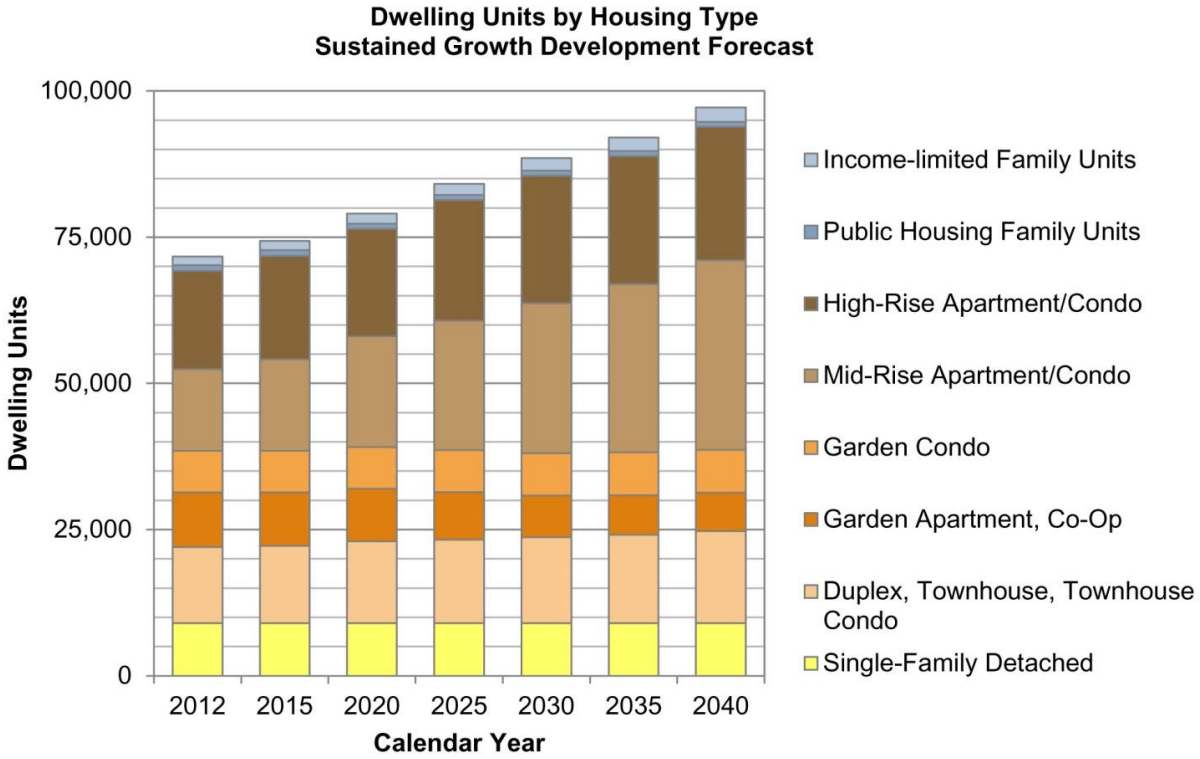
The figure at the top on the following page shows the change in the mix of building types that results from the city's development forecast over the enrollment forecast period through 2040. The figure at the bottom of the page shows the extent to which average student generation by housing type would have to change to produce the recommended enrollment forecast. For the recommended forecast to be achieved, student generation rates would have to increase on average by approximately 16.5% of the 2012 generation factor for each building type. Because most new development has a low student generation factor, the average increase in generation factor required for existing housing is approximately 23.6%. Because little increase in generation is expected for existing high- and mid-rise development, the increase for single-family detached and townhouse units is estimated at 46%. An increase of this magnitude results in student generation of approximately 0.41 students for each single-family detached home, which is approximately the current student generation factor for single-family detached homes reported in Arlington County.

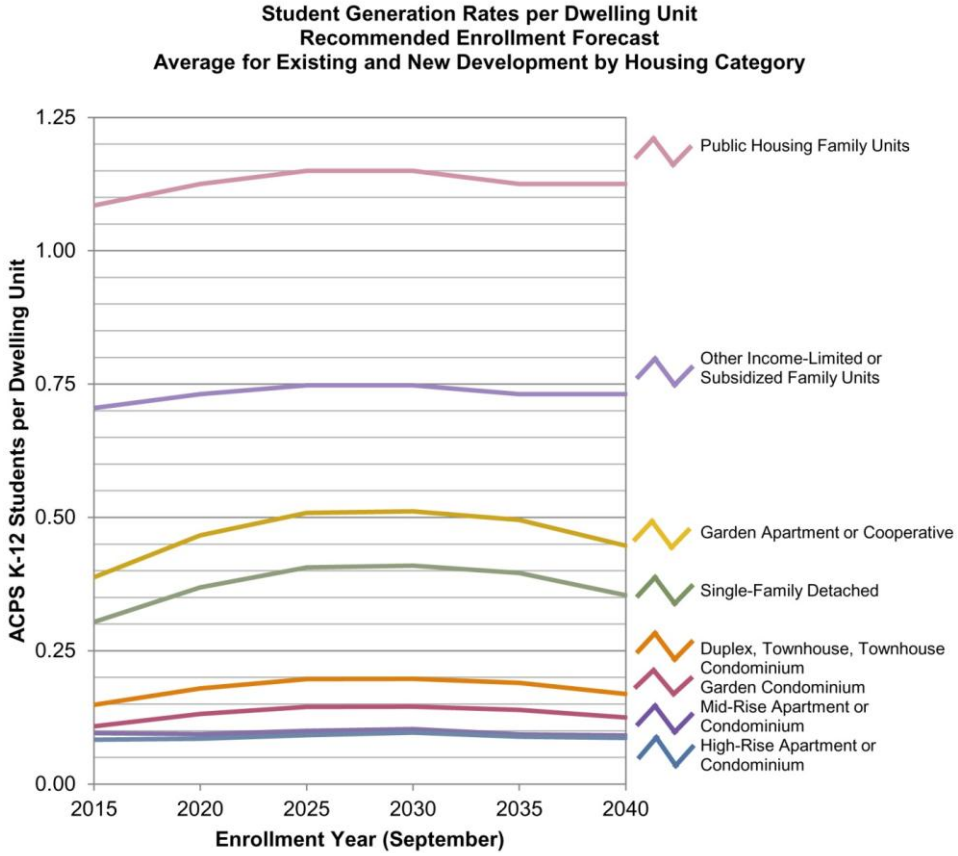
Even as student generation rates increase over time, they will not increase at the same rate for every housing type. Housing units likely to see the greatest student generation rate increase will be single-family detached, townhouse, garden apartment, and affordable housing.

Each of the enrollment forecast scenarios implies a set of student generation rates, which staff examined as a way of testing the likelihood of each scenario. The scenario selected for the recommended forecast was chosen, in part, because the future student generation rates remain within reasonable bounds. In the 2010 Census, only 19% of Alexandria's households were families with their own children under age 18, compared to 29.8% of households nationwide. Alexandria's average family size was 2.85 in 2010, compared to 3.14 nationwide. The higher student generation rate required to accommodate the enrollment forecast is likely to result from both larger families in those households with children, and an increase in the share of households that are families with children. Relatively small increases in family size and the percentage of households that are families with children would be required to meet the peak enrollment of the recommended enrollment forecast, which occurs in 2030. Enrollment increases since 2010 show that the current housing stock is capable of at least some growth in occupancy by families with children.

Student Generation by Housing Affordability.

An analysis of housing affordability conducted by the city showed that for most housing types, student generation is substantially higher for housing with lower rents and lower housing values. The highest student generation rates occur in housing that is reserved for low- and moderate-income households by income restrictions or rent subsidies. This is in part because these programs are oriented to providing family housing. Among market-rate apartments, student generation is much higher for apartments with rents under $1,500 per month. Analysis by age of housing indicated that such rents are typically limited to apartments 30 years old or older. Student generation is very low for apartments with rents exceeding $1,700 per month.


Dwelling Units by Housing Type
Sustained Growth Development Forecast
Dwelling Units
100,000
75,000
50,000
25,000
0
2012
2015
2020
2025
2030
2035
2040
Calendar Year
Income-limited Family Units
Public Housing Family Units
High-Rise Apartment/Condo
Mid-Rise Apartment/Condo
Garden Condo
Garden Apartment, Co-Op
Duplex, Townhouse, Townhouse Condo
Single-Family Detached


Student Generation Rates per Dwelling Unit
Recommended Enrollment Forecast
Average for Existing and New Development by Housing Category
ACPS K-12 Students per Dwelling Unit
1.25
1.00
0.75
0.50
0.25
0.00
2015
2020
2025
2030
2035
2040
Enrollment Year (September)
Public Housing Family Units
Other Income-Limited or Subsidized Family Units
Garden Apartment or Cooperative
Single-Family Detached
Duplex, Townhouse, Townhouse Condominium
Garden Condominium
Mid-Rise Apartment or Condominium
High-Rise Apartment or Condominium

The student generation model used to develop the student generation rates incorporates what is known about existing and planned affordable housing of all types (public, subsidized, and market affordable).

In order to adjust for the expected decline in affordability as well as an expected decline in the percentage of units in the city that are considered desirable by families, the enrollment forecast model for all forecast scenarios assumes that the average kindergarten capture and cohort survival rates will fall slowly over time as less of the city's housing is affordable, and less is considered desirable by families. The moderate and low enrollment forecasts assume a more rapid decline in kindergarten capture and cohort survival rates.

ACPS Enrollment per 1,000 People.

The figure on the following page shows ACPS enrollment each year since 1960 as a rate per 1,000 people in the city. Over this period, the total enrollment peaked at with the maximum enrollment of over 17,000 K-12 students in 1970, when the city's population was about 111,000.

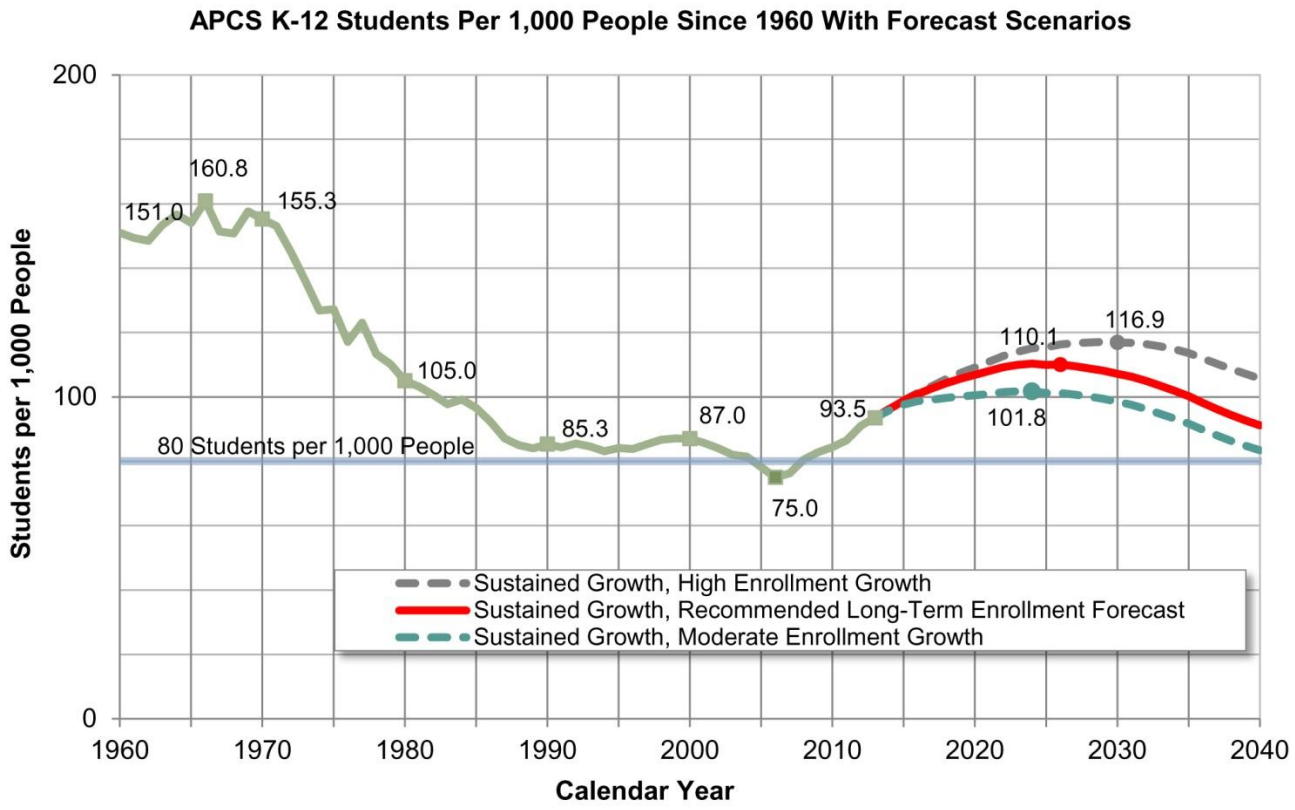
The rate of students per 1,000 residents peaked at over 160 students in 1966, just after the end of the baby boom and when the first baby boomers had started graduating from high school and leaving for college in 1964. Enrollment fell to about 85 students per 1,000 people by 1988, when the last of the baby boomers had graduated from high school. The 1990 Census shows a substantial increase in the share of Alexandria households that were single-person households in 1990, and a significant growth in the 20- to 35-year age cohort, as baby boomers entered the workforce.

During the housing price bubble of the early 2000s, the student rate fell again, reaching a minimum of 75 students per 1,000 in 2006 just as the housing finance market collapsed. Since then, the enrollment rate has grown past its plateau of the 90s to reach 93.5 students per 1,000 in 2013.

The enrollment forecasts on the following page show enrollment continuing to increase to over 100 students per 1,000 people in all scenarios, reflecting the assumption that the recent high rate of births to Alexandria residents will continue to provide an increasing number of students to Alexandria schools over the next few years. The scenarios differ on when the local birth rate will return to its previous level, and when the housing market will again be in a position to provide more options for people to move from Alexandria as their families grow.

All forecasts show a substantial increase in the number of students per capita, reflecting these recent births and the choice of at least some families to seek a more urban environment in which to raise their children. Because it is considered unlikely that the housing market will return to the easy financing of the early 2000s, a return to a declining rate of students per 1,000 people is not foreseen until demographic forces including a significant increase in over-65 population and declining birth rates among the Hispanic population balance the forces now adding students to the schools.

For 2010 fall enrollment following the 2010 Census, Alexandria had 84.4 K-12 ACPS students per 1,000 people based on its 2010 census population. Arlington County had 98.5 K-12 students per 1,000, Fairfax County had 158.6 students and Prince William County had 195.4 students. The City's ratio of students per 1,000 people can grow substantially while remaining well below the ratios of the surrounding suburban counties.



These scenarios show the future decline in enrollment following the expected drop in birth rates at a rate similar to that of the 1980s, when the baby boom impact was declining into a new era of stability in enrollments in the 1990s.