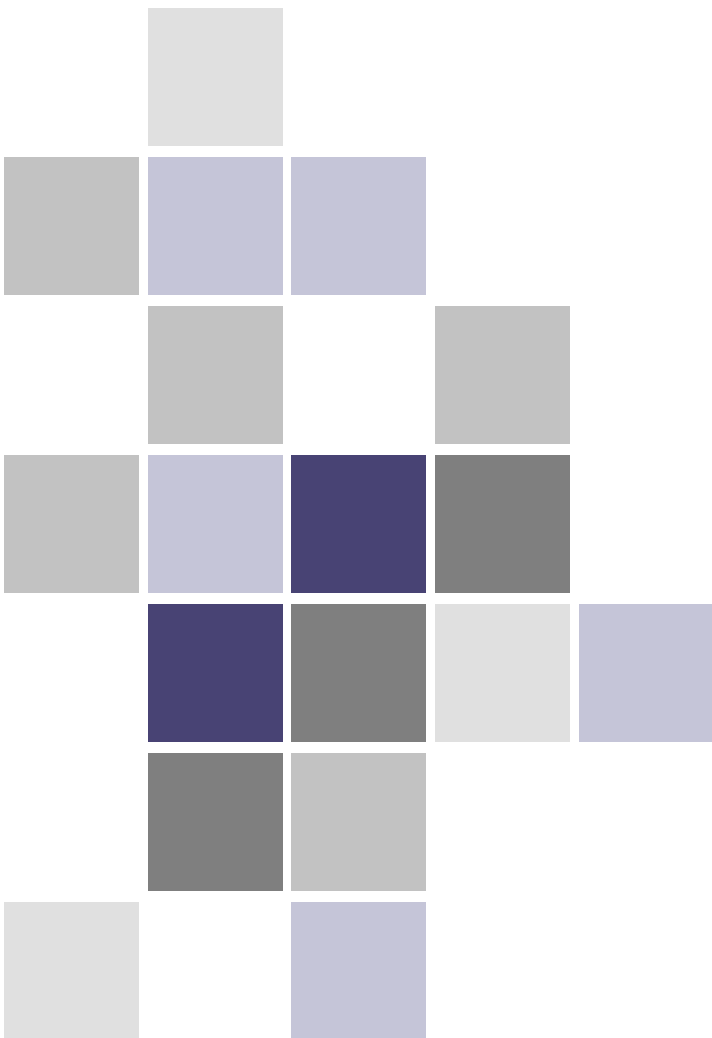




LINDBERGH SCHOOLS DEMOGRAPHIC STUDY

Final Report
February 7, 2018



Lindbergh Schools Demographic Study

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SUMMARY OF ANALYSIS

The overall Lindbergh Schools district population is not changing dramatically. The population has increased slightly at 1%, growing from 60,138 people to 60,780 people between 2010 and 2016. The increase was spread across most of the age groups, indicating no meaningful shift toward a younger population. In addition, the number of child-bearing age women has declined. Though the future school age population (under 5) has increased, the school age population (ages 5-19) has declined, indicating that potential future students are leaving the district sometime before their school age years.

The district has been and continues to be predominately White. Ninety-three percent of the population is White, while no other race is more than 2% of the population. Interestingly, the Black population has decreased 22% between 2010 and 2016, but the Hispanic population has increased 33% over that same period of time, more than offsetting the decline in Black population. Only 4.53% of the district's population is foreign-born.

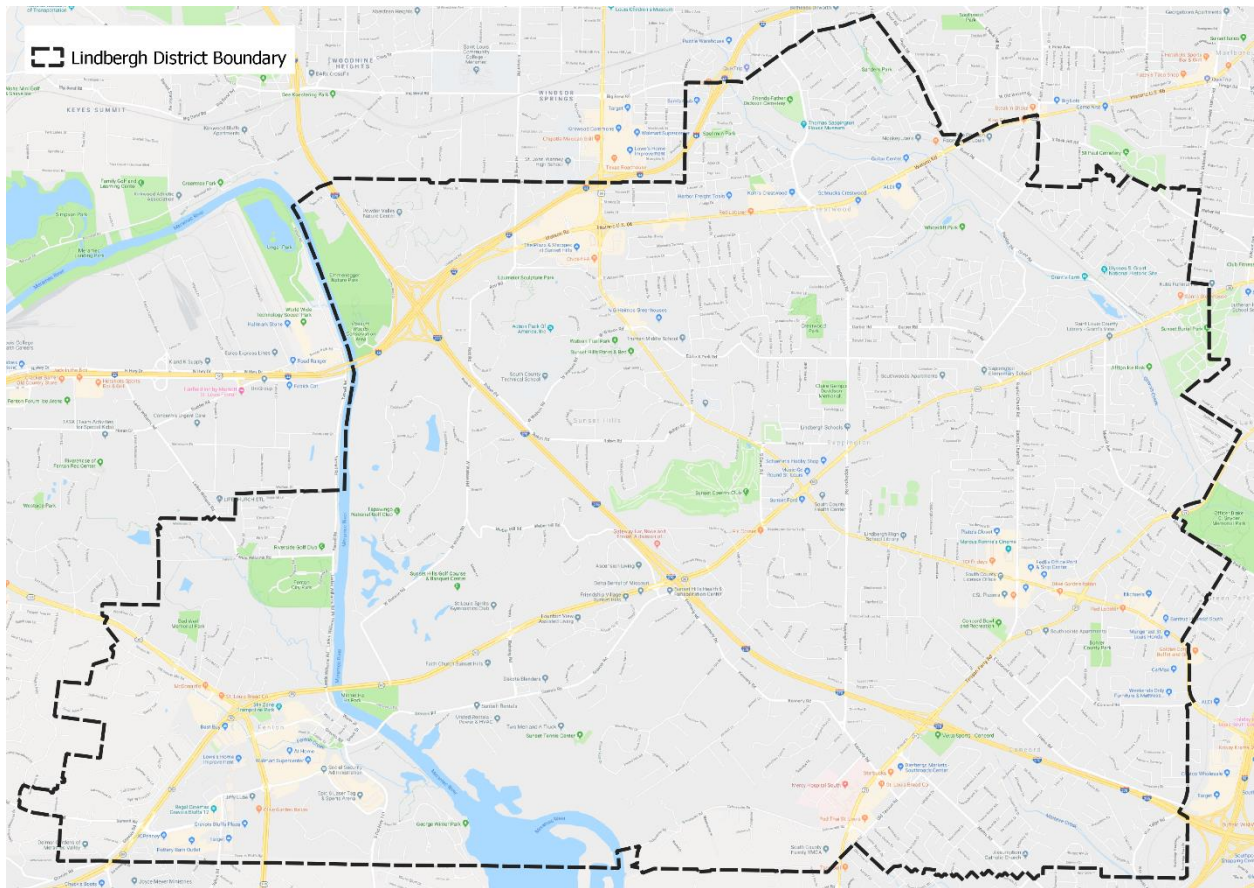
Household income in the district is increasing, and unemployment is a relatively low 4.7%. Median home values in the district have decreased, along with the number of owner-occupied homes. Areas of the district with higher levels of education align with higher median household incomes and home values.

The district's K-12 enrollment has increased 29.5% over the last ten years, in spite of the fact that the district's school age population has increased only 1%. The driving force behind the increase in district enrollment has been an increase the percentage of the school age population (ages 5-19) attending Lindbergh Schools. This capture rate has increased from 50.8% in 2010 to 60.8% in 2016.

Multiple enrollment forecast models predict that enrollment will continue to increase in the district over the next several years. The factors that will determine the rate of increase are: 1) whether the percentage of the school age population enrolled in Lindbergh Schools continues to increase, and 2) whether the under 5 population continues to grow, despite a declining female, child-bearing age population. The strongest factor drawing students to Lindbergh Schools appears to be programs and quality of education. If either factor's influence diminishes and families choose other educational options, population trends suggest that enrollment could decline.

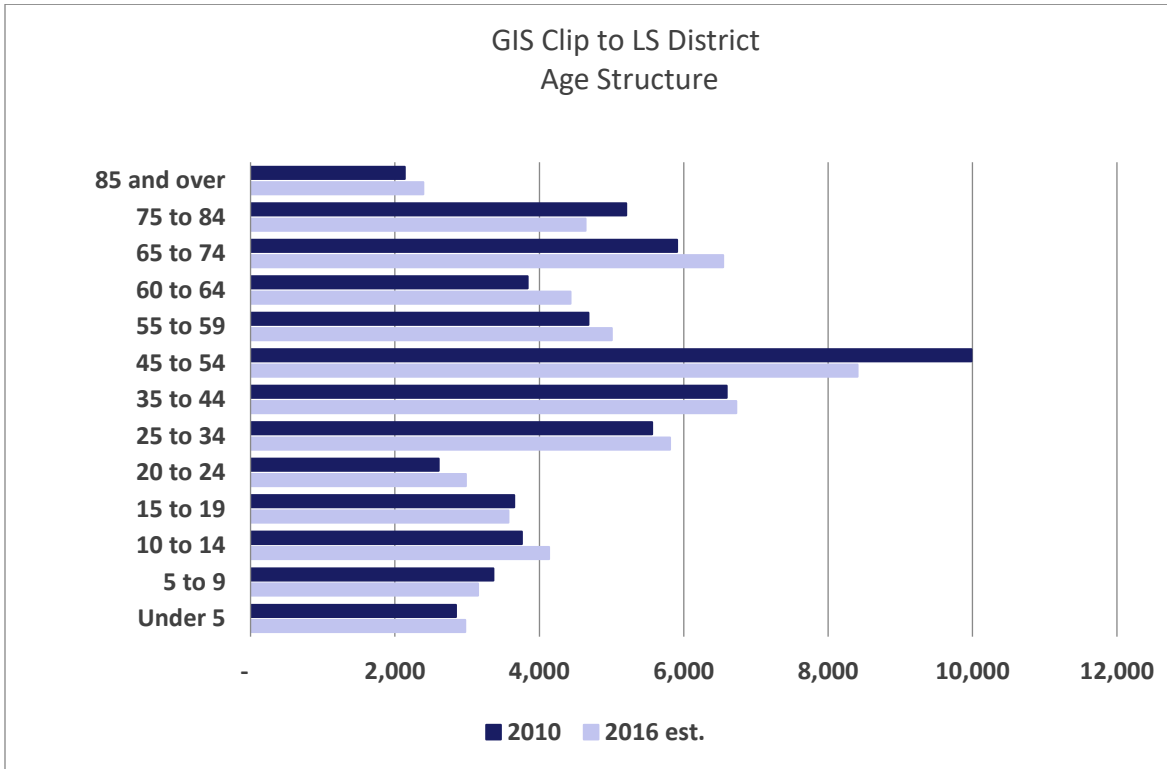
DISTRICT MAP

The different sections of this Study illustrate various data points using maps. The following is a simple street map with the Lindbergh Schools boundary. This map will provide direction and orientation to aid the interpretation of the maps on the subsequent pages.



POPULATION

AGE STRUCTURE

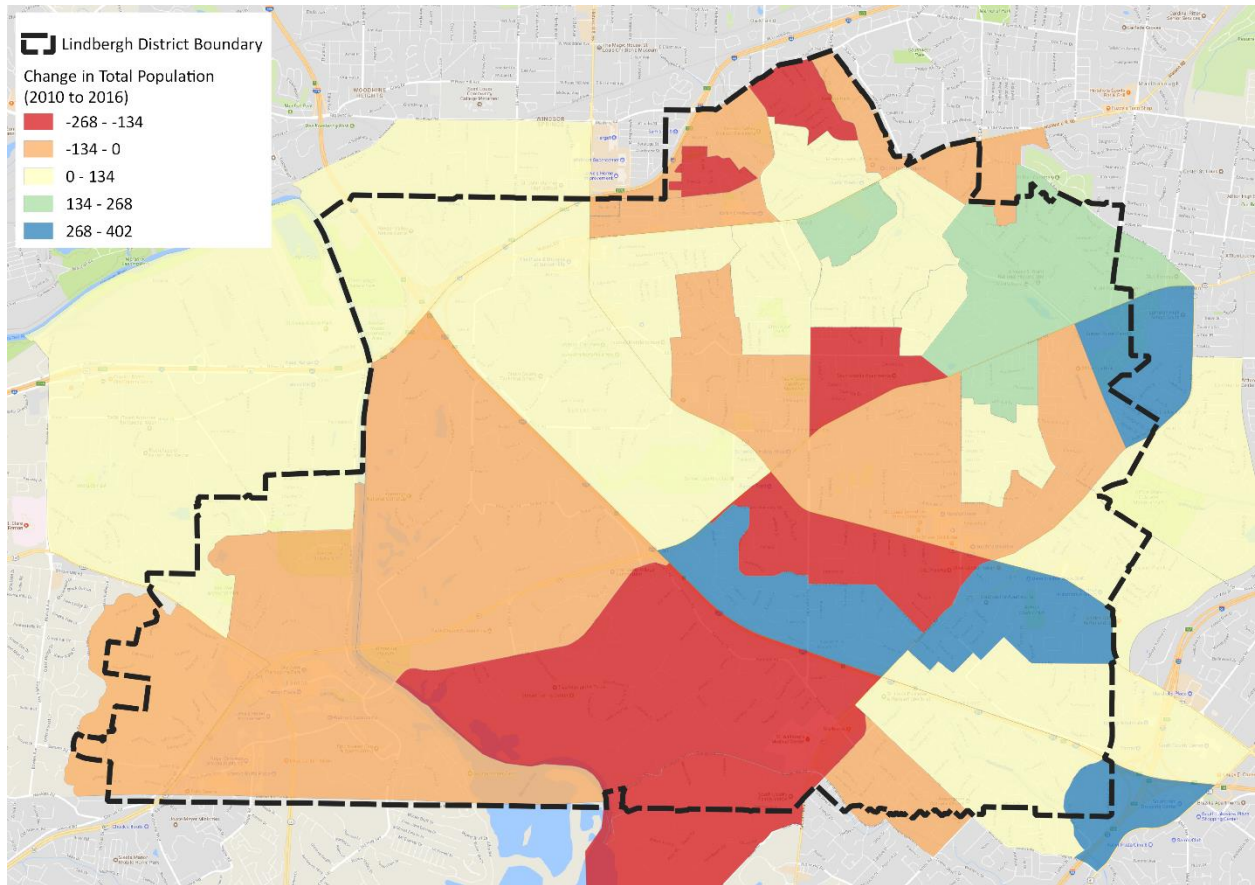


Source: U.S. Census Bureau, 2018.

The Lindbergh Schools district population is getting older. The median age increased from 45.8 to 46.6 between 2010 and 2016.

The 45 to 54 age group decreased, while all age groups between age 20 to age 74 increased from 2010 to 2016. These changes suggest that the district is not shifting dramatically toward a younger population.

OVERALL POPULATION

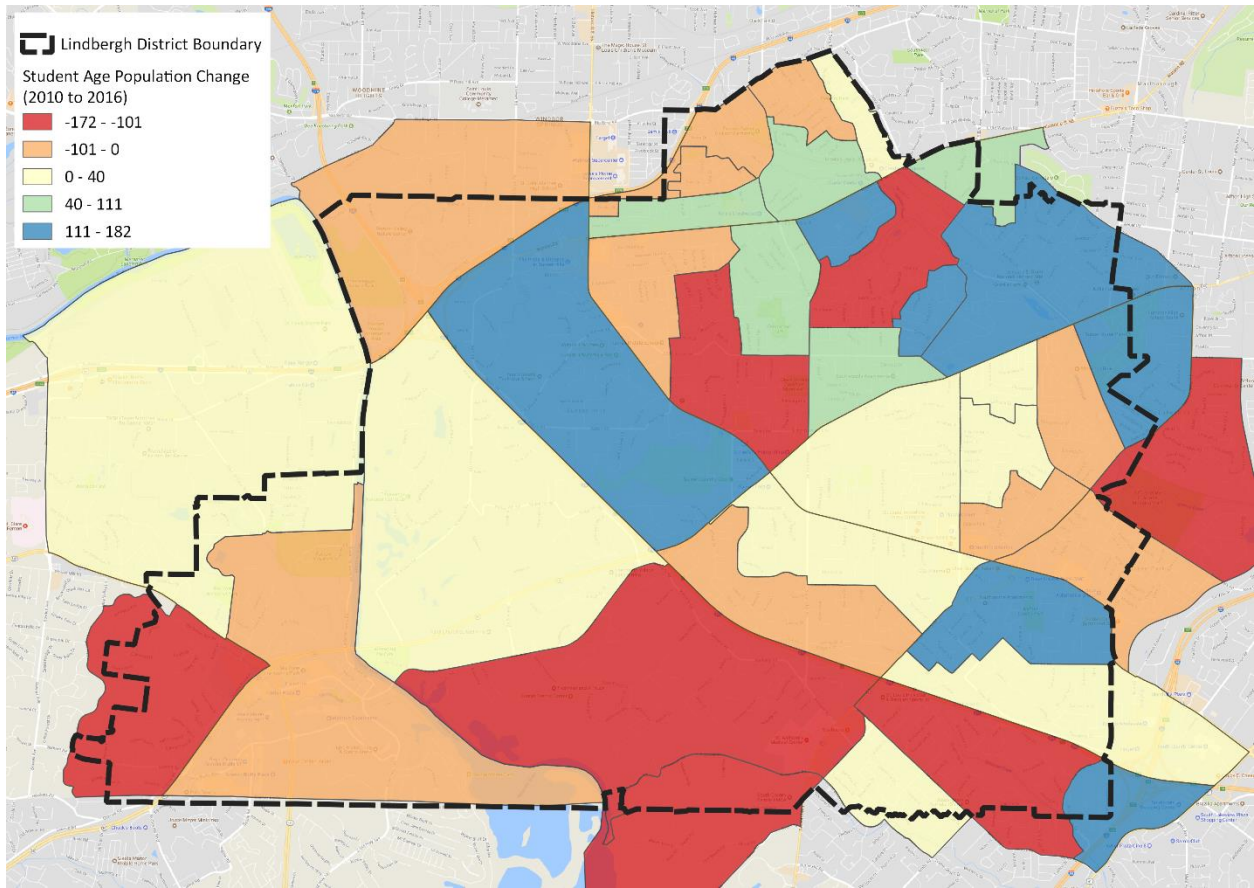


Source: U.S. Census Bureau, 2018.

The total population of Lindbergh Schools has increased 1.1% from 2010 to 2016, growing from 60,138 people to 60,780 people.

The increase in population is fairly isolated, with most areas of the district experiencing a decline in population, albeit not a significant decline.

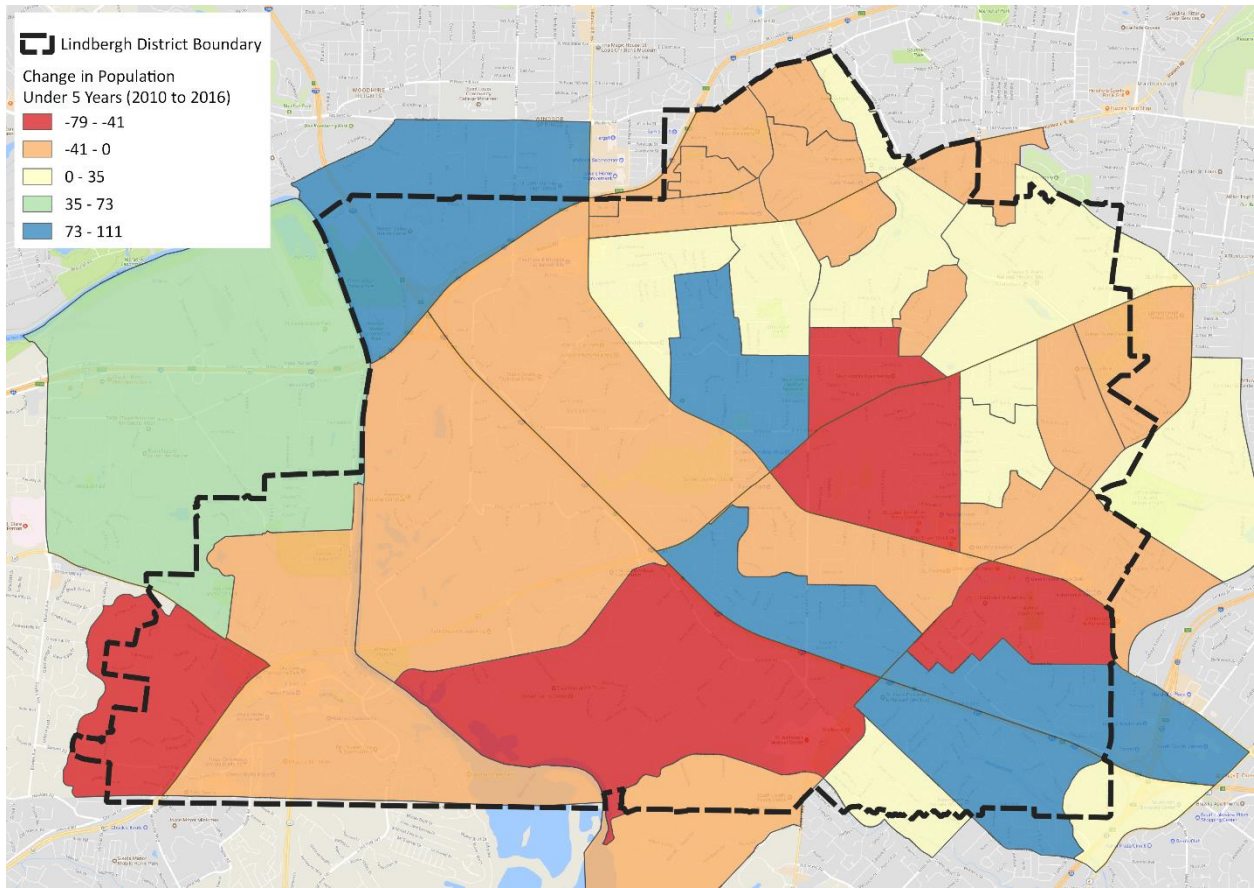
SCHOOL-AGE POPULATION



Source: U.S. Census Bureau, 2018

The school-age population (ages 5-19) has only increased 1% between 2010 and 2016. Areas of increase were focused in the central and eastern parts of the district. The southern and western parts of the district were areas of decline in school-age population.

FUTURE SCHOOL-AGE POPULATION

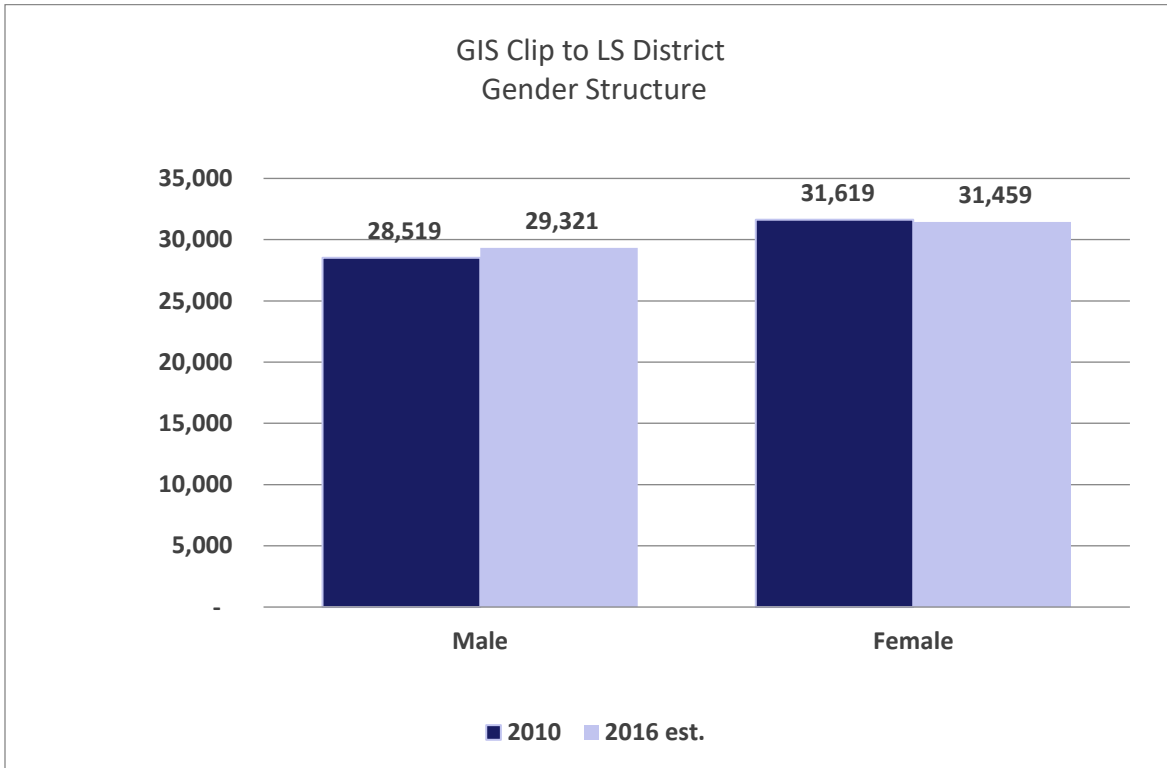


Source: U.S. Census Bureau, 2018

The future school-age population (under age 5) increased 4.5% from 2010 to 2016. The increase was fairly localized in the southeast and the northwest areas of the district.

GENDER

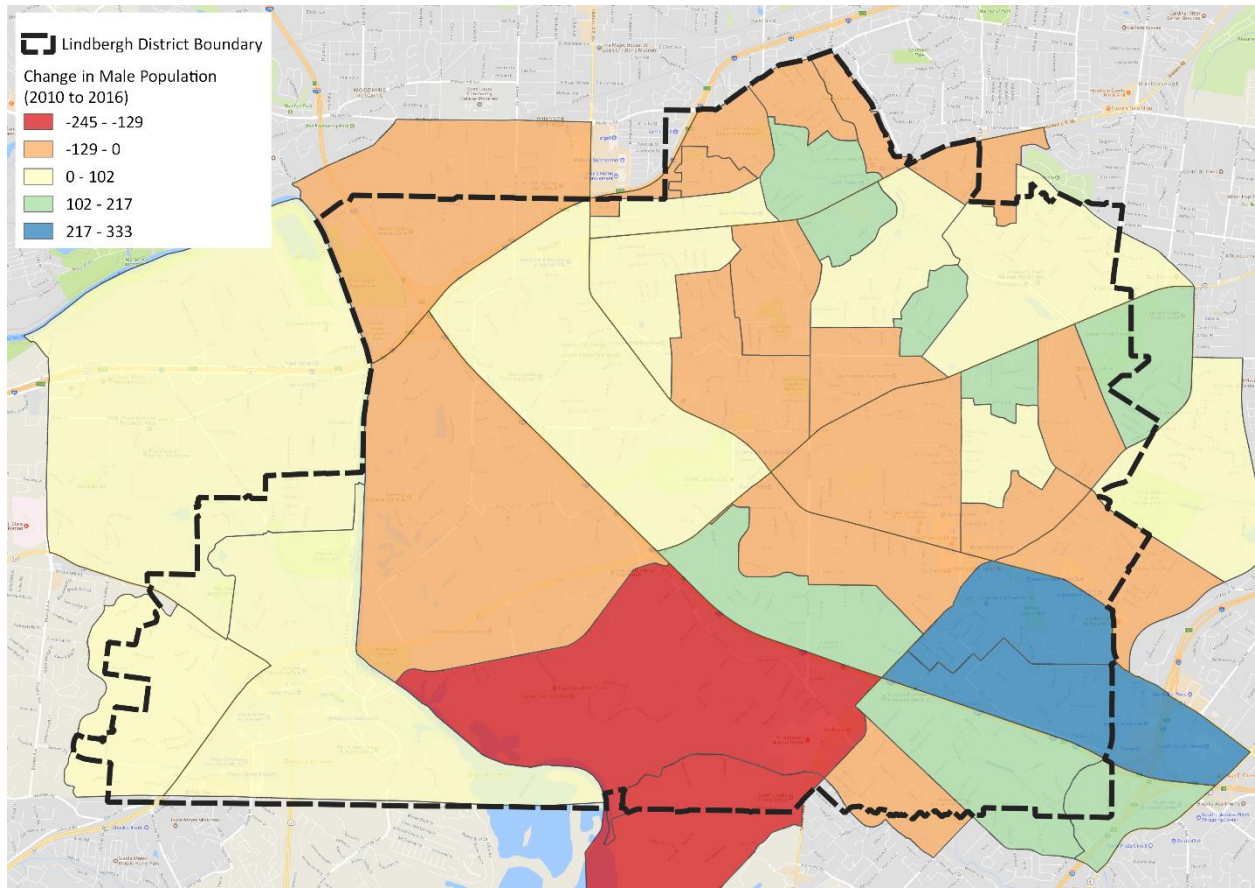
GENDER STRUCTURE



Source: U.S. Census Bureau, 2018.

There are more men than women in the Lindbergh Schools district, though the male population has increased and the female population has decreased.

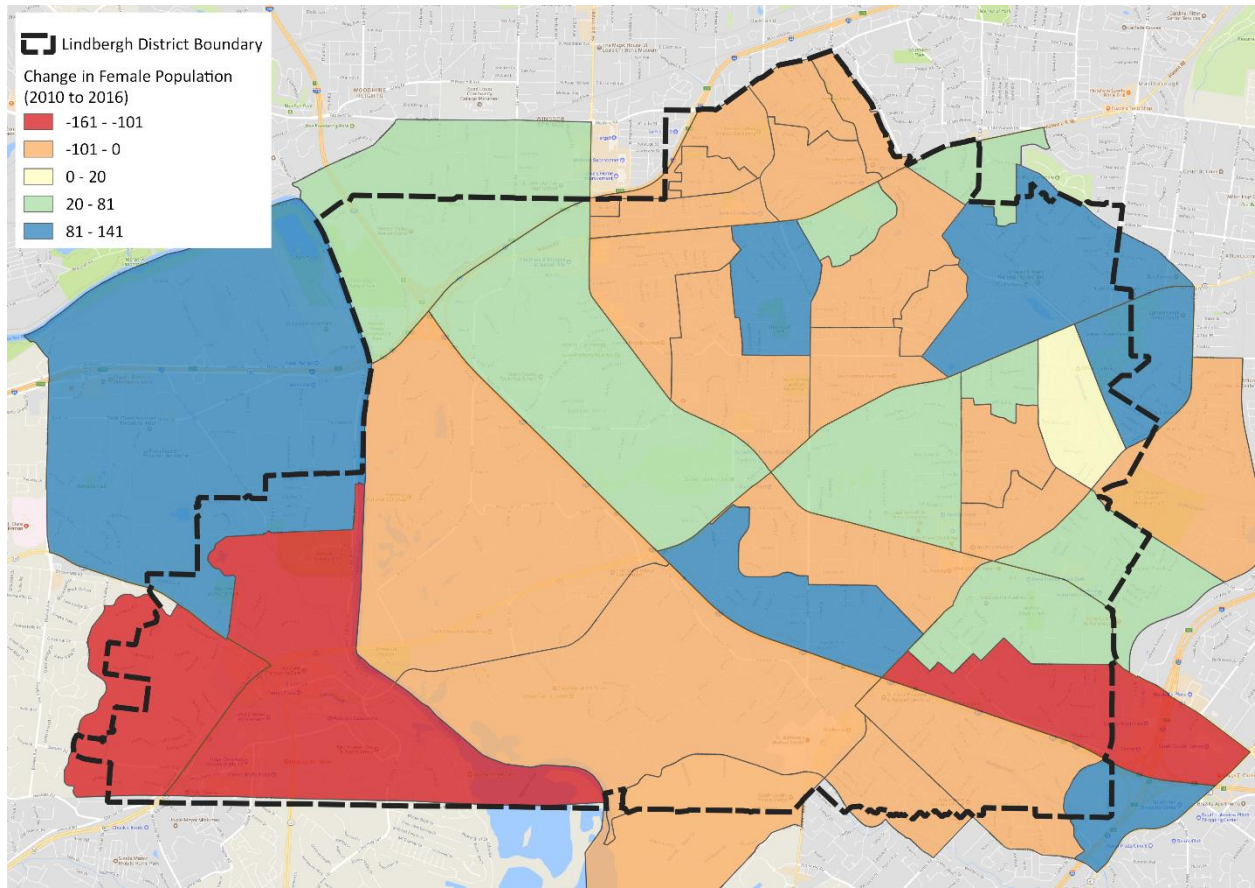
MALE POPULATION



Source: U.S. Census Bureau, 2018.

The male population increased 2.8% from 2010 to 2016. The areas of increase and decrease were fairly well distributed across the district.

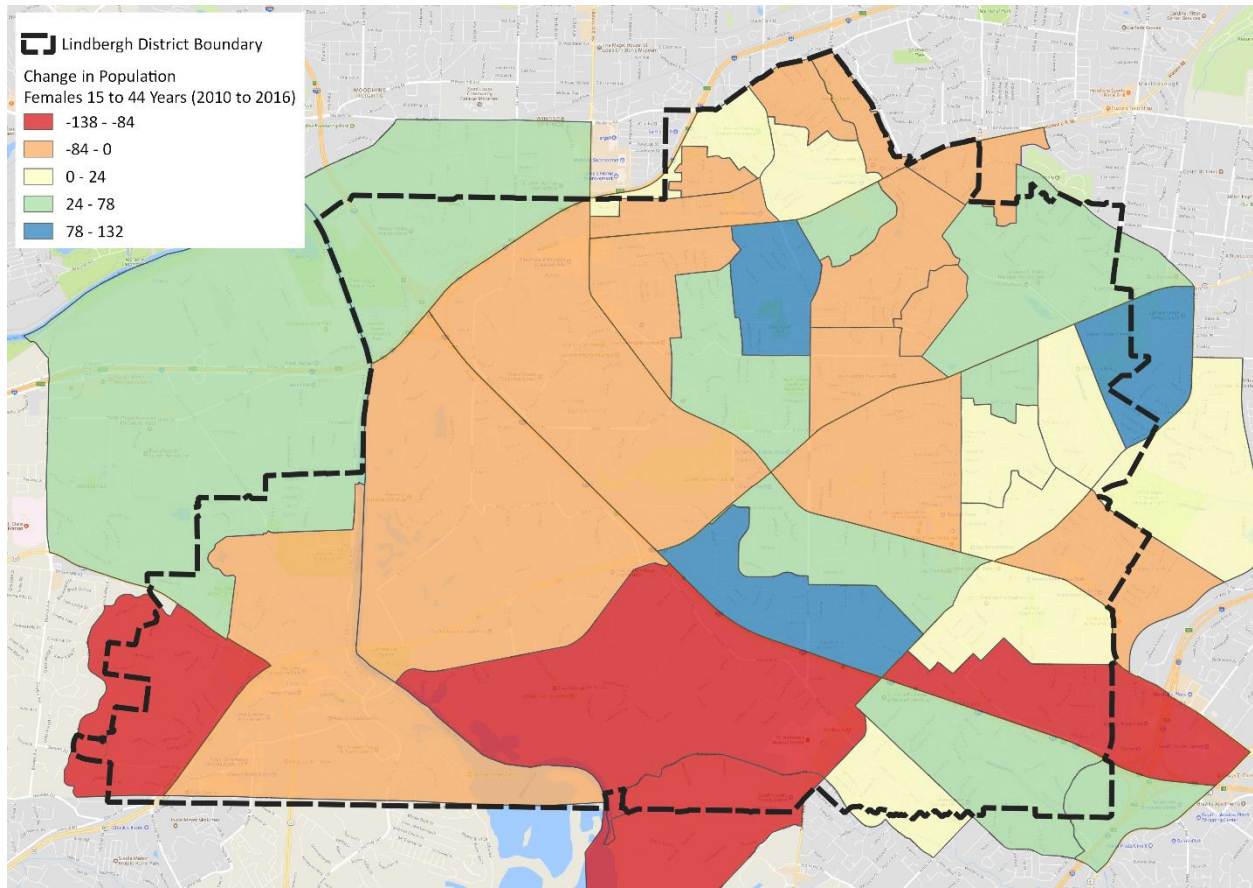
FEMALE POPULATION



Source: U.S. Census Bureau, 2018.

The female population has decreased 0.5% between 2010 and 2016. The areas of decrease were spread throughout the district.

FEMALE CHILD-BEARING AGE POPULATION



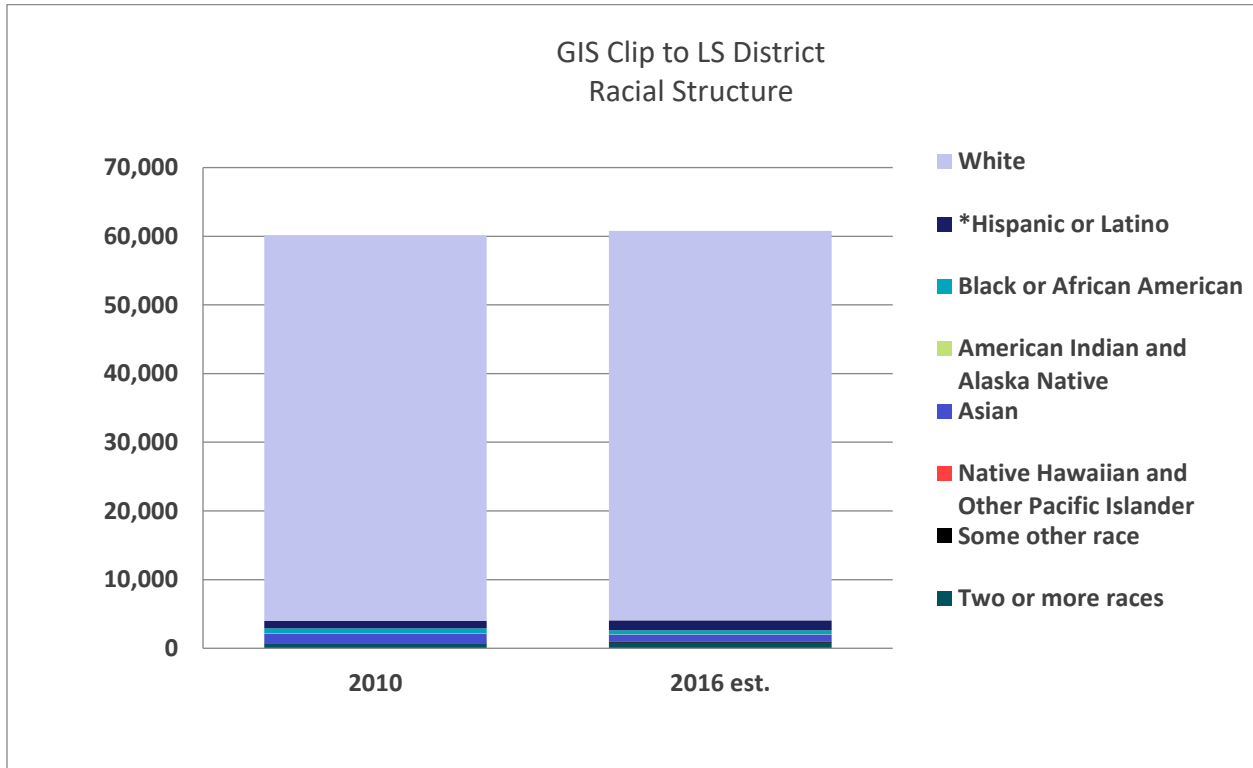
Source: U.S. Census Bureau, 2018.

After the school-age population and the future school-age population, the female child-bearing age population is the most important indicator of the potential for changes in district enrollment. The child-bearing age for females is generally from ages 15 to 44. Though a female can carry a baby to term and healthy delivery outside of that age range, the 15-44 age range is generally understood to be the age range with the greatest fertility for females.

In Lindbergh Schools, the female child-bearing age population has decreased by 141, or 1.3%.

RACE AND ETHNICITY

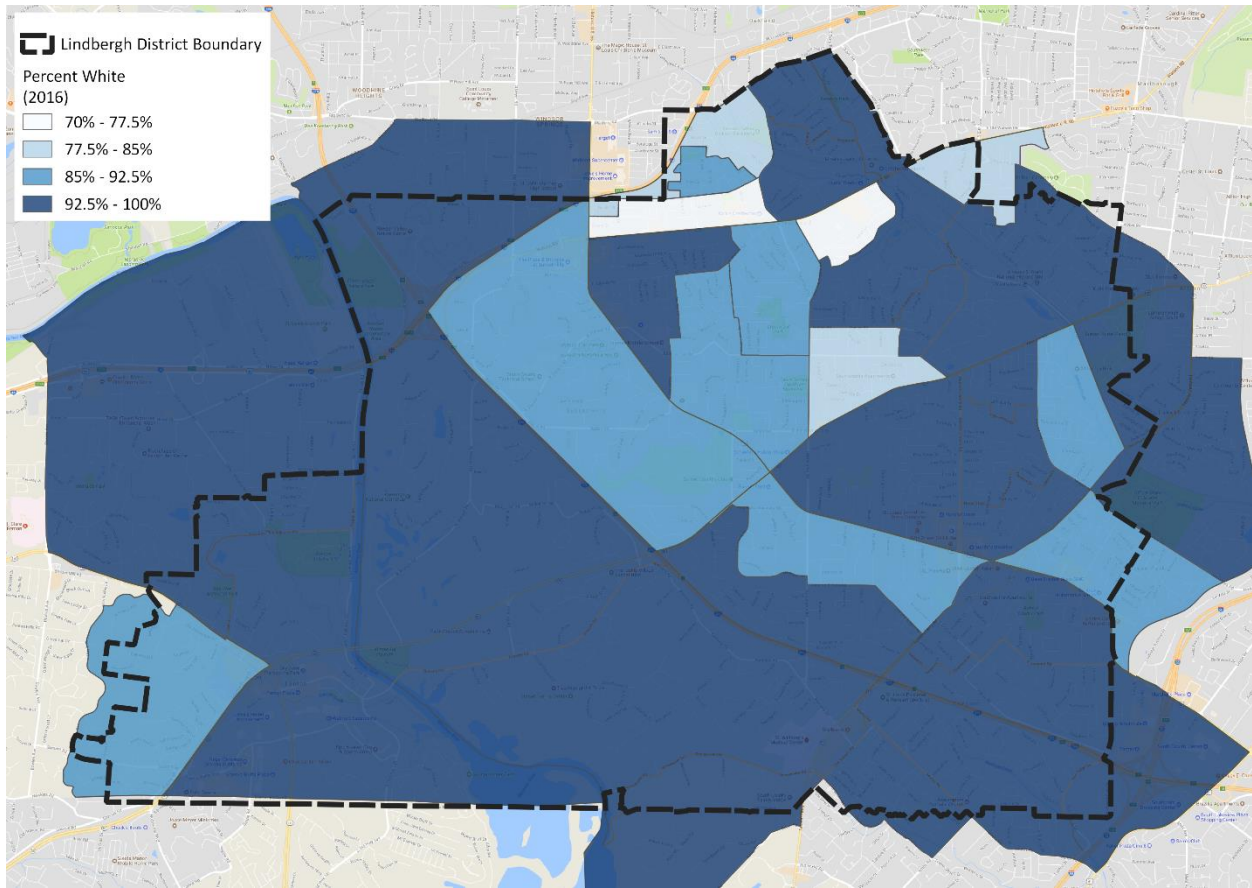
RACIAL STRUCTURE



Source: U.S. Census Bureau, 2018.

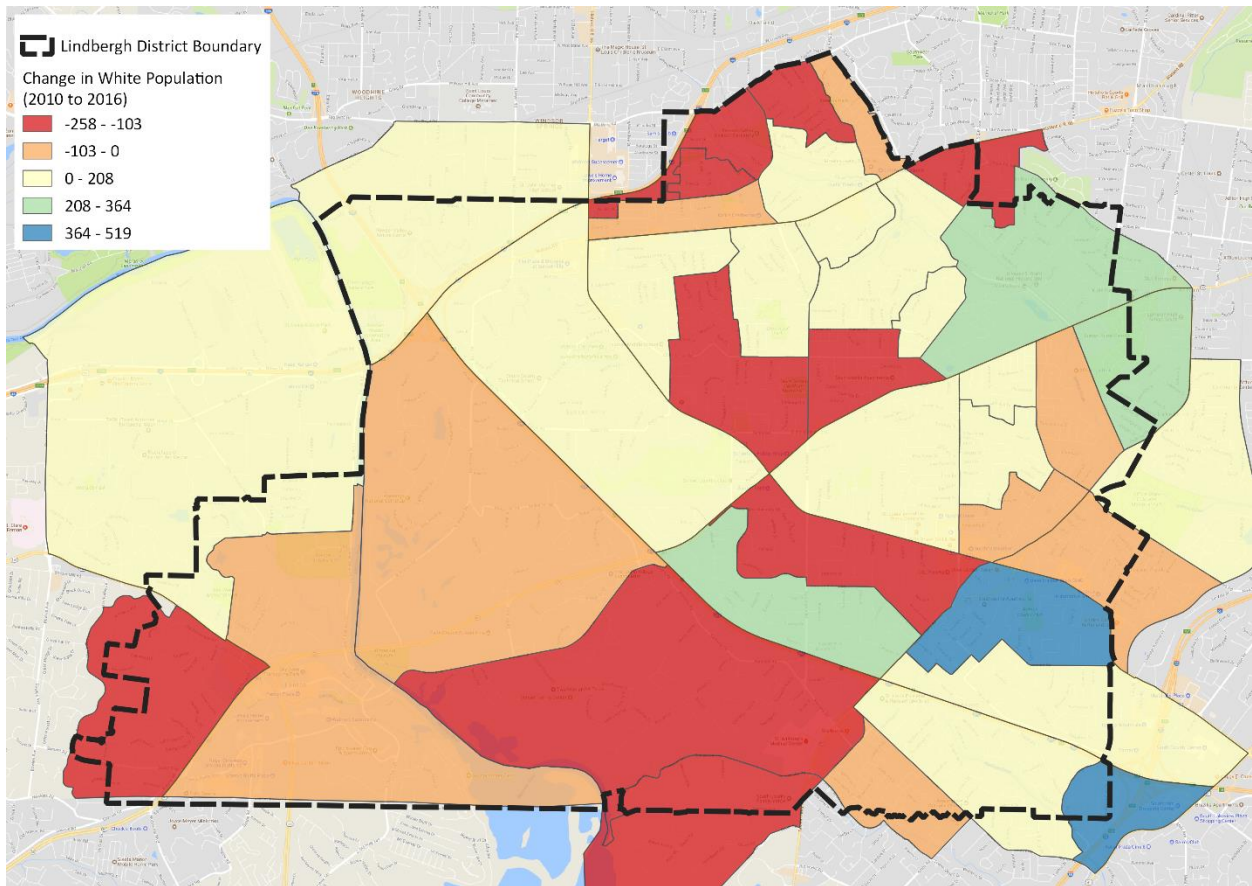
The Lindbergh Schools district is 93% White, a percentage that remained constant even as the total White population grew 1% between 2010 and 2016. No other race is more than 2% of the population.

WHITE POPULATION



Source: U.S. Census Bureau, 2018.

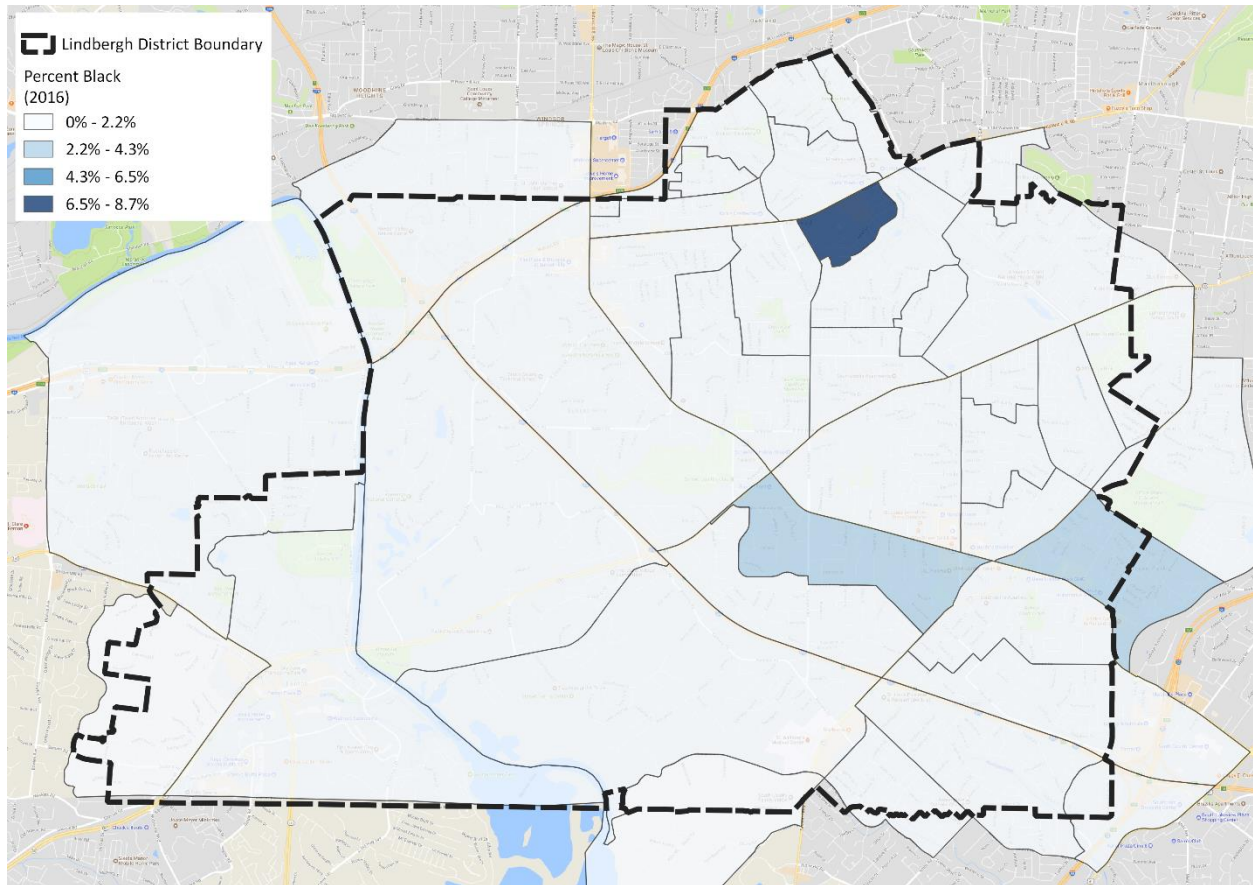
The district's White population is spread throughout the district, with only a few small pockets in the northern part of the district where there are fewer White residents. However, even those northern pockets are still at least 70% White.



Source: U.S. Census Bureau, 2018.

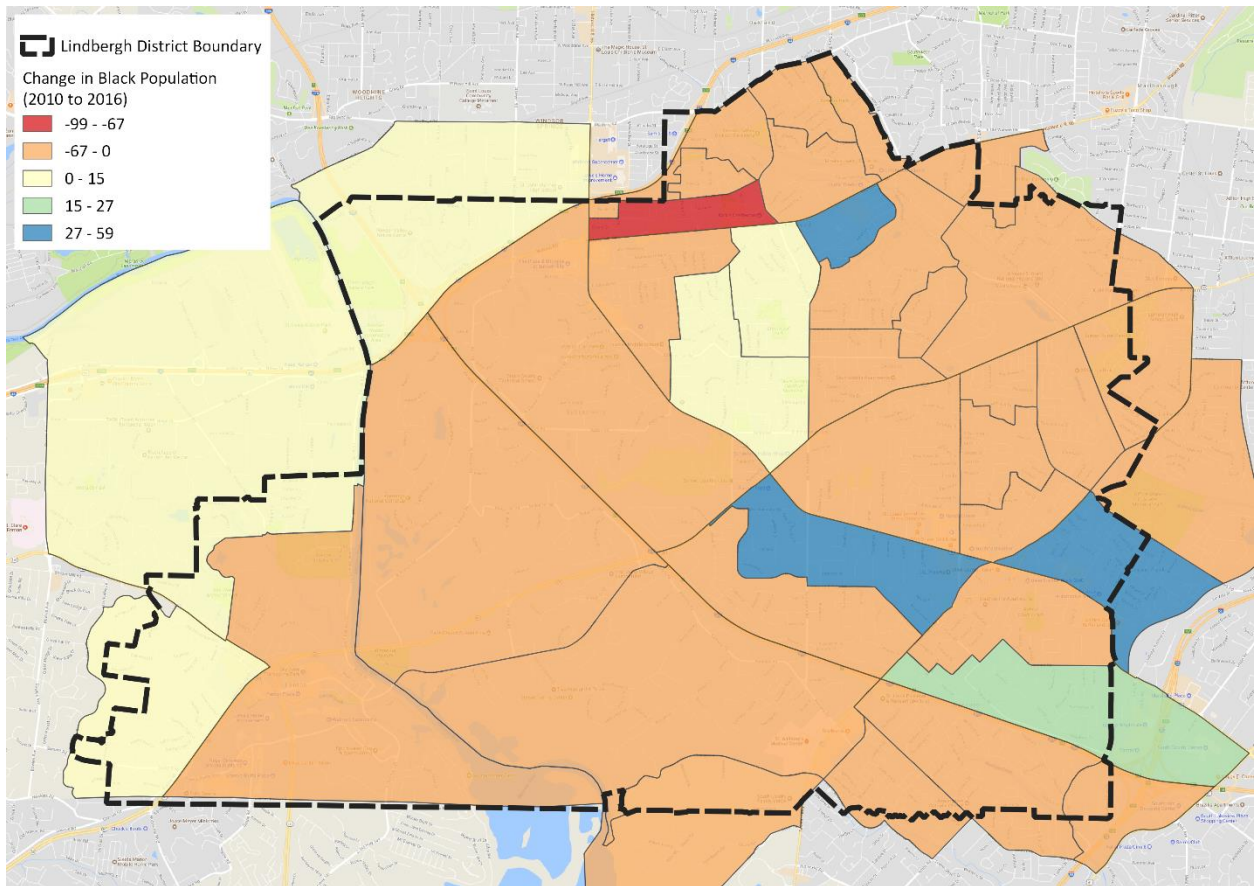
The change in distribution of the White population mirrors the changes in overall population between 2010 and 2016. There are areas of decreasing White population through the center of the district, but those areas of decrease were offset by areas of increasing White population, particularly in the eastern parts of the district.

BLACK POPULATION



Source: U.S. Census Bureau, 2018.

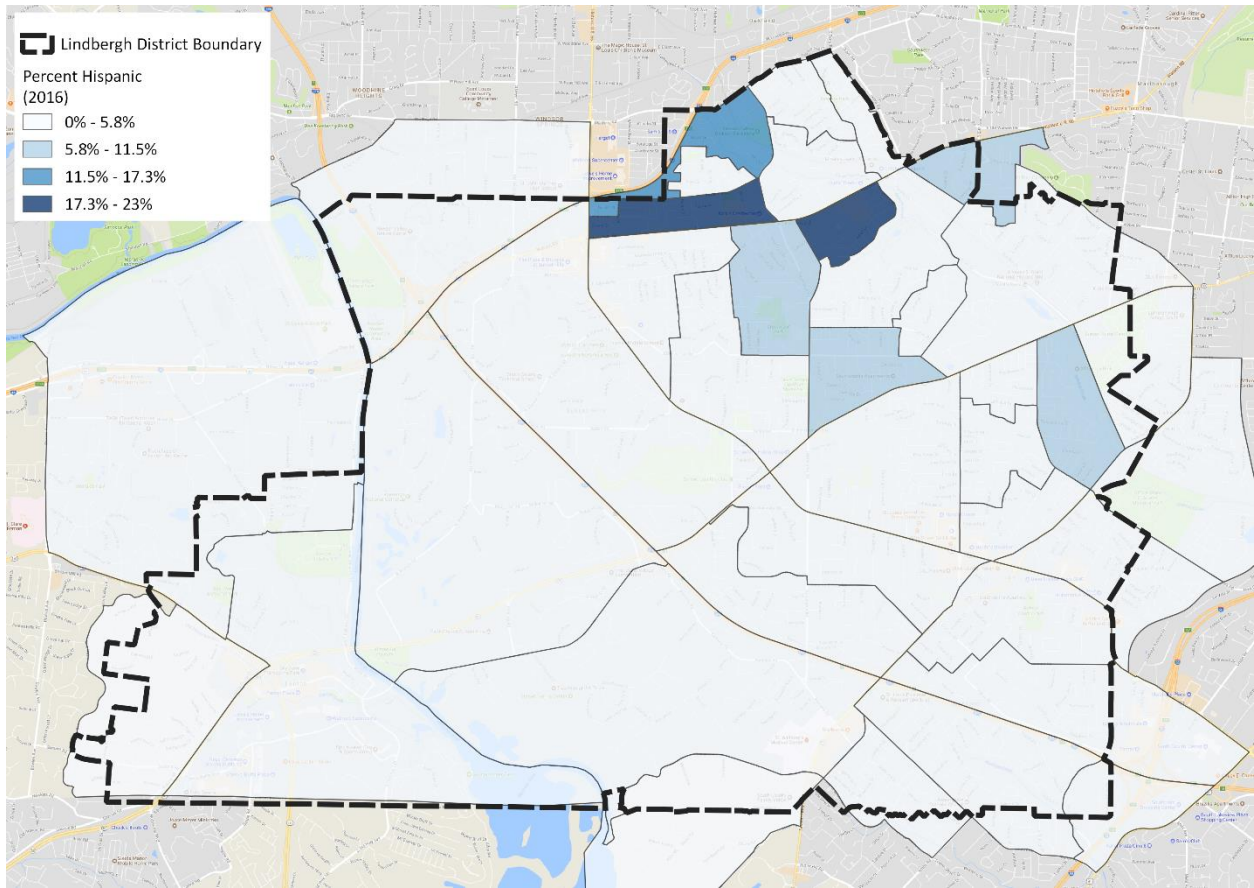
The district's Black population is evenly distributed across the district, with pockets in the north and the east with a larger percentage of Black residents. Overall, 1% of the Lindbergh Schools district population is Black.



Source: U.S. Census Bureau, 2018.

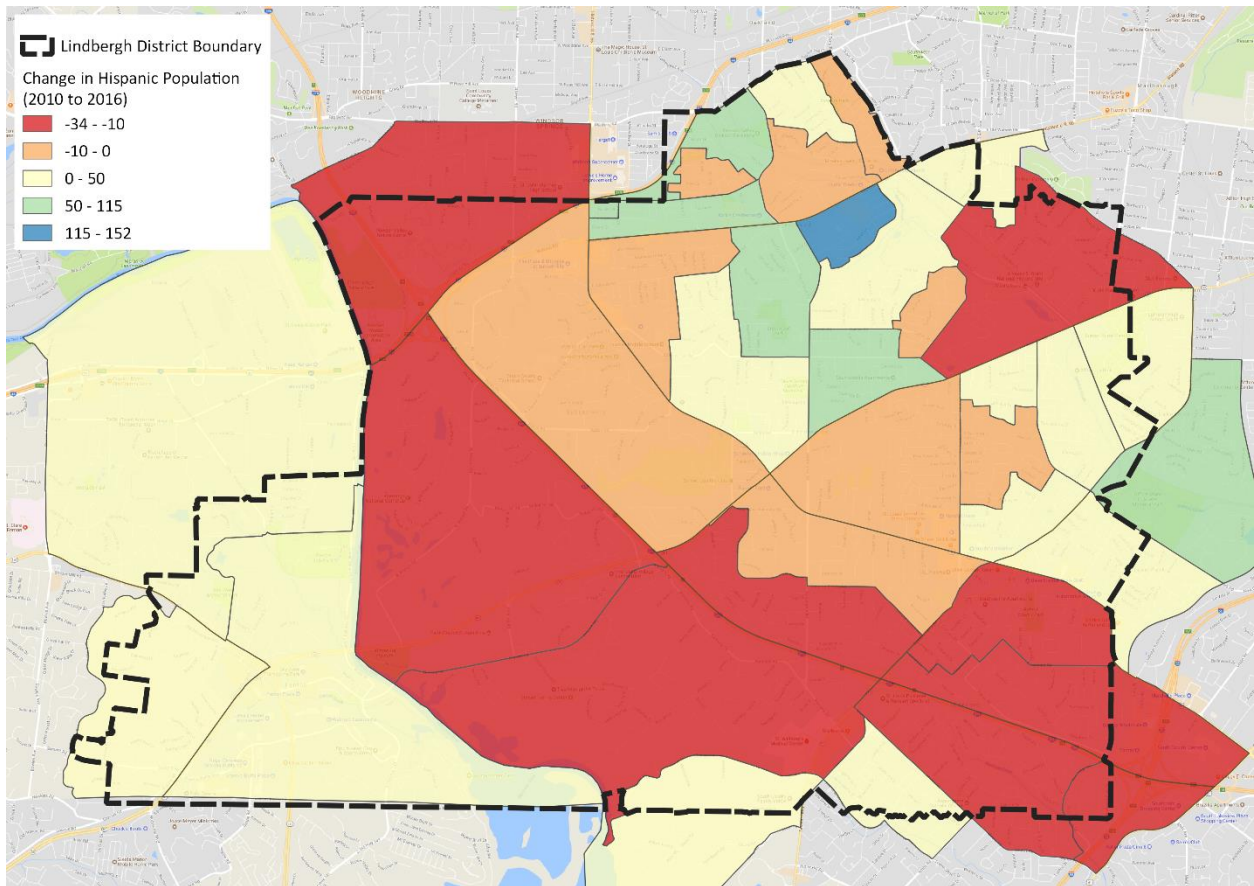
The areas of the district that saw the most significant increase in Black population are the pockets in the north and east with the greater percentage of Black residents. The areas of declining Black population are spread across the district. Overall, the Black population decreased 22% from 2010 to 2016.

HISPANIC POPULATION



Source: U.S. Census Bureau, 2018.

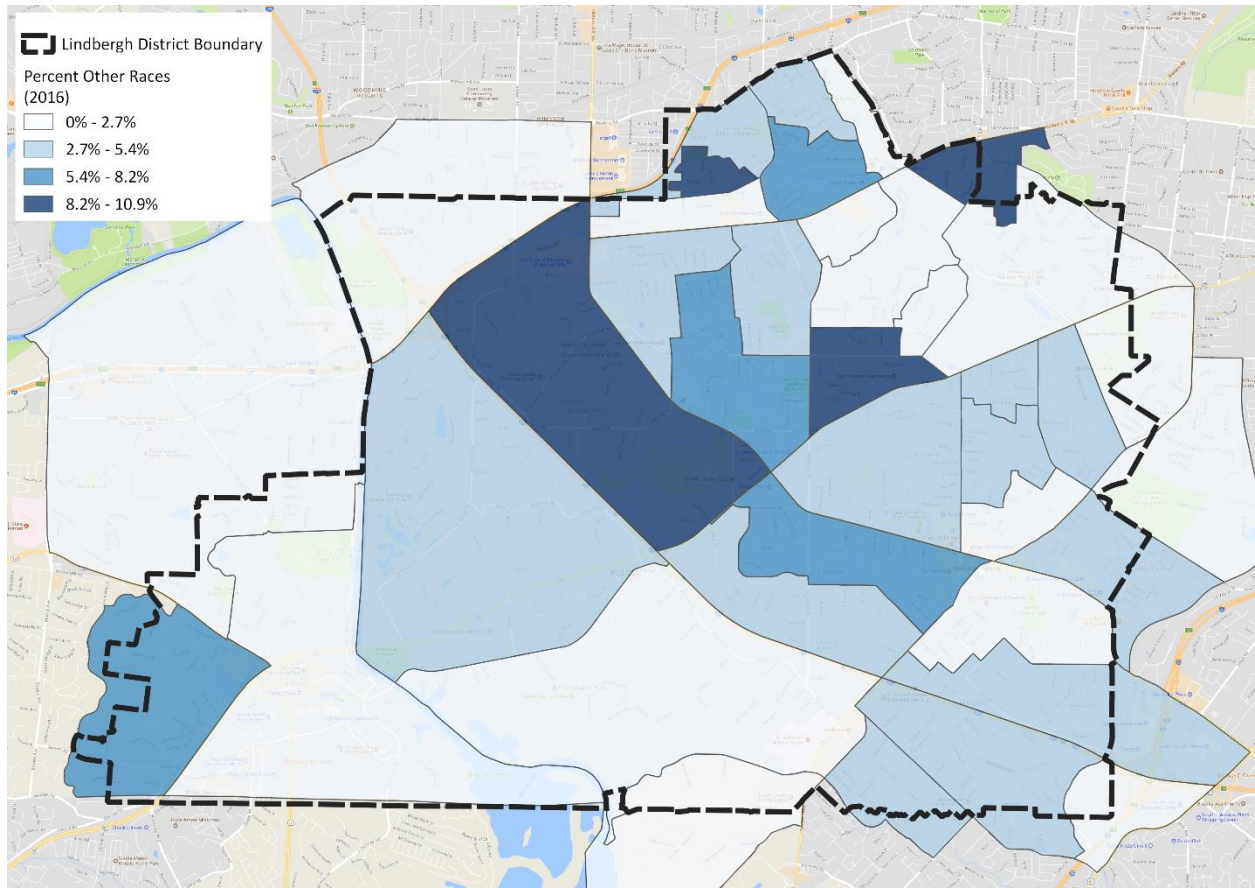
The areas with the highest percentage of Hispanic residents is in the northern part of the district.



Source: U.S. Census Bureau, 2018.

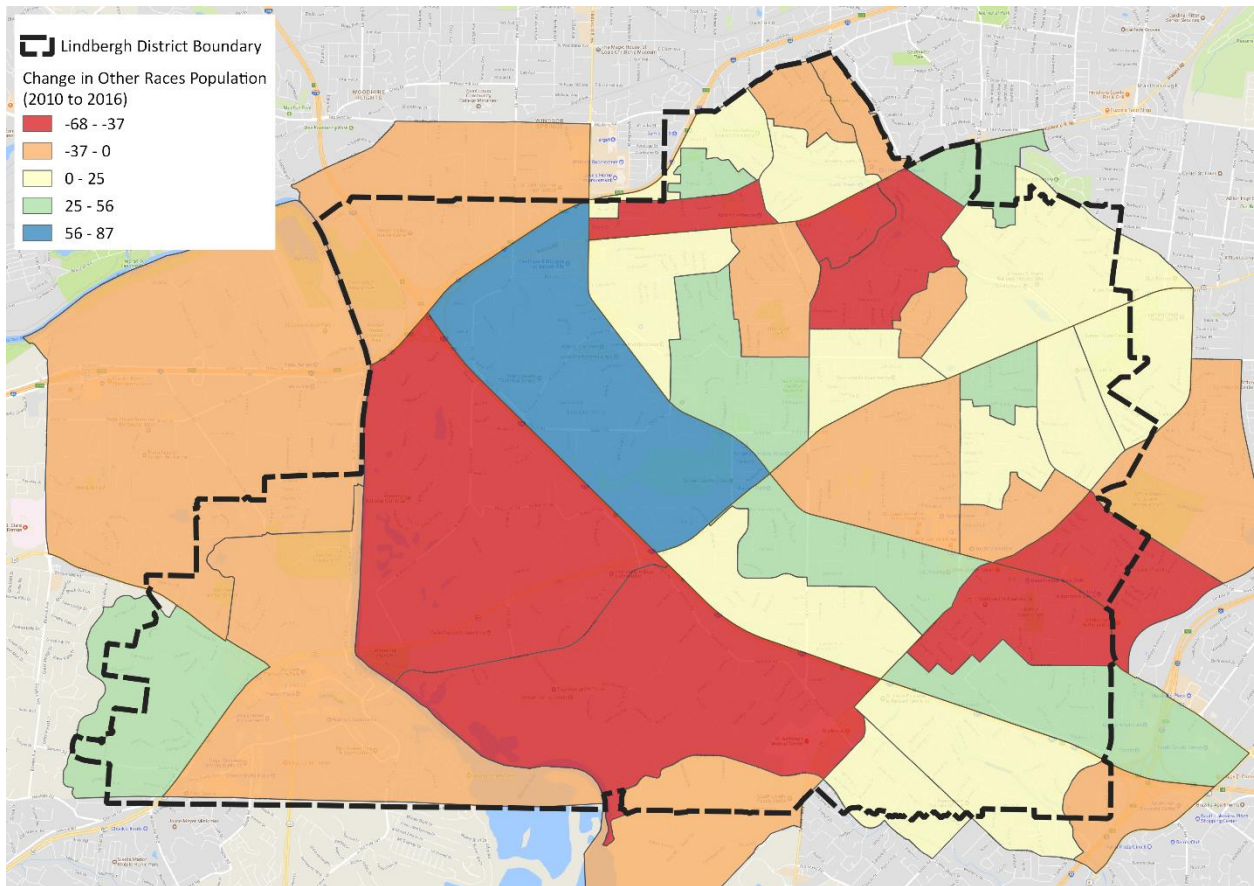
The district's Hispanic population increased 33% from 2010 to 2016. The areas of increasing Hispanic population were predominately in the southwest and the north-central areas of the district.

POPULATION OF OTHER RACES



Source: U.S. Census Bureau, 2018.

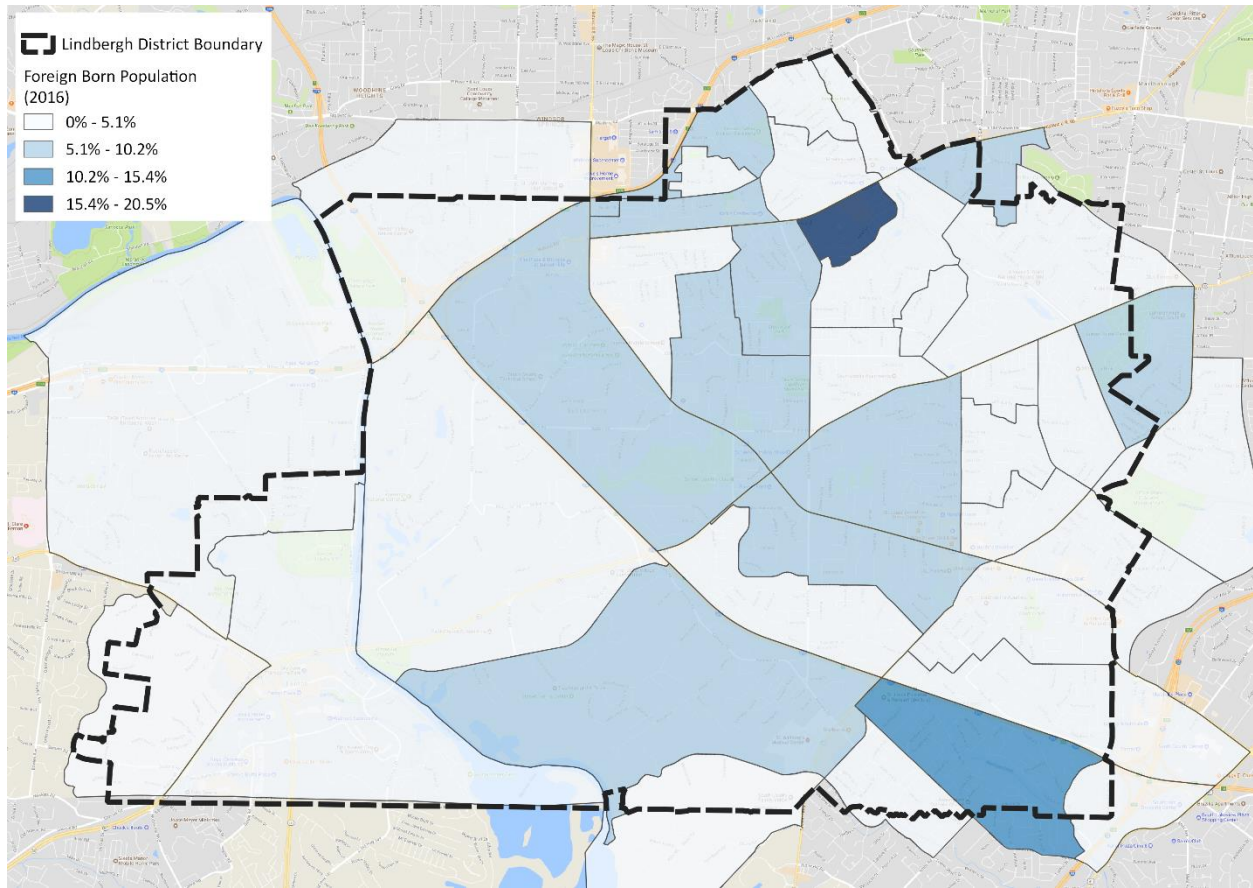
The district's population of Other Races is distributed largely in the central part of the district.



Source: U.S. Census Bureau, 2018.

The district's population of Other Races increased primarily in the central part of the district. The southwest part of the district saw the greatest decrease in the Other Races population.

FOREIGN-BORN POPULATION

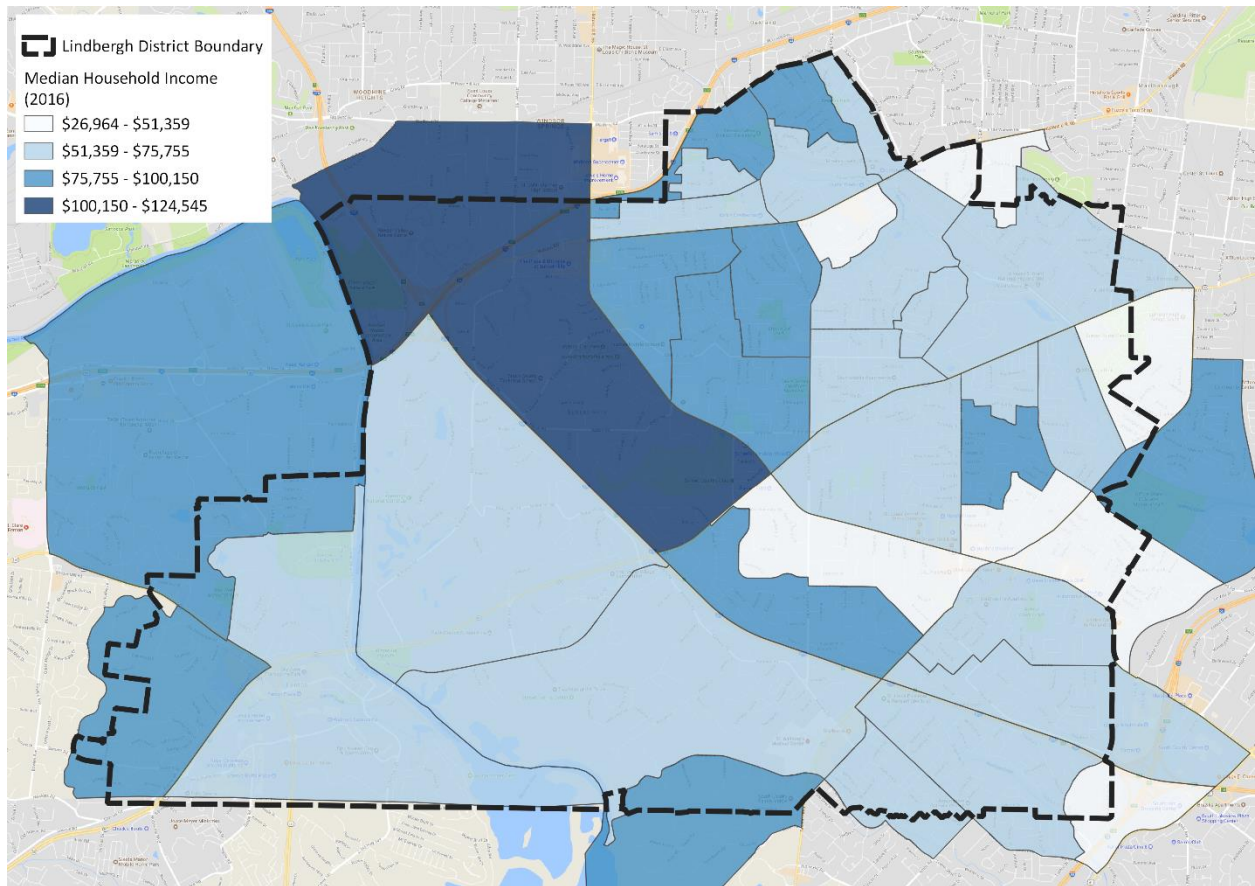


Source: U.S. Census Bureau, 2018.

Only 4.53% of the district's population is foreign-born. The part of the district that is foreign-born is fairly evenly spread out across the district, though there are distinct pockets in the North and the Southeast.

ECONOMICS, HOUSING, AND EDUCATION

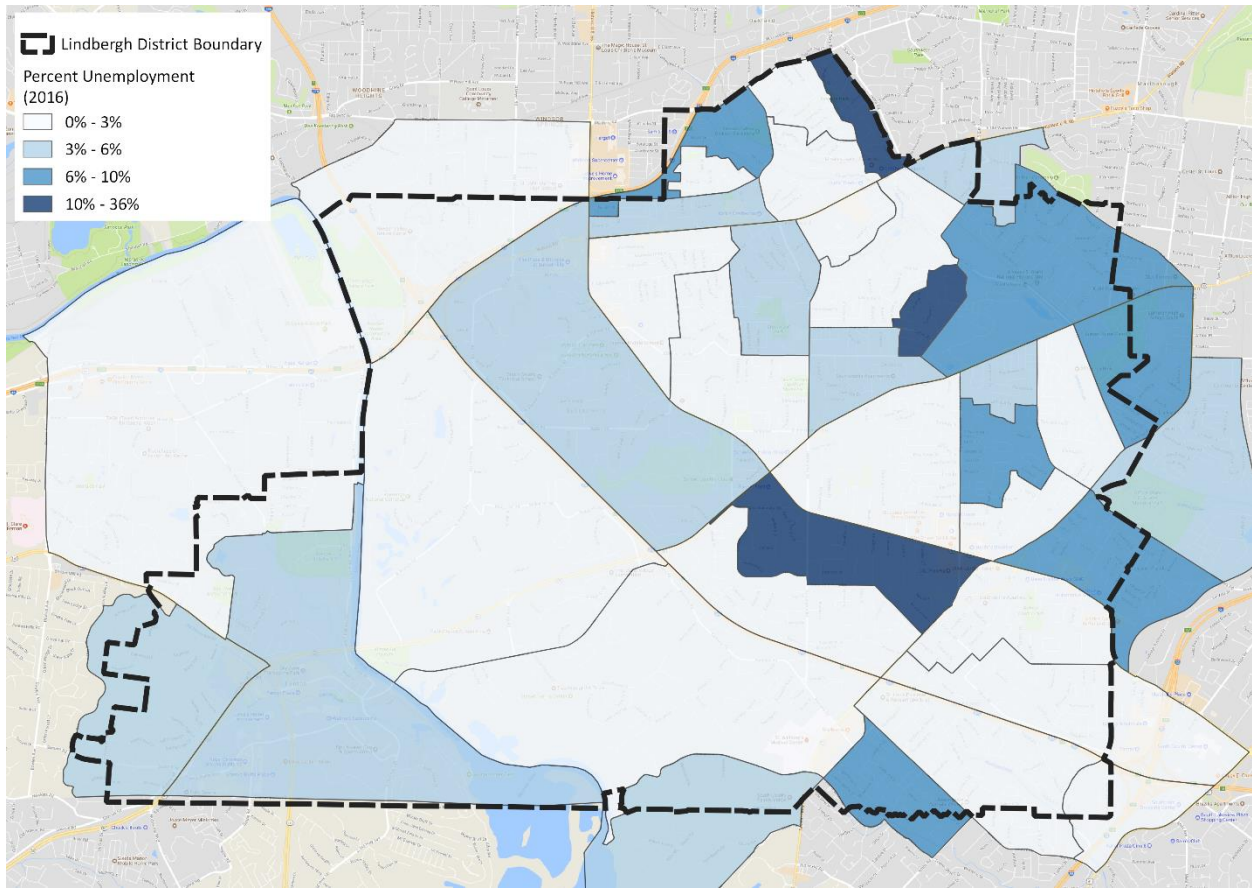
MEDIAN HOUSEHOLD INCOME



Source: U.S. Census Bureau, 2018.

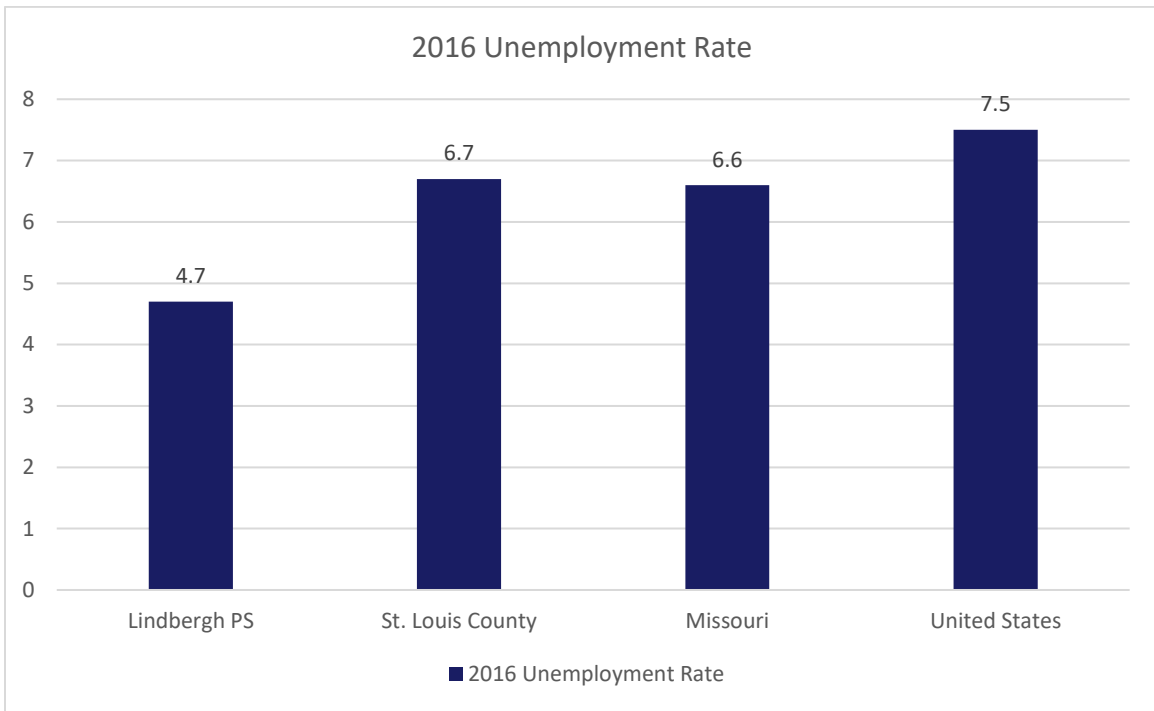
The district's median household income increased 3% from \$67,191 to \$69,468 between 2010 and 2016. The areas of the district with the highest household income are in the central part of the district.

UNEMPLOYMENT



Source: U.S. Census Bureau, 2018; Bureau of Labor Statistics, 2018.

The district's unemployment rate in 2016 was 4.7%. Within the district, unemployment is the highest in the northeast part of the district.



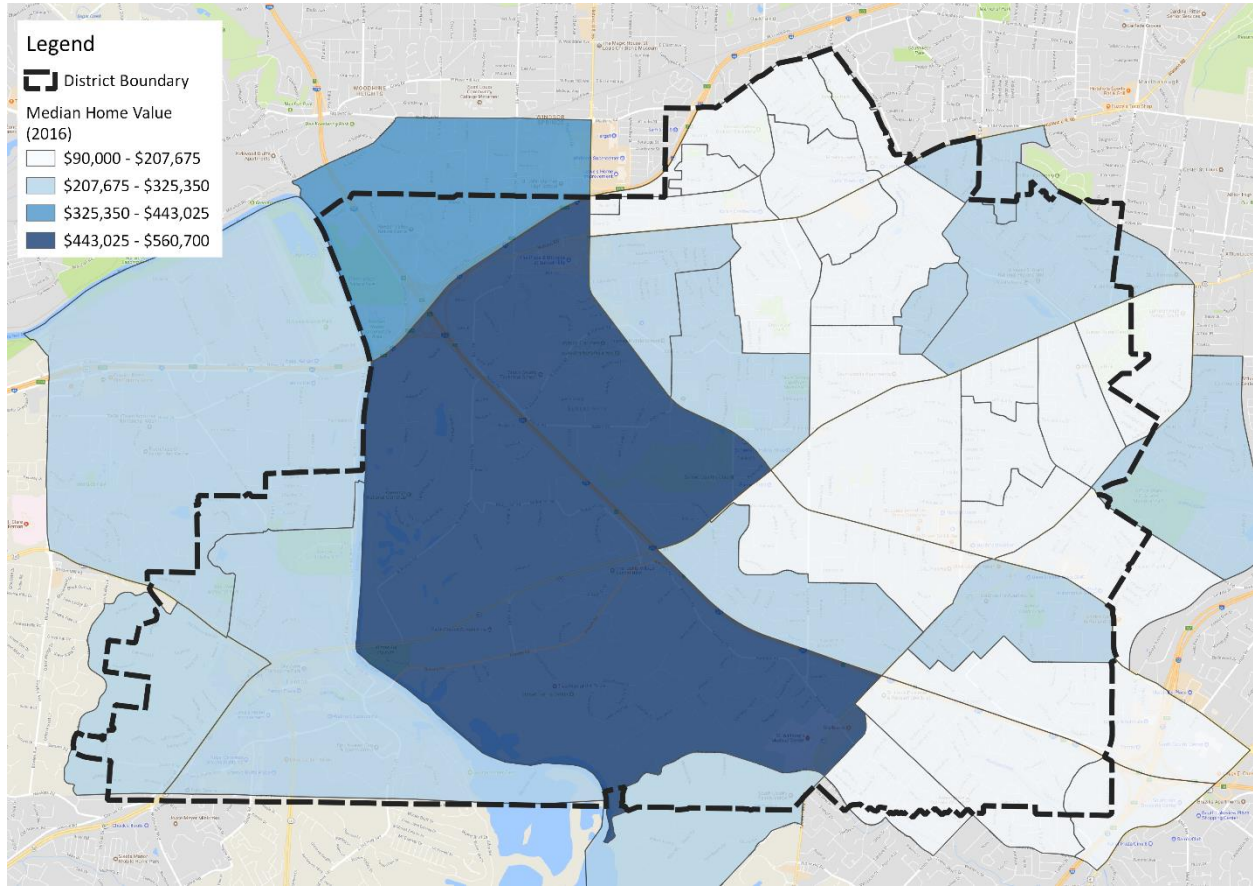
Source: U.S. Census Bureau, 2018. ¹

In 2016, the Lindbergh unemployment rate of 4.7% was less than St. Louis County (6.7%), the State of Missouri (6.6%), and the United States (7.5%). The foregoing unemployment rates were for 2016, the most recent year for which comparable data for the district is available.

The unemployment rate has changed since 2016. In June of 2018, the unemployment rate in Missouri was 3.5% and the U.S. unemployment rate was 4.0%. Unemployment rate data for Lindbergh Schools in 2018 is not available. However, if the district has followed national and state trends, the district’s unemployment rate should be lower in 2018 than it was in 2016.

¹ Note that in order to obtain an unemployment rate at the district level, American Community Survey data was analyzed at the block group level. The St. Louis County, Missouri and United States unemployment rates reflect comparable American Community Survey data and are not sourced from the Bureau of Labor Statistics.

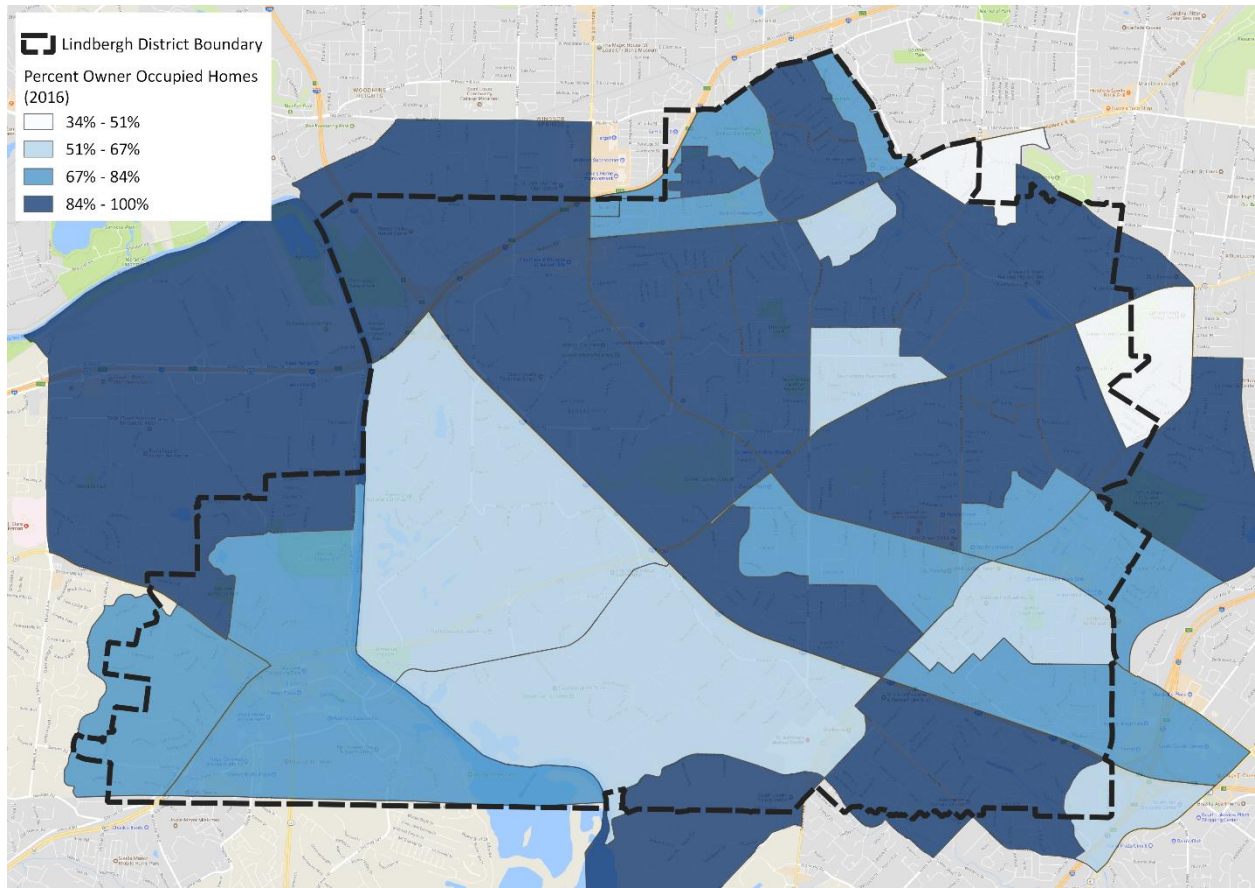
MEDIAN HOME VALUES



Source: U.S. Census Bureau, 2018.

The median home value in the district has decreased 0.4%, from \$221,066 in 2010 to \$220,200 in 2016. The areas within the district with the highest median home values are in the central and western parts of the district.

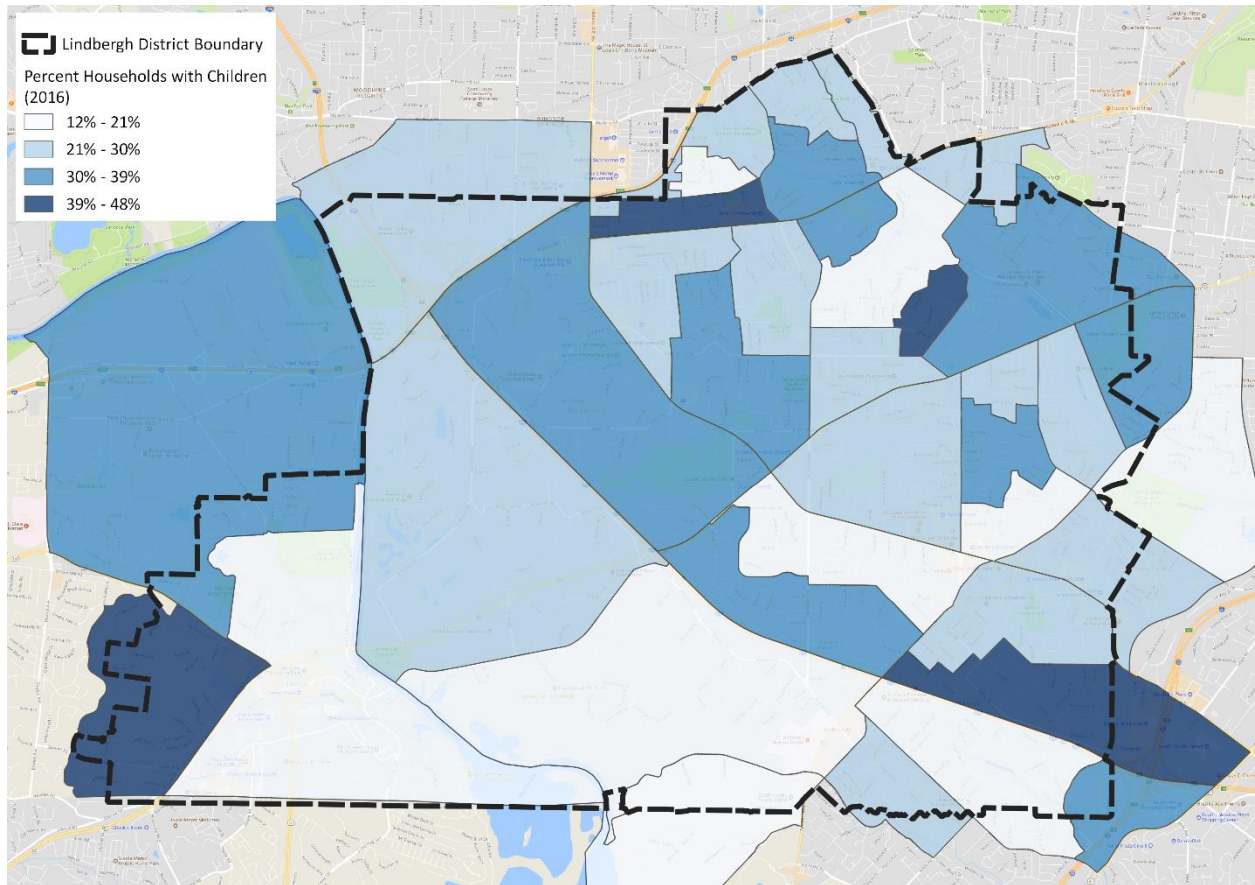
OWNER-OCCUPIED HOMES



Source: U.S. Census Bureau, 2018.

The split between owner-occupied homes and rentals has remain essentially the same between 2010 and 2016. However, the percentage of owner-occupied homes has decreased from 82% to 80% of the homes in the district, while the percentage of rental homes has increase from 18% to 20%. The areas with the lowest percentages of owner-occupied homes are in the northeast part of the district.

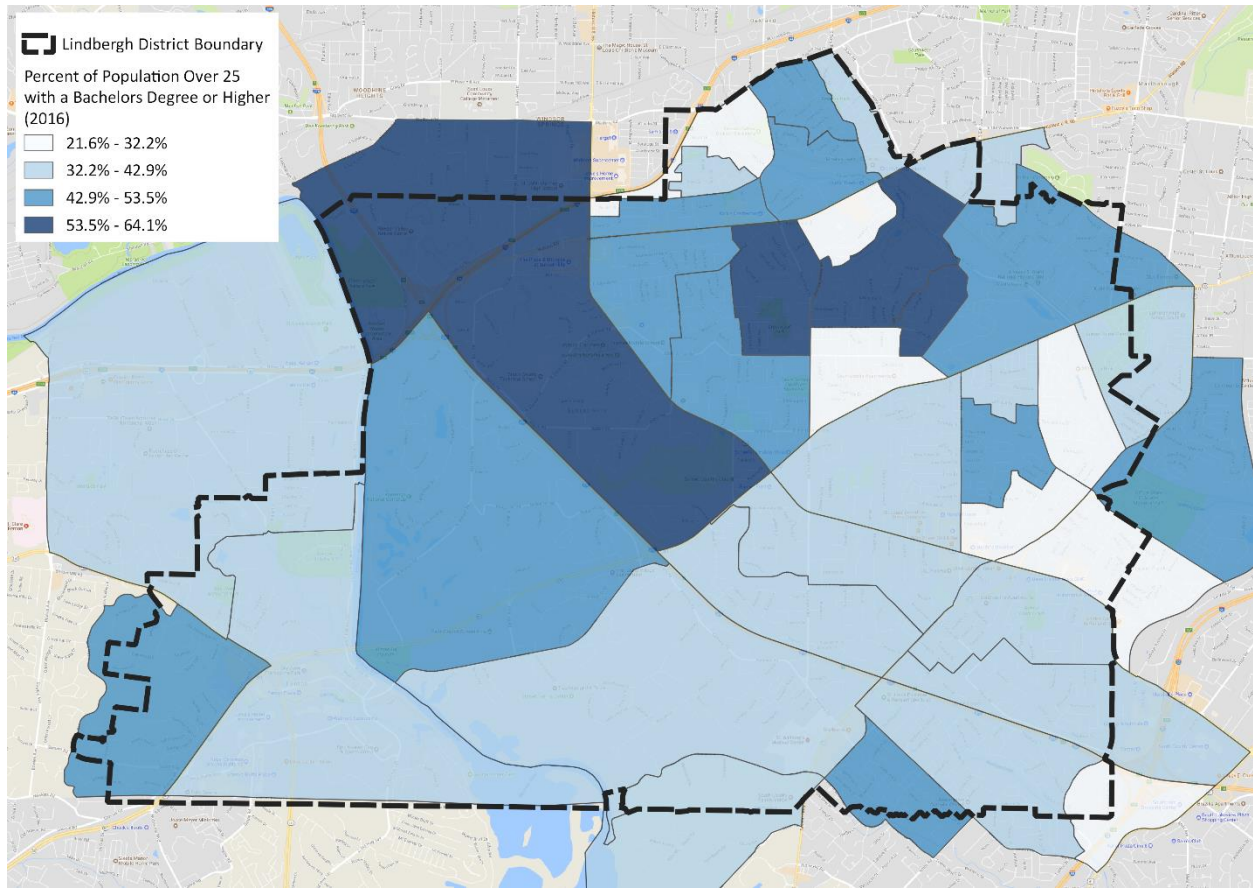
HOUSEHOLDS WITH CHILDREN



Source: U.S. Census Bureau, 2018.

The southern part of the district has the lowest percentage of households with children. Areas of the district with higher percentages of households with children are generally in the central and northeast.

EDUCATION

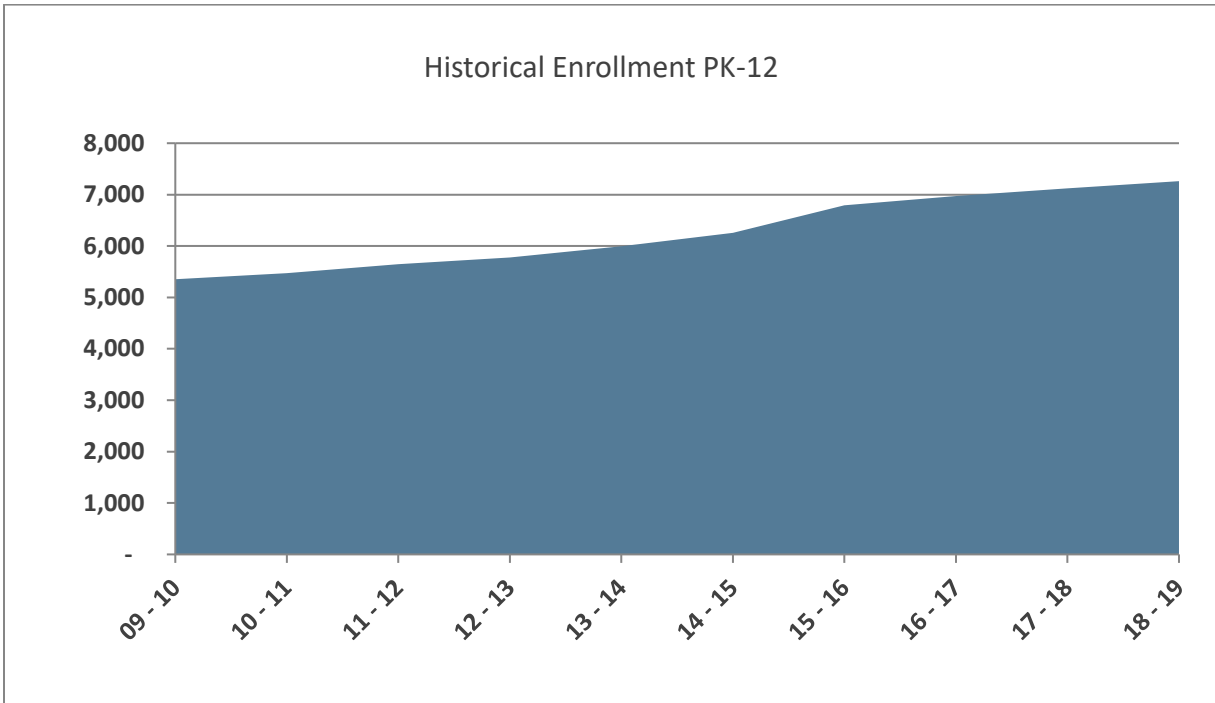


Source: U.S. Census Bureau, 2018.

Areas in the central and northern parts of the district have the highest percentage of population with a Bachelors' degree or higher. This distribution of post-secondary educational achievement mirrors the areas of the district with higher incomes and higher home values.

ENROLLMENT

HISTORICAL ENROLLMENT



Source: Lindbergh Schools, 2018.

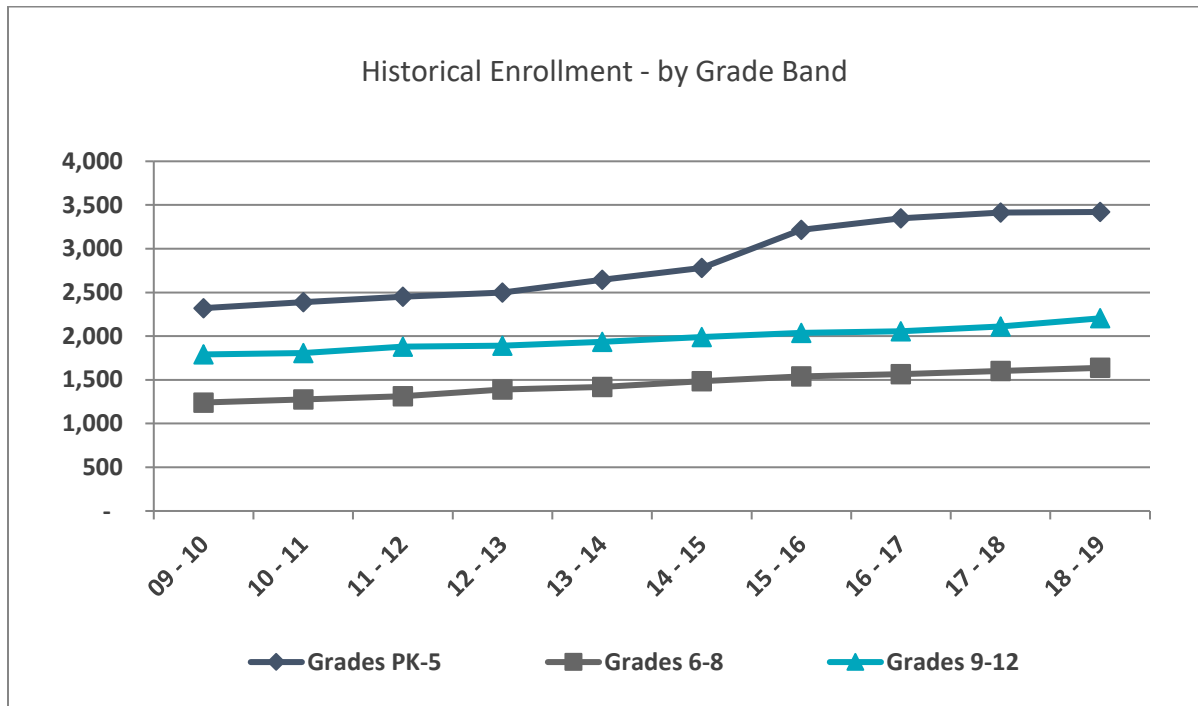
Lindbergh Schools enrollment has steadily increased over the last ten years. Over the last ten years, the district’s enrollment has increased 35.7%. The foregoing chart excludes VICC enrollment.²

Prior to the 2015-16 school year, the district did not track early childhood program enrollment. The district began tracking PK enrollment in 2015-16, which led to the notable bump in historical enrollment.

The increase in enrollment has occurred despite the lack of growth in the school age population in the district, suggesting that Lindbergh Schools is capturing a larger percentage of school age children living

² The historical enrollment analyzed for this report does not include students in the Voluntary Interdistrict Choice Corporation (VICC) program. The VICC program implemented desegregation in Missouri. Lindbergh Schools phased out its VICC program beginning in 2006. Students could choose to remain in the program through graduation from high school, but no new students could enter the program after 2006. In 2016, the remaining students from the VICC program graduated from high school. MGT’s analysis excluded VICC students so that the historical enrollment analysis and projected enrollment reflected trends from students who live in the Lindbergh School district.

within the district boundaries. Indeed, this has been the case. In 2010, the district enrollment 50.8% of the school age children in the district (ages 5-19). By 2016, that percentage had increased to 60.8%.³



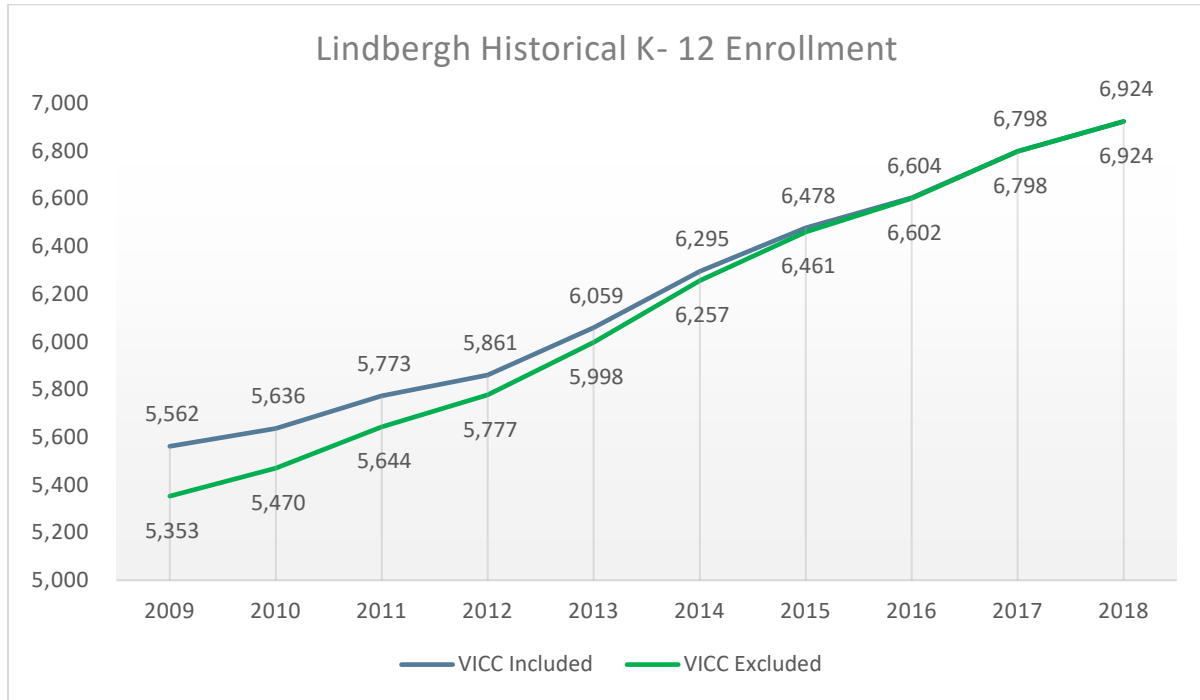
Source: Lindbergh Schools, 2018.

The district’s increase in enrollment has been felt across all three grade bands. The PK-5 grade band enrollment increase is the highest at 47.4%, though that increase is influenced by the decision to begin recording PK enrollment in 2015-16. The 6-8 grade band enrollment increase is next highest at 31.9%, followed by the 9-12 grade band at 23.1%.

³ This capture rate does not include prekindergarten enrollment because population data does not separately identify the four-year old population.

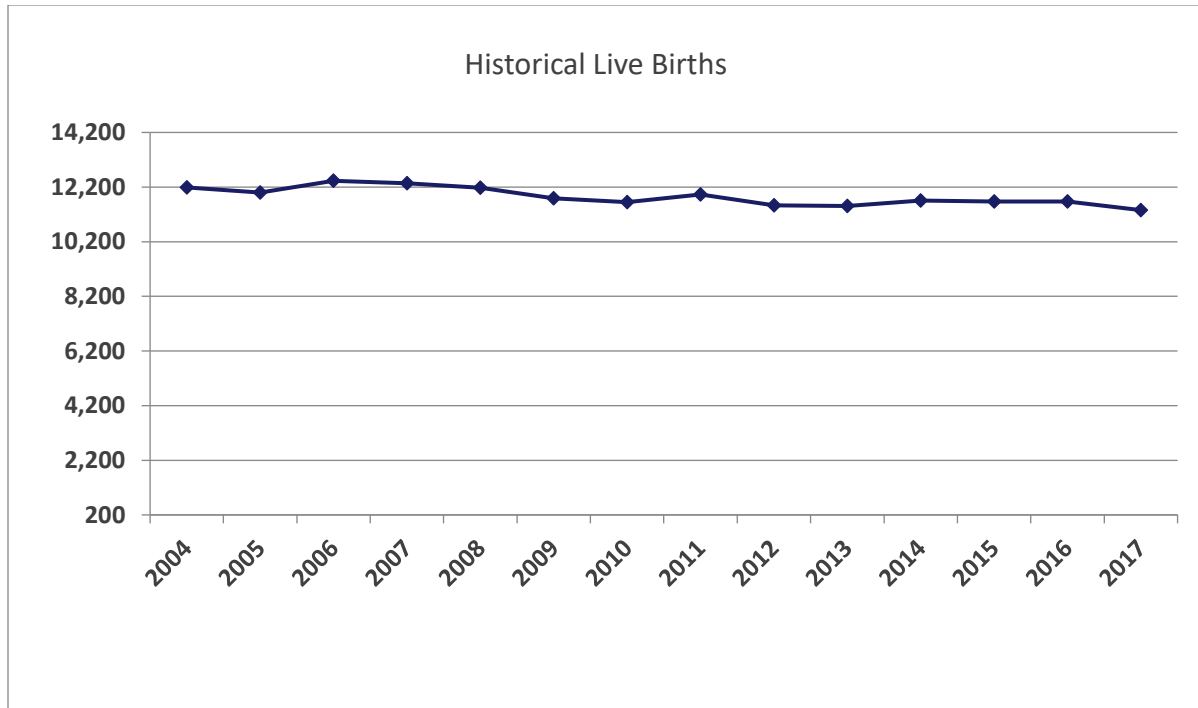
HISTORICAL ENROLLMENT VICC STUDENT COMPARISON

The exhibit below shows the impact of the VICC students to the district enrollment history. VICC student enrollment was at its highest (209 students) in 2009. The VICC students accounted for 4% of the total enrollment in 2009. Since then, VICC enrollment has decreased to 0 in both 2017 and 2018. A majority of the VICC student enrollment is in the middle and high school grade bands.



Source: Lindbergh Schools, 2018; MGT, 2018.

LIVE BIRTHS AND KINDERGARTEN ENROLLMENT

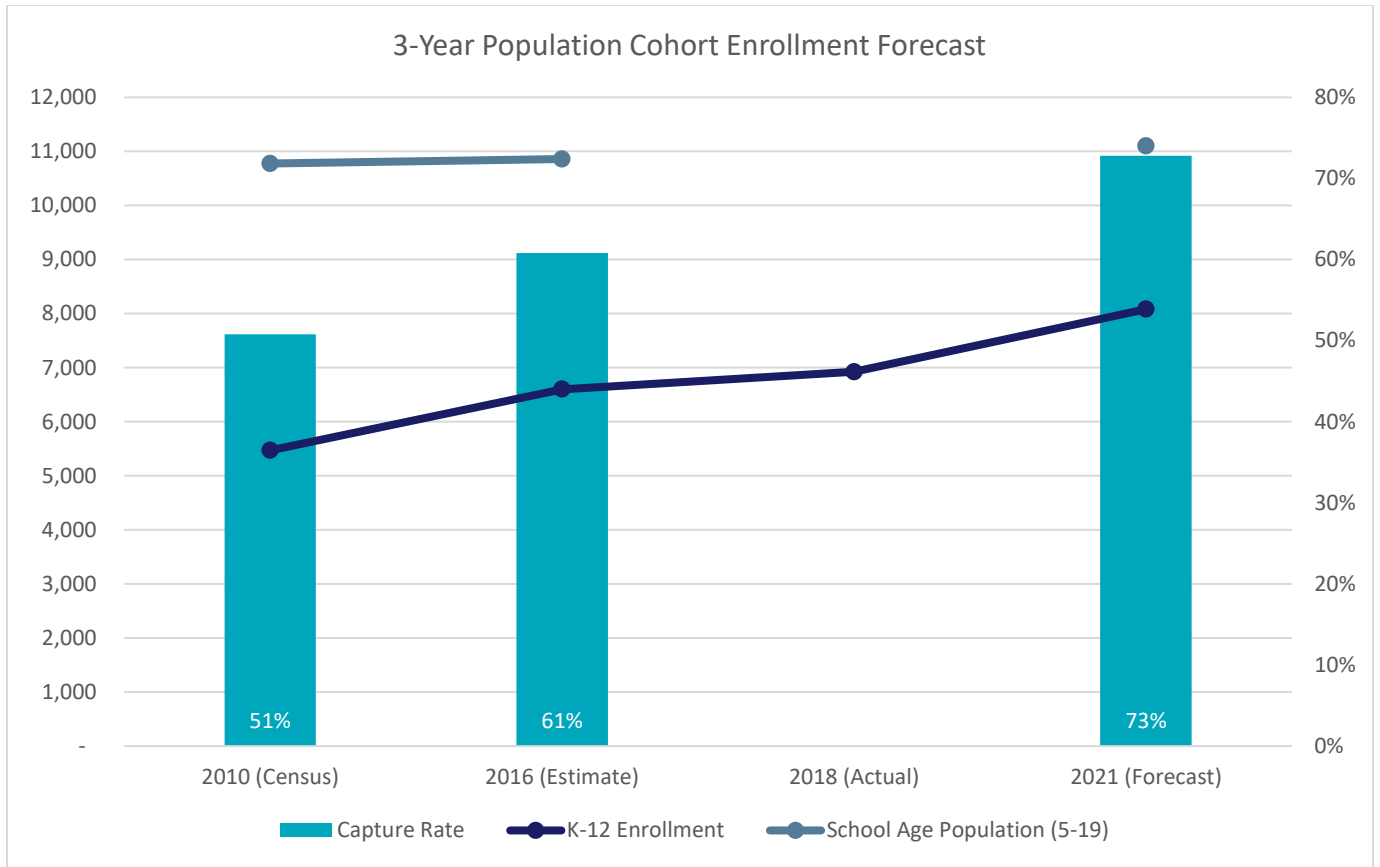


Source: Missouri Department of Health and Senior Services, 2018.

Live births have steadily declined over the last fourteen years in St. Louis County, Missouri. Unfortunately, live birth data is not available for just Lindbergh Schools. County level data is the only available live birth data. By itself, this data may or may not be reflective of the dynamics in Lindbergh Schools. However, it is the best available source of live data.

The decline in live births at the county level is consistent with the effects from a declining female child-bearing age population in Lindbergh Schools. Fewer child-bearing age females would likely result in fewer live births.

3-YEAR POPULATION COHORT ENROLLMENT FORECAST



Source: U.S. Census Bureau, 2018; Lindbergh Schools, 2018; MGT, 2018.

Under a 3-year population cohort enrollment forecast model⁴, the district’s enrollment will continue to increase by 17% over the next three years. The forecasted 2021-22 K-12⁵ enrollment is 8,080 students.

⁴ The 3-year population cohort enrollment forecast model assumes that the population cohorts will increase or decrease by the same percentage experienced between 2010 and 2016. The model also assumes that the Lindbergh Schools capture rate (percentage of school age population enrolled in the district) will again increase 20% as it did between 2010 and 2016. Under this model, the school age population would increase 2% from 2016 to 2021, which is consistent with the 1% increase from 2010 to 2016.

Note that the above chart does not have Census data for 2018, so there is a gap in the School Age Population data line and the Capture Rate data bars.

⁵ Prekindergarten enrollment is not included because U.S. Census data does not separately identify the four-year-old population and moving that single age cohort would be ineffectual given that Census data for the population under 5 is released as a group and not individual ages.

10-YEAR ENROLLMENT FORECAST METHODOLOGY

Enrollment forecasts are merely an *estimate* of future activity based on the historical data and information provided. During the implementation of any of the recommendations provided, it is critical that the district reassess these numbers on a regular basis and adjust plans accordingly.

To identify trends and prepare for adequate spaces, teaching staff, materials and supplies, educational leaders use several methods of projecting enrollment. Among the most commonly used models are *Average Percentage Annual Increase*, *Cohort Survival*, *Linear Regression*, and *Student-per-Housing Unit* models. Because no one model is foolproof, MGT generates a weighted average of these four “base” models to arrive at its enrollment forecast.

A rule of thumb when forecasting enrollment is that the models should use as many years of historical data as there are years in the projection period. In other words, if the model is projecting enrollment for five years from now, then five years of historical data are used. If the model is projecting enrollment for ten years from now, then ten years of historical data are used. Each of the following “base” models draw data in this manner for their calculations.

AVERAGE PERCENTAGE ANNUAL INCREASE MODEL

This model calculates future school enrollment growth based on the historical average growth from year to year for each grade level. This simple model multiplies the historical average percentage increase (or decrease) by the prior year’s enrollment to project future enrollment estimates. For example, if enrollment in the first grade decreased five percent from 2010 to 2011 and decreased seven percent from 2011 to 2012, then the average percentage change would be a six percent decrease, and six percent would be the factor used to project future enrollment in this model.

LINEAR REGRESSION MODEL

This model uses a statistical approach to estimate an unknown future value of a variable by performing calculations on known historical values. Once calculated, future values for different future dates can then be plotted to provide a “regression line” or “trend line”. MGT has chosen a “straight-line” model to estimate future enrollment values, a model that finds the “best fit” based on the historical data.

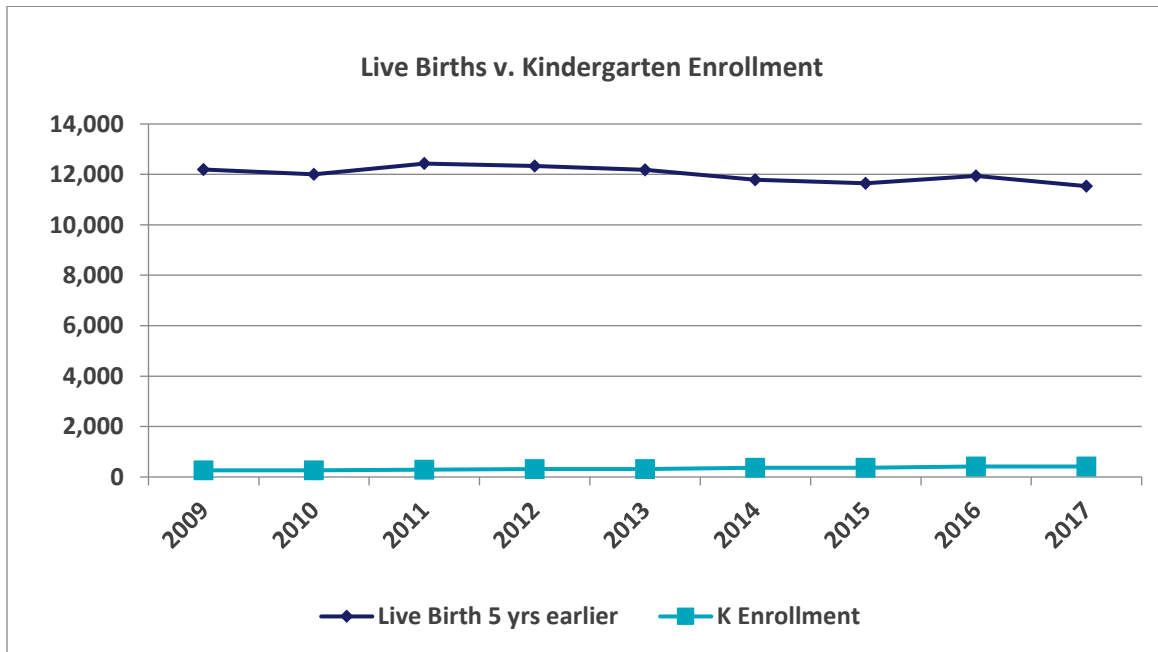
COHORT SURVIVAL MODEL

This model calculates the growth or decline between grade levels over a period of ten years based on the ratio of students who attend each of the previous years, or the “survival rate”. This ratio is then applied to the incoming class to calculate the trends in that class as it “moves” or graduates through the school system. For example, if history shows that between the first and second grades, the classes for the last ten years have grown by an average of 3.5%, then the size of incoming classes for the next ten years is calculated by multiplying them by 103.5%. If the history shows a declining trend, the multiplying factor would be 100% minus the declining trend number.

The determination of future kindergarten enrollment estimates is critical, especially for projections exceeding more than five years, because future kindergarten enrollment forms the beginning baseline in the cohort survival model. There are two methods of projecting kindergarten enrollment. The first model is based on the correlation between historical resident birth rates (natality rates) and historical kindergarten enrollment. The second model uses a linear regression line based on the historical

kindergarten enrollment data. The correlation method was used for Lindbergh Schools due to the strong correlation coefficient between live births and kindergarten enrollment.

When examining the ratio of live-births-to-kindergarten enrollment, live-birth data is collected for the past 15 years and kindergarten enrollment for the past ten years. For example, a child born in 2010 would enroll in kindergarten at the age of five in 2015. Therefore, in this analysis, we are looking at how many children are enrolled in kindergarten as compared to the number of children born in the area five years prior to a particular school year. The following chart compares the district’s historical kindergarten enrollment to the county live birth data.

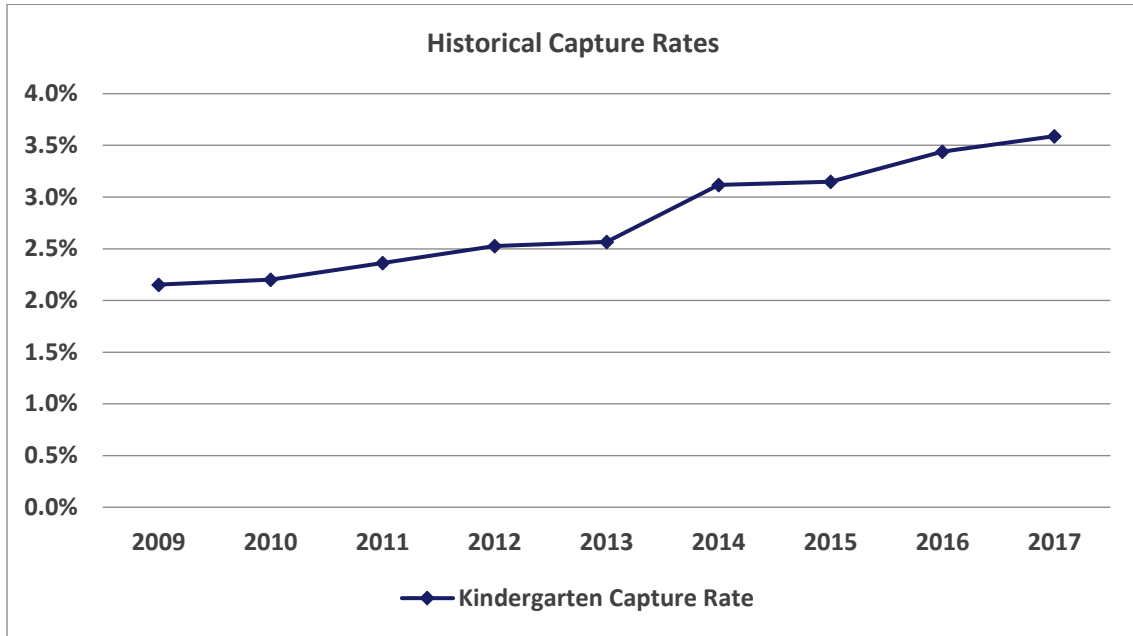


Source: MGT of America Consulting, LLC, 2018.

Two statistics are critical to understanding the relationship between live births and kindergarten enrollment in the district: the correlation coefficient and the capture rate.

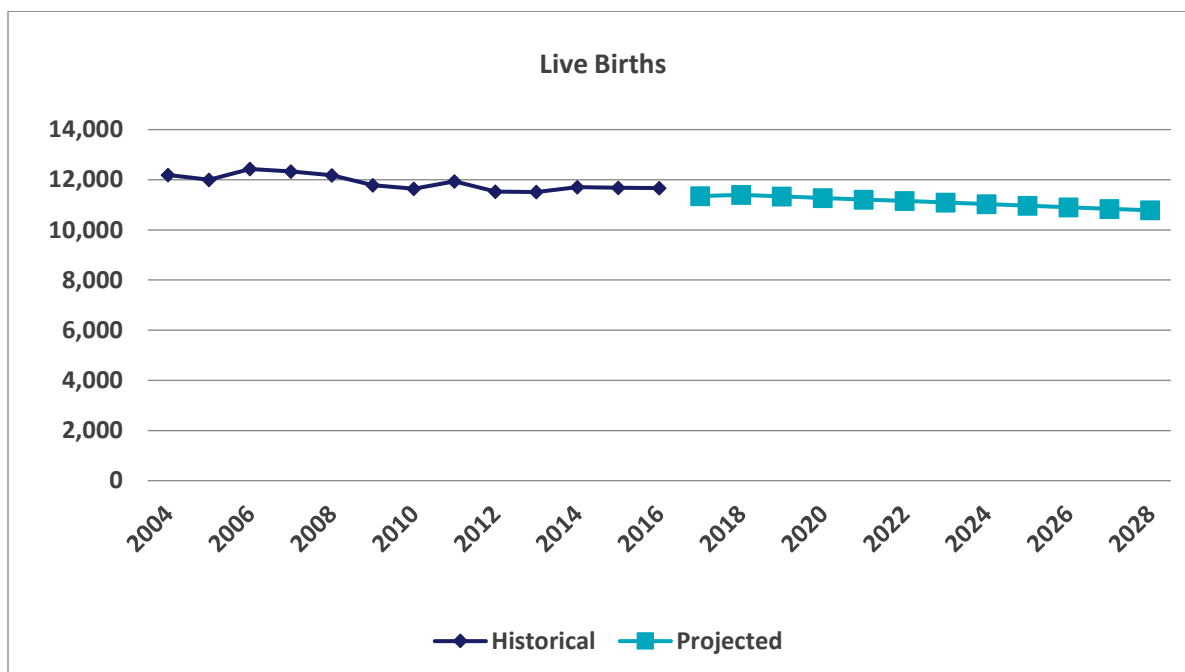
The correlation coefficient calculates the strength or weakness of the relationship between two series of data. A correlation coefficient of 1 or -1 indicates a strong relationship; a correlation coefficient of 0 indicates a weak relationship. For Lindbergh Schools, the correlation coefficient for kindergarten enrollment to live births is -0.76, which indicates a strong, inverse relationship, and therefore, the live birth rate may not be a good indicator of future kindergarten enrollment for forecasting purposes.

The capture rate measures the percentage of live births that resulted in kindergarten enrollment five years later. Over the last ten years, the district's kindergarten capture rate has averaged 2.85%. The capture rate has been steadily increasing for the last ten years.



Source: MGT, 2018

Live births are projected using a linear regression model based on 14 years of historical resident live births in St Louis County. The linear regression analysis predicts a decrease in live births, which is consistent with the aging district population and the decline in the child-bearing age population.



Source: MGT, 2018.

STUDENTS-PER-HOUSEHOLD MODEL

This last model utilizes the estimated number of housing units as its base data. Using the housing unit data and historical enrollment data, MGT created a student generation factor for each projected grade level. By taking the 2010 enrollment by grade level and dividing it by the 2010 census housing levels, MGT calculated a *Student Generation Factor* ("SGF") for each grade level. This factor indicates the number of students within each grade level that can be expected to be generated by each new housing unit.

BASE MODEL WEIGHTING

Once each of these four base models has been calculated, MGT generates a weighted average of the models. A weighted average allows the analysis to reflect all the trends observed in the historical data and the over-arching themes from the qualitative information gathered in this process. The weighted average also works to maximize the strengths of each of the "base" models.

Two models, the Average Percentage Annual Increase Model and the Linear Regression Model, emphasize historical data. These models are quite effective predictors if there is no expectation of unusual community growth or decline and student population rates have minimal fluctuation.

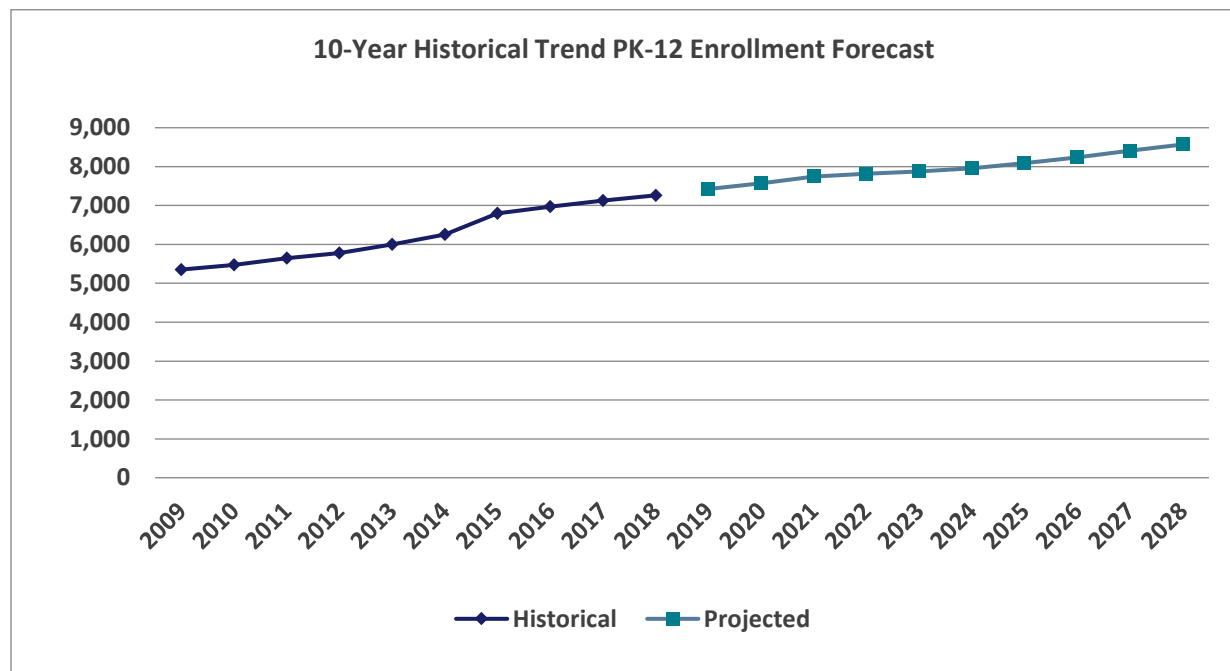
The Cohort Survival Model also uses historical enrollment numbers but considers student-mobility patterns and the effects of the natality rates in prior years. The Cohort Survival Model is perhaps the best-known predictive tool using this type of data. However, like the Annual Percentage Annual Increase Model and the Linear Regression Model, the Cohort Survival Model loses its predictive

capabilities in communities that experience, or are expecting to experience, more rapid growth or rapid decline.

The Students-Per-Household Model allows the planner to consider projections for housing developments and general growth in the county. This model looks forward and is based on the input from local planners. The planning information is important and the district should continue to monitor this information.

MGT assigned different weights for each school’s enrollment projection. The assigned weights are based on the dynamics within the models and the historical trends affecting each school.

10-YEAR DISTRICT ENROLLMENT FORECAST



Source: Lindbergh Schools, 2018; MGT, 2018.

Under a 10-Year Historical Trend Enrollment Forecast model, PK-12 enrollment will continue to increase over the next ten years. The model forecasts an enrollment increase of 18% over the ten-year forecast period, resulting in a 2028-29 enrollment of 8,569.⁶

⁶ The historical enrollment and the enrollment forecast do not include students in the Voluntary Inter-District Choice Corporation (VICC) program. The VICC program implemented desegregation in Missouri. Lindbergh Schools phased out its VICC program beginning in 2006. Students could choose to remain in the program through graduation from high school, but no new students could enter the program after 2006. In 2016, the remaining students from the VICC program graduated from high school. MGT’s analysis excluded VICC students so that the

10-YEAR ENROLLMENT FORECAST BY SCHOOL

Enrollment at each Lindbergh School is expected to increase over the next ten years.

School Name	2017	2018	5 yr Trend	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Concord ES	630	603		618	598	602	597	613	636	656	683	706	728
Crestwood ES	432	438		439	429	440	444	451	459	470	471	472	477
Dressel ES	623	644		639	636	636	643	657	678	707	747	789	831
Kennerly ES	440	436		461	480	516	514	506	488	483	476	479	483
Long ES	492	489		473	441	423	421	427	437	450	466	481	498
Sappington ES	474	474		491	574	626	652	603	539	548	559	574	594
Sperreng MS	901	904		941	966	1,068	1,085	1,089	1,116	1,078	1,062	1,050	1,057
Truman MS	699	733		737	737	706	717	735	756	779	804	825	850
Lindbergh HS*	2,109	2,204		2,273	2,350	2,388	2,382	2,427	2,473	2,533	2,583	2,638	2,641
Early Childhood	325	338		352	358	342	360	367	374	382	391	400	409
District PK-12	7,123	7,262		7,424	7,568	7,747	7,815	7,874	7,956	8,088	8,241	8,414	8,569

*Includes Alternative HS Students

Source: Lindbergh Schools, 2018; MGT, 2018.

historical enrollment analysis and projected enrollment reflected trends from students who live in the Lindbergh School district.