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Kentucky's K-12 Public School Spending and Its Relationship to Enrollment Percentages of Students with Limited English Proficiency and Students Eligible for the Free and Reduced-Price Lunch Program

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Capstone

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Abstract

Public school funding formulas vary broadly between states in both the levels of funding and the mechanisms through which funding is distributed. Most states provide targeted funding for student populations that need supplemental resources, including low-income and limited English proficiency student populations, as does the Federal Elementary and Secondary Education Act (ESEA). In the past, a lack of school level enrollment and financial data made it difficult to determine whether funding provided to local education agencies has been equitably distributed to the schools with whom they are affiliated. The 2015 Federal Every Student Succeeds Act requires that school-level enrollment and financial information be publicly available, providing an opportunity to assess the relationship between student enrollment and local, state, and Federal spending.

Introduction

Across the United States, every state provides funding to public schools with the intention of ensuring comparable educational opportunities between districts and schools with diverse student populations or with different district characteristics. States typically utilize specific funding formulas that consider a variety of criteria, most of them outside a school district's control, and allocate funds (or provide access to funds) to adjust for those characteristics (Kolbe, Atchison, Kearns, & Levin, 2020).
These include criteria such as student needs, grade ranges, district size or location, state geography, and cost of inputs (Ibid.). States allocate funding using a variety of mechanisms such as per-student base funding, weighted student characteristics, resource-based allocation, and categorical grant programs (Ibid.). Although they vary widely by state, most school funding formulas provide increased funding for student populations that need supplemental levels of support such as economically disadvantaged or other at-risk students, students with limited English proficiency, and student with disabilities.

Within Kentucky, the Support Education Excellence in Kentucky (SEEK) state funding formula, enacted in 1990, establishes a per-student guaranteed base funding level and includes add-on weighted funding for specific student populations (KDE, 2021). While guaranteed base funding is provided to every public K-12 school using an attendance-based calculation, the SEEK formula also includes targeted add-on funding intended to level the playing field between public school districts with varying levels of property wealth and unique student populations, giving districts supplemental resources for students with unique needs (Weston, 2021). Federal funding is also available for specific student populations, including students from low-income families and for students who are English language learners.

As might be expected, enrollment of targeted student populations varies between districts and schools. For example, consider an urban district with two elementary schools that are approximately the same size and would receive about the same level of SEEK guaranteed base funding. One school may have a larger number of low-income students whereas the other might have a larger number of students who have limited English proficiency. These two schools need different resources to best support their specific student populations. Until recently, a lack of publicly available school-level enrollment and financial data made it difficult to determine if districts are allocating SEEK add-on and Federal funding equitably.

Using school-level data that is now publicly available due to the Federal 2015 Every Student Succeeds Act (ESSA), this capstone research project examines relationships between combined local, state, and Federal spending levels and the enrolled student populations. Beginning with a background of K-12 public school funding sources within Kentucky, it then summarizes recent public school funding literature, including specific issues identified by researchers. Having established a baseline, the research design is outlined and a research question and null hypothesis are formulated. These are followed by a description of the data sources used to address the research question, the results of an examination of

the data, and conclusions about those results, as well as a consideration of research or data limitations and any remaining questions that could be addressed by future research.

Background

Kentucky public K-12 school district budgets include funding from three primary sources: local revenue, state formula funds, and Federal funding. Public school districts that wish to participate in the SEEK funding program must meet minimum local revenue requirements outlined in the SEEK formula. Specifically, the areas in which school districts are located must demonstrate that they are providing revenue equal to 30¢ per $100 of taxable property (KDE, 2021; The Prichard Committee, 2021). If districts raise more than this required share, the SEEK formula matches a portion of the additional funding. Local revenue is frequently raised through ad valorem taxes levied on real and personal property such as homes, land, or motor vehicles (Cornell Law School, 2020) although the Kentucky Department of Education (KDE) clarifies that local revenue can be raised through a combination of ad valorem or other taxes, such as occupational or excise taxes (KDE, 2021). Of the counties for which specific sources were reviewed, all included ad valorem and utilities taxes and several also included occupational taxes although no discernable pattern could be identified. Local revenue is tracked within the district and reported to KDE as part of the district's annual budget.

Kentucky's General Assembly establishes the SEEK guaranteed base per student as part of the biennial budget process (KDE, 2021). In academic year (AY) 2015-2016, the guaranteed base provided by the state was $3981 per student; it has increased slightly to $4000 for AY 2021 and 2022 (The Prichard Committee, 2015; The Prichard Committee, 2021). SEEK funds are allocated based on average daily attendance with an allowance for year-over-year growth; districts that experience reductions do not lose funding (Cummins, et al., 2021; KDE, 2021). The SEEK funding formula includes weighted add-on funding to provide supplementary resources for specific student populations such as economically

disadvantaged or at-risk students, students with disabilities, and students with limited English proficiency; these targeted add-on funds are based on enrollment or "membership" (KDE, 2021; Cummins, et al., 2021). As mentioned previously, tiered funding is available to districts that exceed their required local share, providing a partial match for a portion of the additional funds (KDE, 2021). The SEEK formula includes funding for transportation costs and addresses capital construction funding (KDE, 2021). A Hold Harmless Funding clause ensures that no district will receive less funding that it did in 1992, soon after the SEEK funding formula was established. SEEK funding is distributed through KDE to school districts (KDE, 2021). KDE requires annual independent audits of school financial data; district superintendents are responsible for reviewing and reporting enrollment data ((KDE, 2022; KDE, 2022).

Federal educational funding is provided largely through the Elementary and Secondary Education Act of 1965 (ESEA) and subsequent appropriations. As with SEEK add-ons, most Federal funding targets specific student populations. These targeted funds, like ESEA Title I, Part A, may only be used for allowable activities in the schools with the specified student populations (KDE, 2021). Although Title I, Part A has the highest level of funding, there are additional designated funds, including Title III (English Learners) and IDEA (Special Education). Some portions of ESEA support broad educational objectives such as professional development and other instructional training (Title II) as well as academic enrichment and 21st Century Community Learning Centers (Title IV) (ESEA Network, 2021). For Federal fiscal year 2021, ESEA appropriations exceeded $35.6 billion and were allocated to states and other entities across the United States (Ibid.).

Within Kentucky, the SEEK guaranteed base, weighted add-on, and Federal funding are provided to KDE, as the state educational agency (SEA) to be distributed to local educational agencies (LEAs), generally the individual school districts, to ensure enhanced support for specific student populations. However, these populations are not evenly distributed across a district's schools so it is not possible to simply disperse the funding evenly within a district. Instead, funds must be allocated based on the

schools in which those populations are enrolled. School-level enrollment and financial data are key to an assessment of whether districts are distributing funds appropriately. ESSA added the requirement that states provide publicly available report cards that better inform parents and other stakeholders (U.S. Department of Education, 2017), and that district-level and school-level per-students expenditures must be included in these report cards (Ibid.). The KDE School Report Card (SRC) system is designed to meet this ESSA requirement. For example, in Figure 1, Lee County Middle High School total Federal spending per student for AY 2017-2018 is $2338, compared to $1868 for Lee County School District and $873 statewide (KDE, 2022). As previously discussed, Federal funding is provided for several different
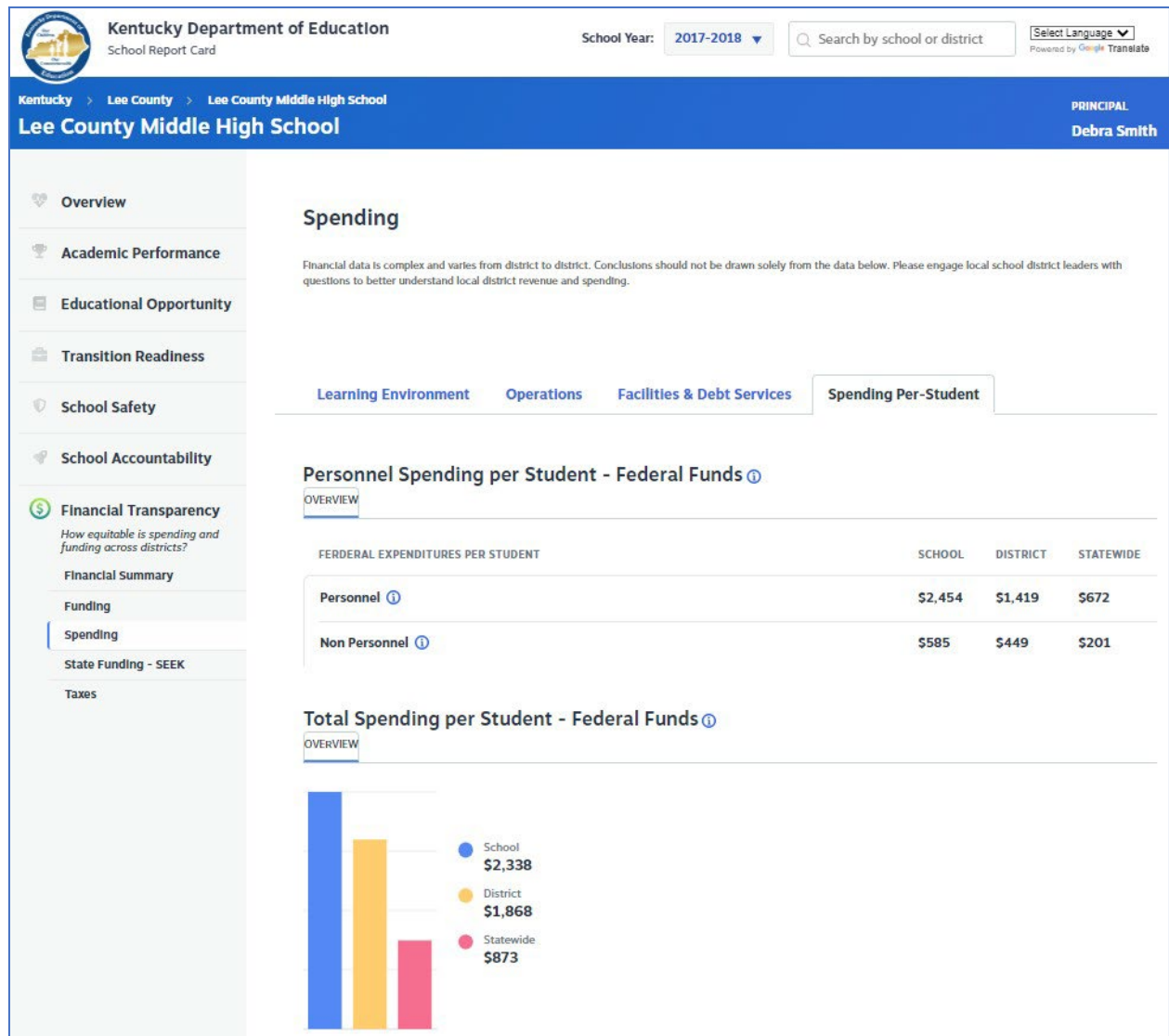

Figure 1 (continued next page)

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Personnel Spending per Student - State/Local Funds ⓘ

OVERVIEW

STATE/LOCAL EXPENDITURES PER PUPIL	SCHOOL	DISTRICT	STATEWIDE
Personnel ⓘ	$9,068	$7,328	$9,283
Non-Personnel ⓘ	$1,713	$1,718	$1,677

Total Spending per Student - State/Local Funds ⓘ

OVERVIEW

School
$11,108

District
$9,046

Statewide
$10,961

Total Spending per Student - All Fund Sources ⓘ

OVERVIEW

School
$12,157

District
$11,732

Statewide
$13,887

objectives such as targeted support for students from low-income families, for Englisher learners, and for other broad goals (U.S Department of Education, 2018). However, the KDE SRC dashboard presents the Federal funding as a single amount per enrolled student in the district rather than being presented as a comparison based on specific student populations or goals for which the funding is provided.

State and Federal funding levels vary widely based on a school district's enrollment level and the characteristics of its student population. Whereas the SEEK guaranteed base is provided for every student, the goal of the SEEK add-ons and most Federal funds is to ensure educational equity, that is, to

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provide supplemental resources for students with unique needs. At both the state and Federal levels, the expectation is that providing these resources to school districts ensures every student is capable of meeting state academic standards (ESEA Network 2021; Weston, 2021).

Literature Review

Public school funding formulas have been the subject of a significant amount of research over the past few decades. More recently, researchers have focused on public school funding at the interstate, intrastate, inter-district, and intra-district levels with an eye toward equity and adequacy for all students. They also consider aspects of educational resources such as student-to-teacher ratios, teacher experience, and quality of facilities, which, combined with the per-student funding set by the state and district, contribute to the quality of education students receive.

School funding formulas are difficult to examine at the interstate level because the cost of inputs, both payroll and materials, fluctuate across states and regions, making it challenging to determine whether variations are due to input fluctuations or to the school funding formula (Burke, 1999). At the intrastate level, changes in funding levels are more easily identified because state-level funding formulas are assumed to be constant across districts and schools, based on enrollment and specific qualifying criteria. Within Kentucky, the guaranteed base funding per student is consistent regardless of where that student resides (KDE, 2021). However, Burke's intrastate research identified variations within states in the absence of district boundaries (Burke, 1999). Although some research considers inter-district spending (Burke, 1999; Shores & Ejdemyr, 2017), most researchers focus on intra-district funding, that is, amounts allocated by school districts to the schools within the district. As data within districts have become more accessible, intra-district spending patterns have been examined more specifically (Burke, 1999; Shores & Ejdemyr, 2017). Researchers have concluded that inequities exist in these allocation patterns (Burke, 1999; Darden & Cavendish, 2011), potentially leading to discrimination against some

student populations (Burke, 1999; Darden & Cavendish, 2011; Knight, 2017). Darden and Cavendish examine allocation of "soft resources" such as teacher experience levels, equality over equity, distribution of general education funds, and parental involvement, adding that misappropriations within these practices are often done inadvertently, or from a lack of awareness (Darden & Cavendish, 2011). Regardless of the intent, these intra-district disparities impact students' quality of education and can have a life-long impact (Knight, 2017).

Discussion of school funding equity is generally divided into two areas: horizontal equity and vertical equity, both of which consider the specific needs of individual students. Horizontal equity is applied to students with similar socioeconomic status (SES) and race or ethnicity, or other characteristics within the family or background, regardless of where those students live within Kentucky. For example, one might consider two White students, one perhaps living in a Louisville suburb and the other in Monticello, both from families that have lived in Kentucky for many years, are of similar SES levels, and neither student having unique educational needs. Vertical equity, however, applies to students with different needs, SES, race, ethnicity, or other characteristics (Houck, 2010; Warner-King & Smith-Casem, 2005). In this case, one student might be White, from a low-income family, and live in Perry County and the other student might live in Lexington and have limited English proficiency. Even assuming neither student has specific needs that might require an individualized education plan, these two students have unique needs for which targeted Kentucky SEEK and Federal funding would be provided to the school district. Federal and state funds should be allocated to the students' schools based on individual needs but as discussed previously, vertical inequities have been identified by researchers (Burke, 1999; Knight, 2017). Although well worth considering, the concept of adequacy likely requires comparison not just of staffing and class sizes but also specific school facilities and supplies (Knight, 2017). Without clear guidelines for assessing these characteristics, comparisons are challenging and often subjective so

adequacy will not be discussed here. Taken as a whole, horizontal and vertical equity are key to a clear understanding of how funding is being utilized within districts and across states.

Some researchers also examined indirect aspects of schools and school funding, including equality versus equity, student-to-teacher ratios, teacher experience levels, and utilization of general education funds. Darden and Cavendish specifically consider the issue of equality versus equity, in which districts allocate resources on a per-school basis rather than incorporating enrollment data that informs them about the needs of students at specific schools. Regardless of whether it is administrative staff, computers, or other materials, utilizing equality instead of equity tends to result in students in schools with lower total enrollments having access to proportionally more resources (Darden & Cavendish, 2011). Distributing resources equitably ensures that each student has similar access to educational resources regardless of what school they attend. Multiple researchers concluded that schools with high percentages of low-income or minority students often have less qualified teachers (Darden & Cavendish, 2011; Houck, 2010). However, some states have teacher collective bargaining agreements and assignments are often tied to seniority (Darden & Cavendish, 2011) so changes are problematic. Knight adds that because teacher layoffs are often based on seniority, disadvantaged schools are likely to be impacted more significantly during recessions; the resulting "teacher churn" that follows layoffs adds an additional challenge for schools (Knight, 2017). Researchers also discussed the impact of reducing class sizes; as student-to-teacher ratios are decreased, "intuitive reasoning suggests that…factors such as low student/teacher ratios should have a positive influence on student achievement" (Burke, 1999). Finally, Darden and Cavendish discuss allocation of general education funds, stating that schools with larger percentages of low-income or other disadvantaged students often receive lower levels of general education funding. Despite the higher levels of categorical funding received by these schools, this shortfall and the resulting decrease in flexibility has a negative impact on students (Darden & Cavendish,

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2011). Regardless of the resource being considered, most researchers agree that increased (or decreased) access to resources impacts students' educational outcomes.

The weighted portions of the SEEK funding formula as well as the Federal ESEA funding are intended to increase equitable educational opportunities for students with dissimilar needs. Schools with student populations that are at-risk, have limited English proficiency, or who have other characteristics that qualify them for targeted funding need these supplemental funds to provide the additional resources necessary for their unique student populations. However, once funds are distributed to districts, it has been difficult to determine if the funding has been allocated as intended. District administrators who are aware of the needs of students, teaching, and other staff, as well as the facilities and other educational needs, should be better able to manage equitable allocations within their districts.

Research Design

Horizontal and vertical equity are key components of ensuring comparable educational opportunities among public school students. Within Kentucky, state SEEK formula and Federal funds are distributed to the SEA and then to LEAs, to be distributed to the schools within that district. To ascertain whether funds are being allocated equitably, enrollment percentages of the targeted student populations must be determined and then compared to financial data, to determine if schools with larger percentages of specific student populations are spending at a proportionally higher level. Although ESSA required that school level data be available as of 2019-2020, the KDE SRC system provides school-level enrollment and financial data as of AY 2017–2018, including total enrollment, enrollment by race/ ethnicity, of limited English proficiency, students eligible to receive free or reduced-price lunch (FRPL, a measure of family income), as well as state, local, and Federal spending. Comparing

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actual school spending levels to the enrollments of specific populations should establish relationships from which an understanding of horizontal and vertical equity can be derived.

In November 2021, the Kentucky Office of Educational Assessment (OEA) released a summary report that included a discussion of the impact of a SEEK formula add-on for rural and micropolitan districts, signaling that it could be considering funding revisions. Kentucky has a highly diverse population density among its 120 counties, so, in addition to considering the student characteristics outlined above, this capstone research includes a comparison of school-level funding based on the National Center for Educational Statistics (NCES) urban-centric category (i.e., city, suburb, town, or rural) of the school's location, to identify potential location-related variances between school funding levels and specific student populations. If identified, these variances would impact determinations about horizontal equity between students in different districts and schools across Kentucky. The research question, then, is: "Using AY 2017–2018 and 2018–2019 Kentucky Department of Education school-level student enrollment data and school-level local, state, and Federal financial data, what is the relationship between school spending levels and the characteristics of specific student populations, including students from low-income families and students with limited English proficiency?". The null hypothesis is that there is no relationship between school-level spending and enrollment of limited English proficiency or FRPL-eligible students.

Data Sources

All data used in this capstone research is publicly available and was downloaded either from the KDE or NCES websites. The variables used are each available at the school-level and include the unique state school identification code, academic year, county, district, and school names, per-student state and local spending, per-student Federal spending, total enrollment, and enrollment by race/ethnicity (specifically, White, Black, Hispanic, Asian, American Indian and Alaska Native (AIAN), Hawaiian, and

two-or-more race students). KDE data also include the number of students eligible for the FRPL program, the number of students who have limited English proficiency, as well as a two-digit alphanumeric code which designated the school classification type (i.e., alternative, district-operated special education, etc.), a measure of whether the school is eligible for SEEK funding. Data obtained from NCES includes the urban-centric locale categories and subcategories (city, suburb, town, or rural), which, for simplicity, have been truncated to include just the category. For the purposes of this capstone, the terms "city" and "urban" are interchangeable when not referring to the NCES categories.

As of early 2022, audited financial and enrollment data was available from KDE for AY 2017–2018 and 2018–2019 , allowing an examination of the relationship between school-level spending and student characteristics often considered "disadvantaged", including students of color, from low-income families (Darden & Cavendish, 2011), or who have limited English proficiency (Houck, 2010). Research will be constrained to these two years of data for two reasons: 1) previous years were not subject to ESSA school-level data requirements and may therefore have incomplete data and 2) the 2020 COVID-19 pandemic and the resulting Federal funds provided to states and allocated to school districts created a discontinuity with pre-pandemic data. Although KDE received a waiver for the ESSA-required data because of the school closures that began in March 2020 (KDE, 2020) and continued into the 2021-2022 school year, the shifts between in-person and virtual schooling impacted enrollment and attendance. For example, enrollment data for AY 2019-2020 is available although KDE specifically states that it has not been verified by district superintendents (Ibid.). The impact of the Federal funding is likely to last for several years, after which changes to the SEEK formula or Federal funding guidelines may preclude an accurate comparison to previous years. Three modifications were made to allow more consistent analysis of the data:

- 2017–2018 FRPL data was provided as total students eligible for free lunch and total students eligible for reduced-price lunch whereas 2018–2019 data was a count of the combined groups. To

allow comparison, the 2017–2018 free and reduced groups were added together, providing a count of the combined groups.

- Highest grade listed for a school varied by district so schools were broadly grouped as elementary (highest grades listed as K – 7), middle school (highest grades listed as 8 – 9), and high school (highest grades listed as 10 – 12).

- Schools are classified as A1 – A9 based on the type of services they provide. For example, an A1 school is managed by a principal or head teacher and is not operated as part of another school. There are several other classifications, such as A5 schools, which are a "district-operated facility with no definable attendance boundaries" (KDE, 2022). To ensure consistency, only A1 schools were used for comparison.

[CC3]

Results

To better understand the characteristics of the KDE and NCES enrollment data, this section begins with a general overview of Kentucky's K-12 public school student enrollment, including race and ethnicity, followed by an assessment of the combined local, state, and Federal spending for the

Figure 2

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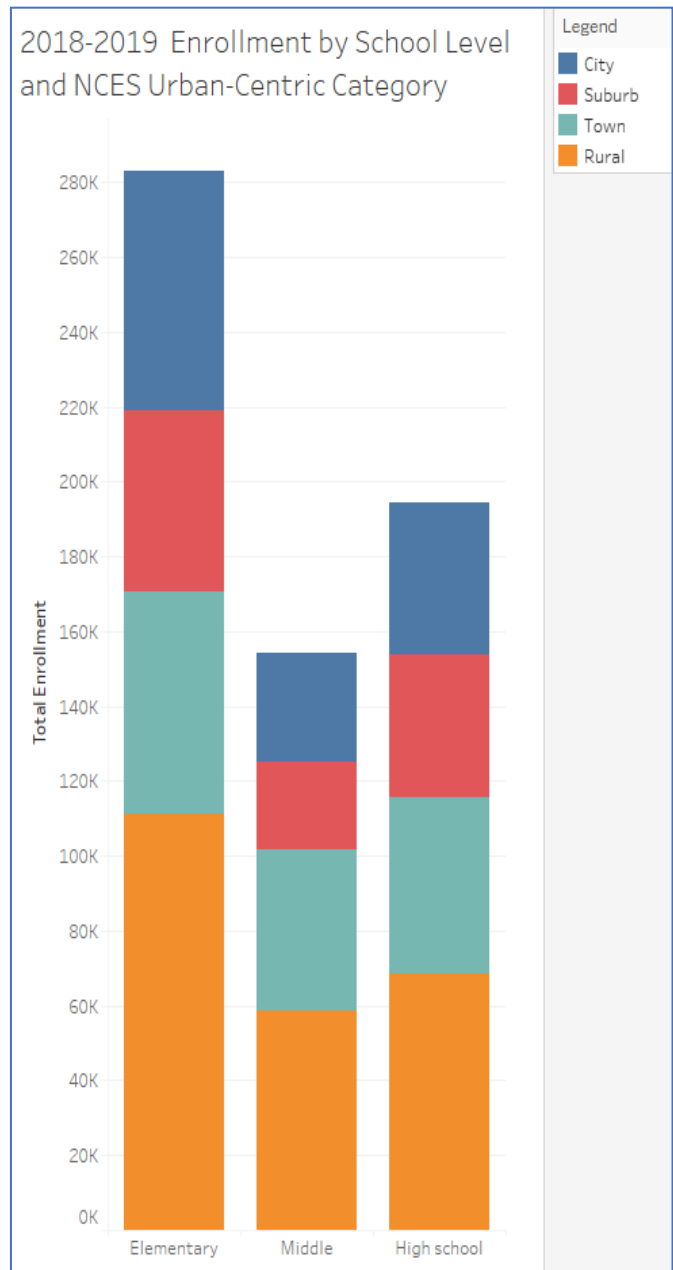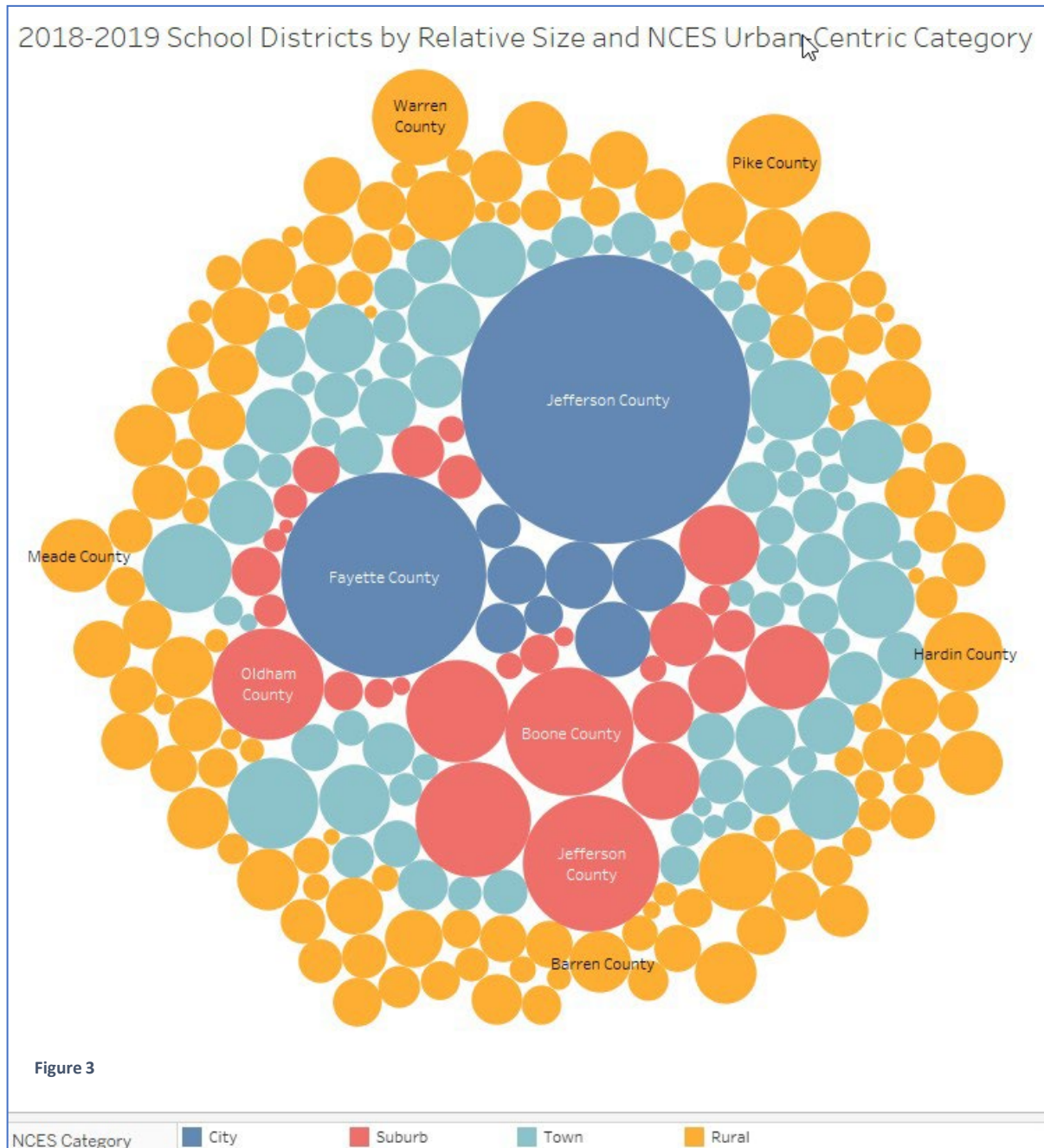
limited English proficiency and FRPL populations. Where possible, school districts mentioned by name

will be identified based on their preferred name, as drawn fro[CC4]m the district web site or other

documentation.

2018-2019 School Districts by Relative Size and NCES Urban-Centric Category

Figure 3

NCES Category   City   Suburb   Town   Rural

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Overview

In AY 2018–2019, Kentucky had 170 public school districts with a combined total of 1122 elementary, middle, and high schools. Figure 2 provides an overview of AY 2018-2019 enrollment by school level (i.e., elementary, middle, or high school) and NCES urban-centric category. Of the total enrollment, 38.5% of students live in urban areas (defined by the U.S. Census Bureau as having populations of at least 100,000) or suburbs near those cities, 23.6% of students live in towns, and 37.8% of students live in rural areas. Many school districts include more than one NCES category. For example, Hardin County Schoo[CC5]ls have a combined total of one city school, ten suburban schools, and ten rural schools. Elizabethtown Independent District is also located in Hardin County and has five city schools. Two districts, Jefferson and Fayette County Schools, serve 20.5% of Kentucky's total K-12 student population (Figure 3).

The highest levels of racial/ethnic diversity are in city school districts (Figure 4), followed by those in suburbs, towns, and rural [CC6]areas. For example,
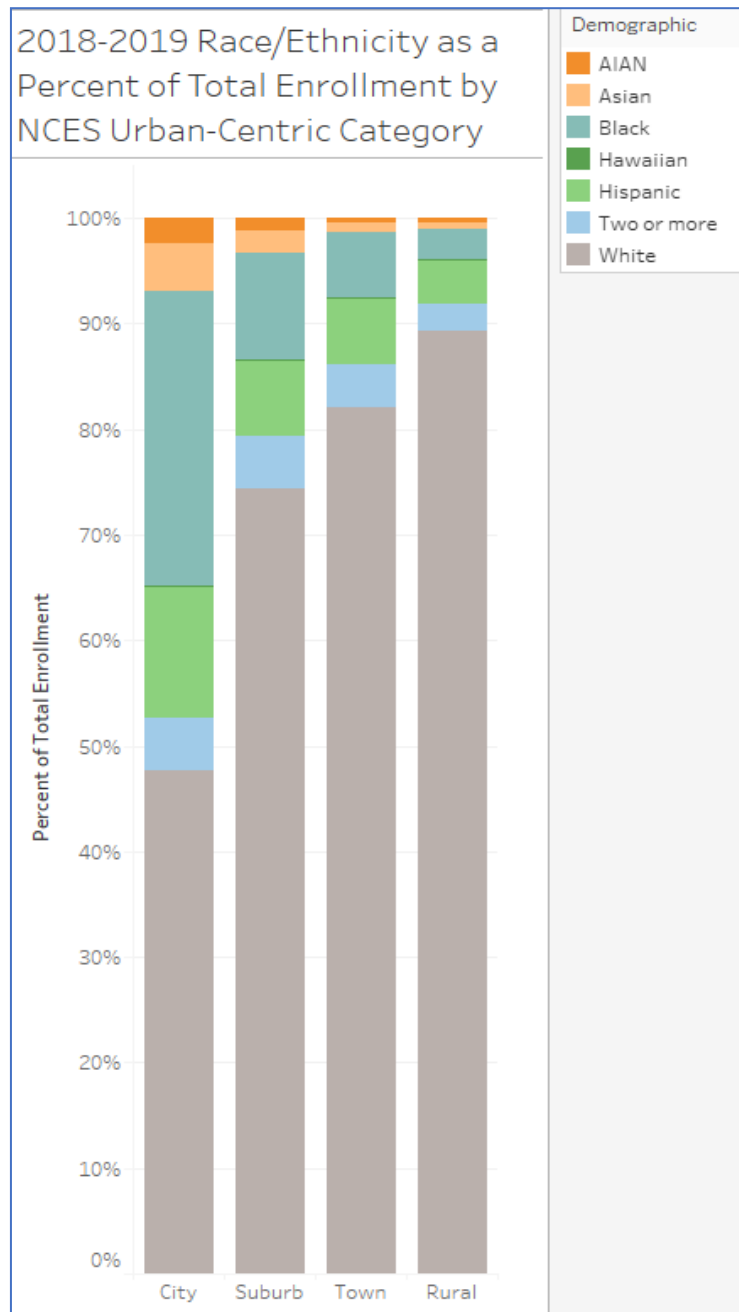

Figure 4

in city schools, 27.8% of students are Black and 12.5% are Hispanic whereas in rural schools, those students make up 2.8% and 4.1% of the enrollment respectively. In city schools, White students comprise 47.6% of the student population but in rural schools they make up 89.3% of the students. In suburb and town schools, White students represent 74.3% of the students and 82.0% of the students respectively. However, even within the more ethnically and racially diverse city schools, just 15% of the AY 2018–2019

Percentage of EL Students by School Level and NCES Category (AY 2018-2019)

	Elementary	Middle	High school
City	15.0%	6.8%	7.8%
Suburb	6.2%	2.4%	2.4%
Town	4.0%	1.6%	1.2%
Rural	2.7%	0.8%	0.6%
Average	7.0%	2.9%	3.0%

City   Suburb   Town   Rural   Average

Percentage of FRPL-Eligible Students by School Level and NCES Category (AY 2018-2019)

	Elementary	Middle	High school
City	70.2%	61.1%	58.5%
Suburb	56.5%	50.1%	48.6%
Town	66.6%	64.6%	58.2%
Rural	66.9%	67.0%	62.0%
Average	65.0%	60.7%	56.8%

Figure 5   City   Suburb   Town   Rural   Average

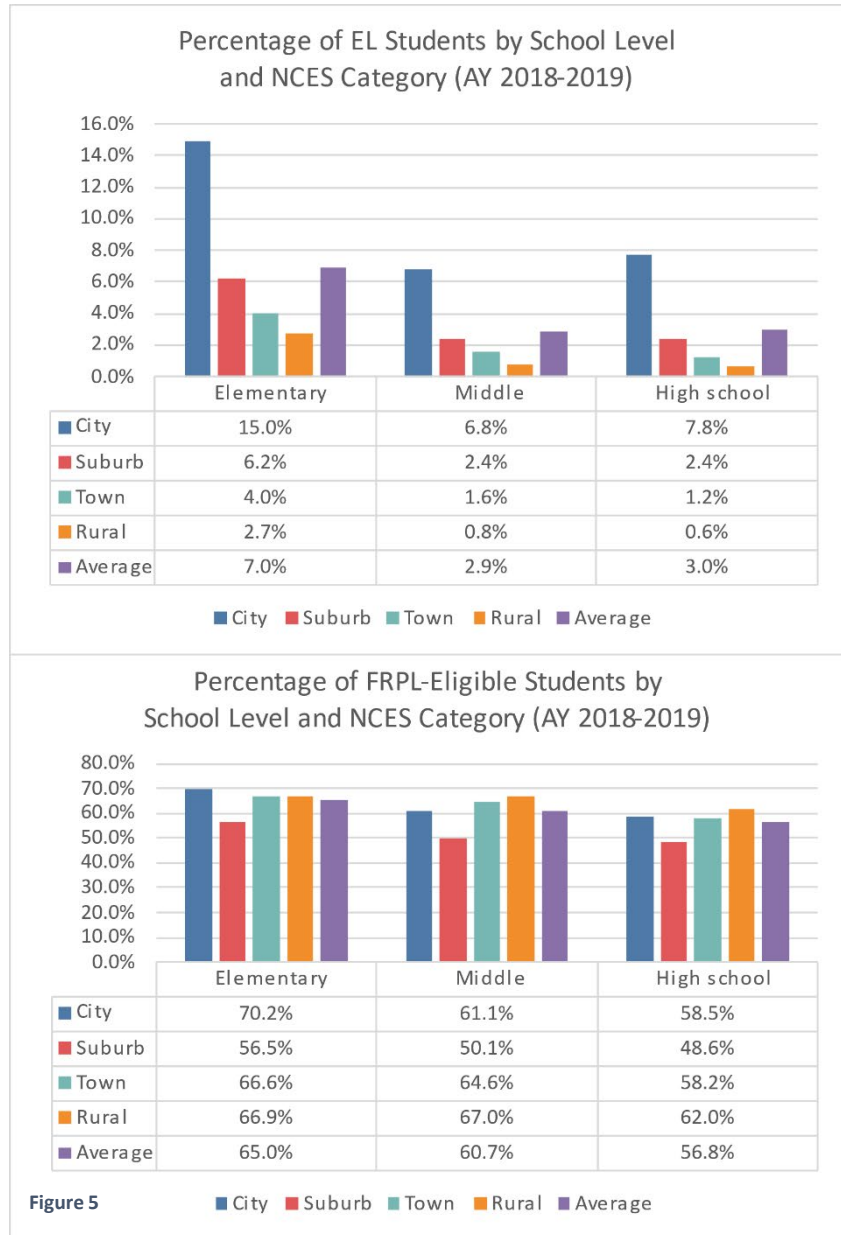student population in were classified as having limited English proficiency (often known as English learners (EL)) (Figure 5).

More than 62% of Kentucky public school students were eligible for the Federal free and reduced-price lunch program In AY 2018–2019 (Figure 5). An average of 65% of all elementary students were FRPL-eligible; at the middle and high school levels, that decreased to 60.7% and 56.8% respectively. At

the school level, FRPL-eligible student enrollment was lower in suburb schools; town and rural schools had similar levels, particularly at the middle and high school levels.

Average, Median, Minimum and Maximum Spending

Per-student local, state, and Federal spending varied by school level (Figure 6). At elementary schools, the average per-student spending was $14,465 and median spending was $13,814. The minimum per-student spending was $6975, in Webster County's Sebree Elementary school, which is a rural school. The maximum per-student spending was $30,197, in Hardin County's New Highland Elementary School, in the suburb category. At the middle school level, the average per-student spending was $13,502 and the median per-student spending level was $13,001. The minimum spending was $5,938 at Bracken County Middle School, which is rural; the highest per-student spending was $28,515, at Allen County's James E Bazzell Middle School, also a rural school. For high schools, the average per-student spending level was $14,471 and the median spending was $13,482. The minimum per-student spending was $7,388, at Oldham County High School, which is a
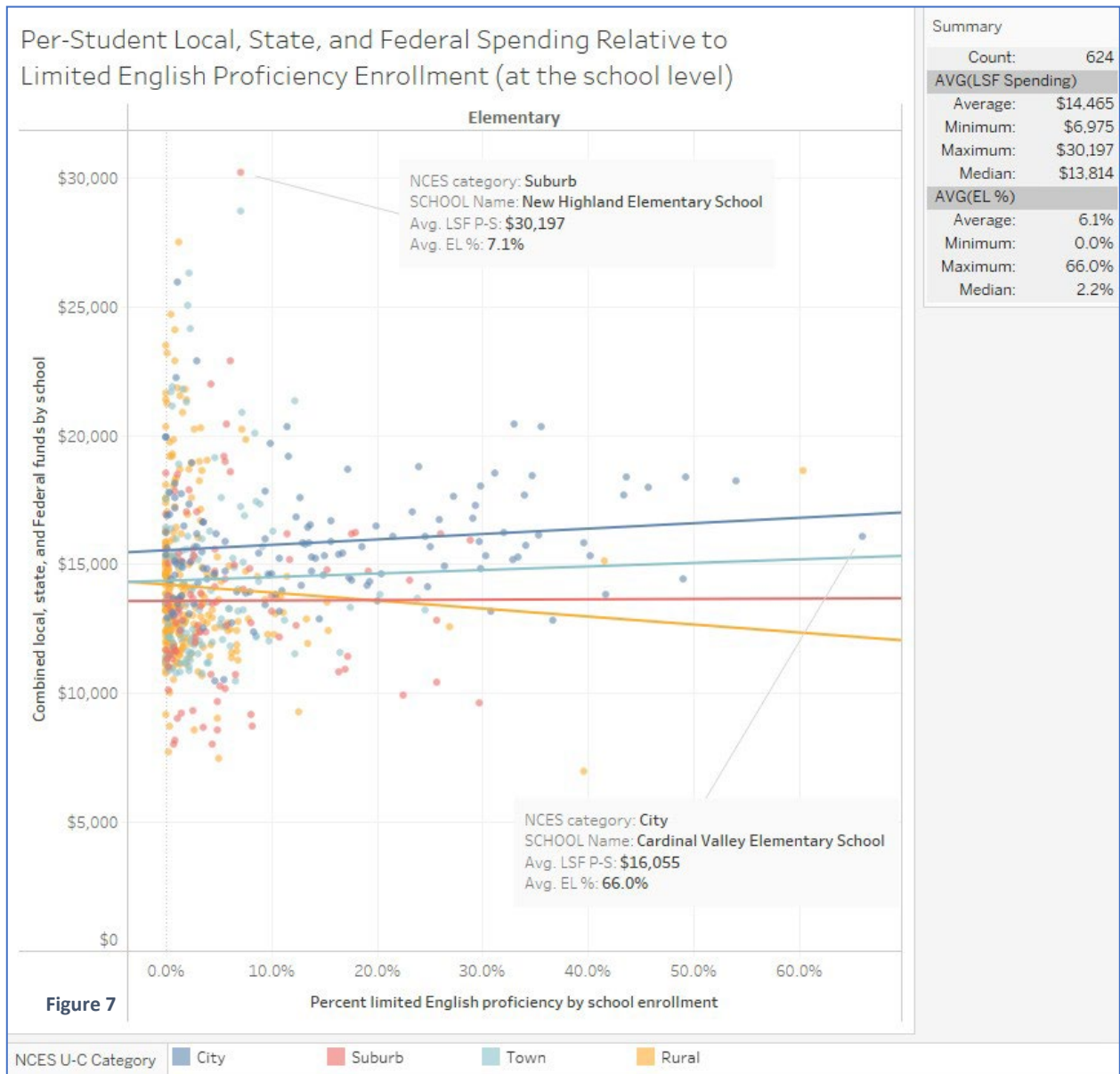
School-Level Spending (AY 2017 - 2019, per student)							
	Average		**Median**		**Minimum**		**Maximum**
Elementary	$	14,465	$	13,814	$	6,975	$	30,197
Middle	$	13,502	$	13,001	$	5,938	$	28,515
High	$	14,471	$	13,482	$	7,388	$	46,155
Average	$	14,146	$	13,432	$	6,767	$	34,956

Figure 6

suburb school. The maximum per-student spending was $46,155 at Calloway County's Murray High School

Spending Trends—EL Enrollment

At the elementary school level, local, state, and Federal spending relative to the average enrollment of EL students (Figure 7), had a positive trend in city schools, that is, spending levels increased as the percent of EL students increased in the school, although the p-value was .1331 and

Per-Student Local, State, and Federal Spending Relative to Limited English Proficiency Enrollment (at the school level)

Elementary

NCES category: Suburb
SCHOOL Name: New Highland Elementary School
Avg. LSF P-S: $30,197
Avg. EL %: 7.1%

NCES category: City
SCHOOL Name: Cardinal Valley Elementary School
Avg. LSF P-S: $16,055
Avg. EL %: 66.0%

Combined local, state, and Federal funds by school

Figure 7 Percent limited English proficiency by school enrollment

NCES U-C Category: City | Suburb | Town | Rural

Summary
Count: 624
AVG(LSF Spending)
Average: $14,465
Minimum: $6,975
Maximum: $30,197
Median: $13,814
AVG(EL %)
Average: 6.1%
Minimum: 0.0%
Maximum: 66.0%
Median: 2.2%

therefore not statistically significant. The trendlines are positive for suburb and town category schools but negative for rural schools. For suburb, town, and rural schools, p-values are .9763, .8417, and .3392 respectively, indicating that there is no discernable relationship between per-student spending and enrollment of EL students for these schools. Cardinal Valley Elementary School, in Fayette County, had an average EL enrollment of 66%, the highest at the elementary school level. Of note, 100 schools had null values for EL students in AY 2017–2018 and 100 elementary schools reported 0% enrollment in AY

2018–2019. Of those, seven schools were in the city category, five in the suburb category, eleven in the town category, and the balance were rural schools.

At the middle school level, city, suburb, and town schools all had positive trendlines (Figure 8), with p-values of .0414, .6496, and .6534 respectively, indicating a relationship between EL enrollment and school level spending for city schools. The slope of the trendline for rural schools was negative, that is, per-student spending decreased as EL enrollment increased, though the p-value of .1563 indicates that this result is not statistically significant. The highest EL enrollment was 21.4%, in Jefferson County's

Figure 8

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Frederick Law Olmsted Academy North, which is a city school. As with elementary schools, 70 middle schools had null values in AY 2017–2018. There were no null values in AY 2018–2019 but 67 middle schools reported 0% EL enrollment.

At the high school level (Figure 9), trendlines for city, suburb, and town schools are each positive; rural per-student spending has a negative slope. The p-values for the city, suburb, town, and rural category schools are .5420, .0037, .8182, and .1542 respectively. In high schools, then, there was a discernable relationship between per-student spending and EL enrollment in the suburb schools.


Figure 9

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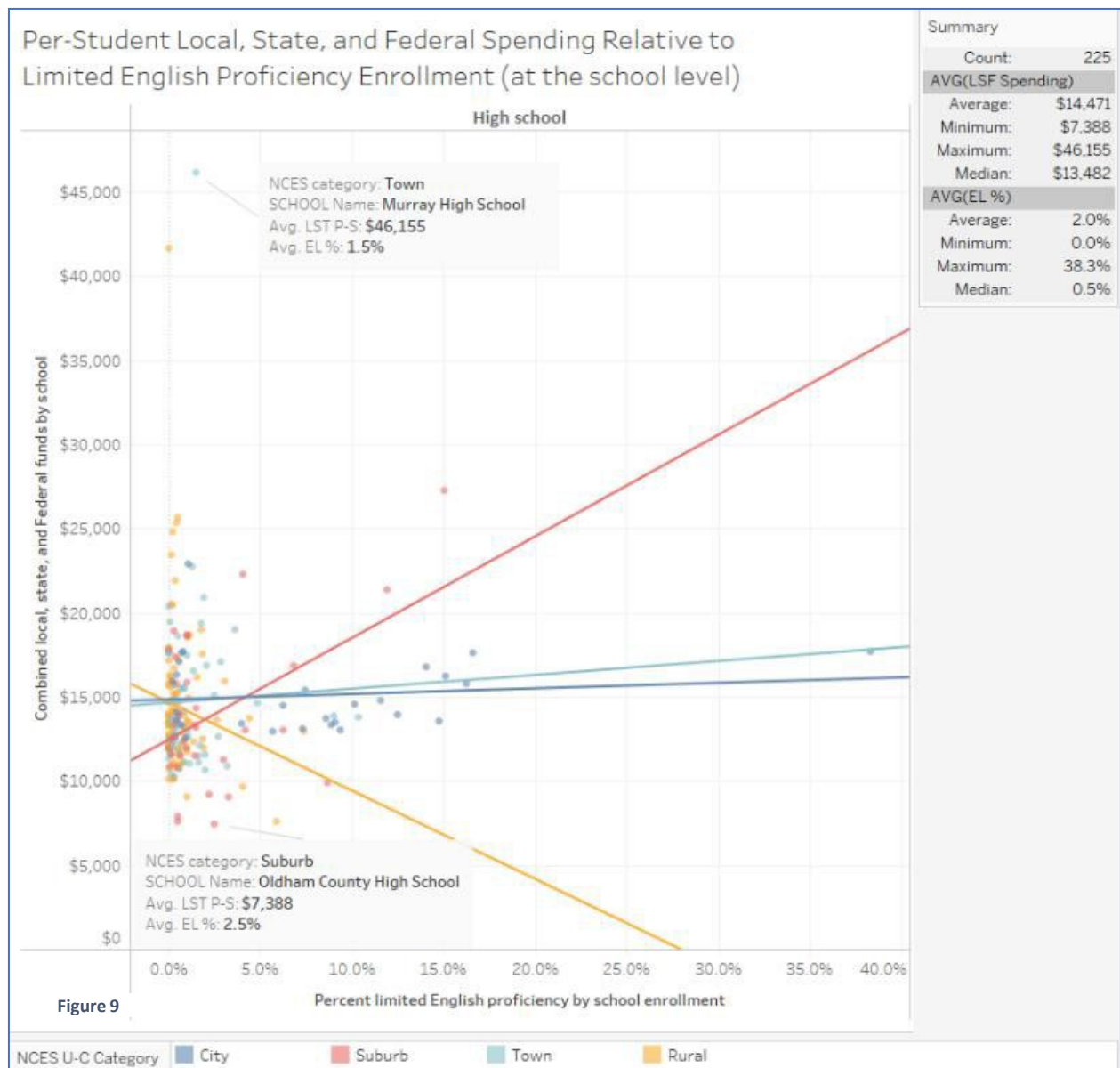
Iroquois High School, a Jefferson County city school, had the highest average EL enrollment, at 38.3%. As with middle schools, there were 45 high schools with null values for EL enrollment in AY 2017–2018. There were no null values in AY 2018–2019 but 53 schools reported 0% enrollment for EL students.

### *Spending Trends—FRPL Enrollment*

When examining school-level spending relative to FRPL-eligible enrollment in elementary schools, there were positive trendlines in each NCES category (Figure 10). The p-value for the city and suburb

Figure 10
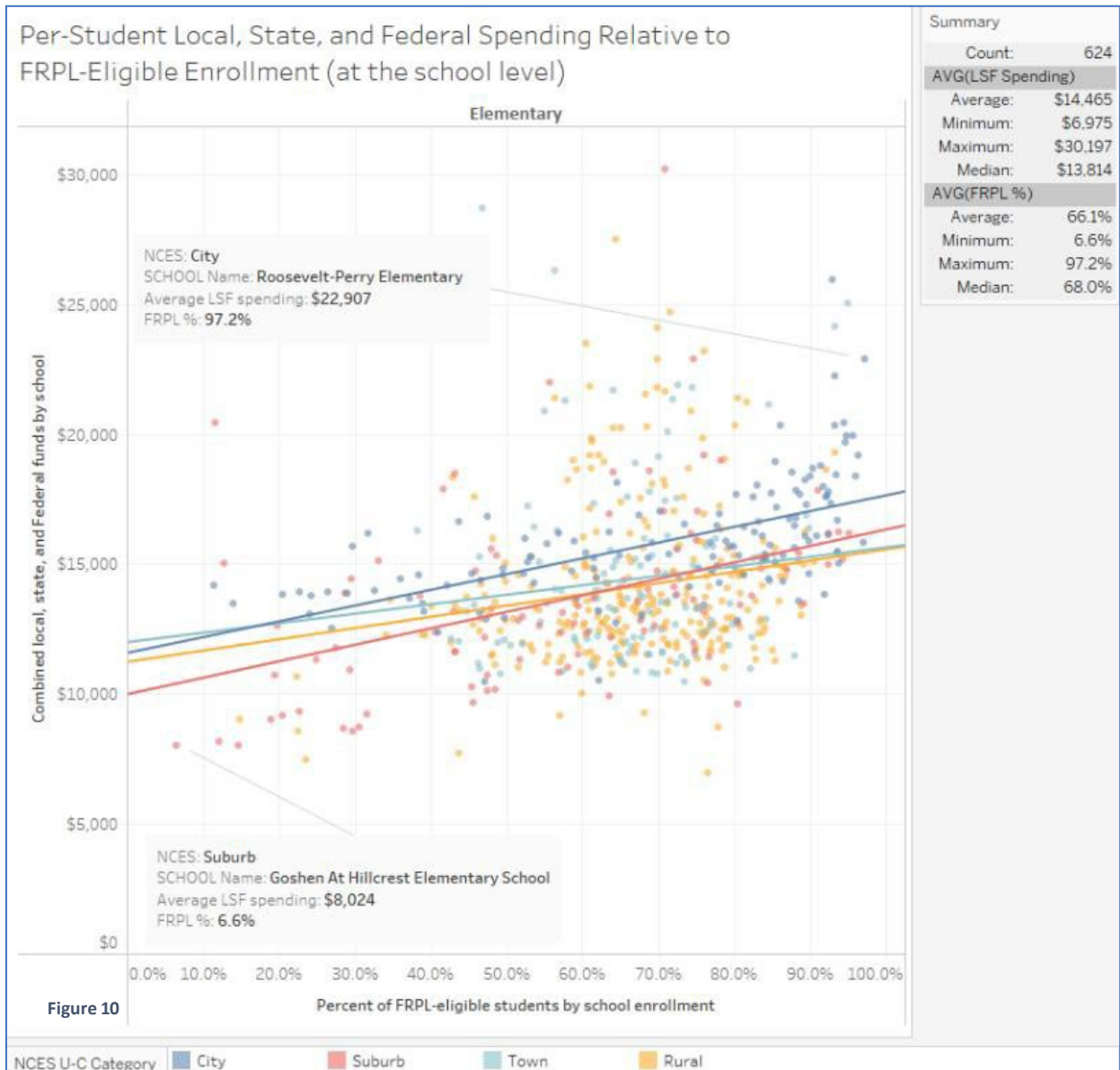
category schools was <.0001; town schools had a p-value of .1887 and the p-value for rural schools was .0027. The values for city and suburb schools indicate a very strong relationship between local, state, and Federal funding and FRPL-eligible enrollment. The relationship in rural schools was also quite strong, whereas there was no discernable relationship between school-level spending and EL enrollment in town schools. Roosevelt-Perry Elementary, a city school in Jefferson County, had the highest average percentage of FRPL-eligible students at 97.2% and Goshen at Hillcrest Elementary School, a suburb school in Oldham County, had the lowest percentage, at 6.6% of student enrollment.

Figure 11

Tarne
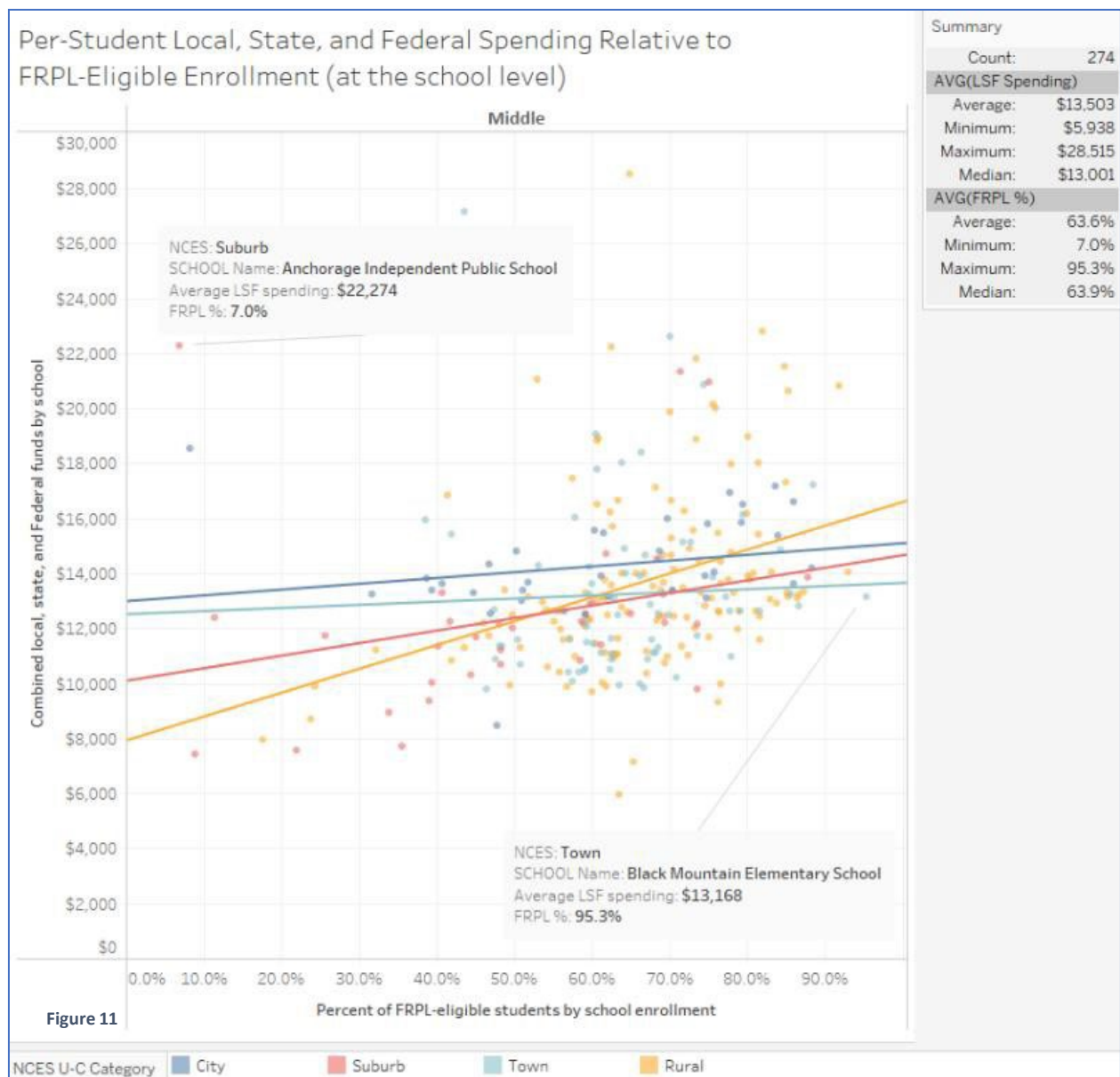
As with elementary schools, middle school trendlines for the relationship between per-student spending and FRPL-eligible enrollment are all positive (Figure 11). The p-values for city, suburb, and town schools were .2188, .1339, and .7332 respectively, indicating that there were no discernable relationships. For rural schools, the p-value was <.0001, which is a very strong relationship. Harlan County's town-category Black Mountain Elementary School (categorized as a middle school because it included students through 8th grade) had the highest average FRPL-eligible enrollment in the state at
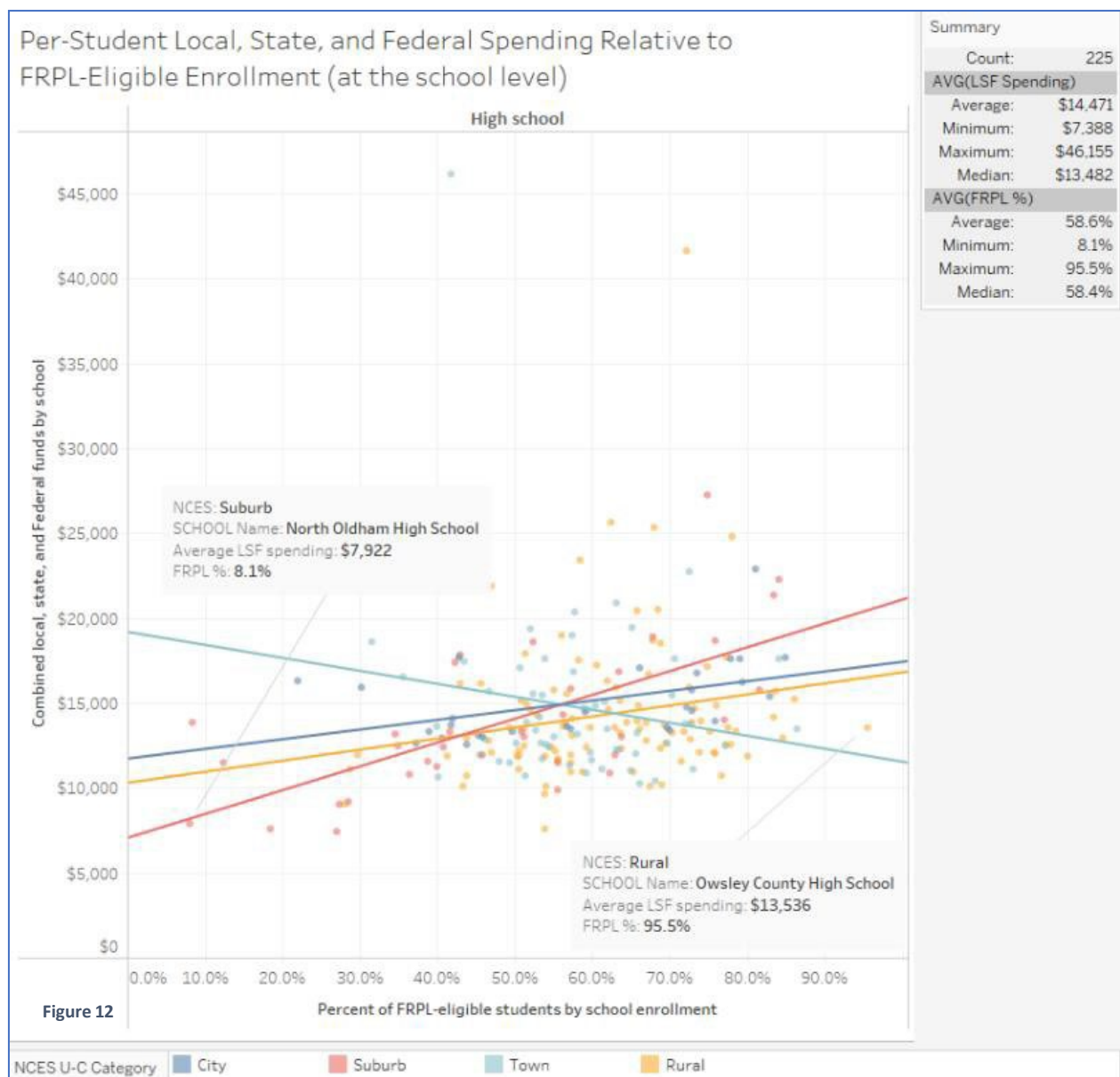
Figure 12

95.3%; Anchorage Independent Public School, in Jefferson County's Anchorage Independent School District, had 7% enrollment, which was the lowest average middle school FRPL-eligible enrollment.

At the high school level (Figure 12), the city, suburb, and rural trendlines are all positive, with p-values of .0132, <.0001, and .0547 respectively. The trendline for town schools is negative, indicating that as the percentage of FPRL-eligible students increase at a school, local, state, and Federal spending levels decrease, although the p-value is .2117, indicating that there was no discernable relationship. The highest level of FPRL enrollment, at an average of 95.5% of the students, was in Owsley County High School, a rural category school. The lowest average level of FRPL enrollment was 8.1% in North Oldham High School, a suburb category school in Oldham County.

The tables in Figure 13 have been created to ascertain trends in the relationship between school-level spending and enrollment of either EL or FRPL-eligible students. The relationship between school-level spending and EL enrollment is tenuous, with statistically significant relationships at just the city middle schools and suburb high schools. However, school-level spending has a strong relationship with FRPL-eligible enrollment at city, suburb, and rural elementary schools, at rural middle schools, and at city and suburb high schools. There is also a weak relationship with town high schools.

EL	City	Suburb	Town	Rural		FRPL	City	Suburb	Town	Rural
Elementary	0.1331	0.9763	0.4170	0.3392		Elementary	0.0001	0.0001	0.1887	0.0027
Middle	0.0414	0.6496	0.6534	0.1563		Middle	0.2188	0.1339	0.7332	0.0001
High	0.542	0.0037	0.8182	0.1542		High	0.0132	0.0001	0.0547	0.2117
	Range of P-values									
	Lower	Upper								
	0.0001	0.0500								
	0.0510	0.0550								
	0.0560	1.0000								

Figure 13

Limitations

For the KDE data, AY 2017–2018 was the first year for which schools provided publicly reported data so there may have been a learning curve as schools and districts collected and entered data. For the FRPL-eligible students, the number of values reported matched the number of schools at each level and NCES category for each year. However, for EL enrollment, there are 215 null values in AY 2017–2018 but no null values in AY 2018–2019 (Figure 14). These null values may have contributed to the low number of relationships identified between per-student spending and EL enrollment.

For publicly available AY 2017–2019 financial data, KDE combined local revenue with state funding, presenting a challenge in aligning targeted funding with specific student populations. As well, although Federal funding is separated out, it is also provided as simply "personnnel" and "non-personnel" funding rather than identifying whether it is targeted funding (i.e., for low-income, English learners, or other specific student populations) or for broad objectives such as Title II professional development or Title IV 21st Century Community Learning Centers. If funding had been provided by funding source and program,

Year	1718			Year	1718		
Number of Schools	Level			**Schools with EL students**	Level		
NCES Category	Elementary	Middle	High school	NCES Category	Elementary	Middle	High school
City	134	35	29	City	130	34	29
Rural	283	132	101	Rural	207	79	68
Suburb	98	33	35	Suburb	90	33	32
Town	126	73	59	Town	114	57	50
Total	**641**	**273**	**224**	**Total**	**541**	**203**	**179**
Year	1819			Year	1819		
Number of Schools	Level			**Schools with EL students**	Level		
NCES Category	Elementary	Middle	High school	NCES Category	Elementary	Middle	High school
City	134	35	29	City	134	35	29
Rural	287	133	102	Rural	287	133	102
Suburb	98	33	35	Suburb	98	33	35
Town	128	73	59	Town	128	73	59
Total	**647**	**274**	**225**	**Total**	**647**	**274**	**225**

Figure 14

NCES Category	Elementary	Middle	High school
City	130	34	29
Rural	207	79	68

it would have been possible to more accurately compare the funding source with the intended student population.

Conclusions

An examination of KDE AY 2017–2019 data identified just two statistical relationships between school-level spending and EL enrollment but six statistical relationships between school-level spending and FRPL-eligible enrollment, occurring at multiple school levels and in different urban-centric categories. Two key differences between these student populations are the size of each group and the amount of state and Federal funding provided for the group. As mentioned previously, more than 62% of all Kentucky K-12 students are FRPL-eligible whereas the highest level of EL students, in city elementary schools, is an average of just 15% of total school enrollment. As well, Federal funding for low-income students (ESEA Title I, Part A) is significantly higher than funding for English learners and immigrant education (ESEA Title III, Part A). For example, in FY 2021, $16.5B was allocated nationwide for low-income students whereas $797M was allocated nationwide for English learners and immigrant education. The SEEK formula also provides proportionally more add-on funding for at-risk students (a group that includes students from low-income families) than it does for students with limited English proficiency (15% of base funding and 9.6% of base funding respectively). For AY 2017–2019, school-level per-student spending for FRPL-eligible students demonstrates strong vertical equity in the city, suburb, and rural elementary schools, as well as in city and suburb high schools and rural middle schools. For EL students, however, there are statistically significant relationships in just city middle schools and suburb high schools, indicating that, for this student population and based on this data, there is decreased vertical equity.

Looking at school-level spending across Kentucky, average per-student spending in elementary, middle, and high schools in each NCES urban-centric category were the above the median (Figure 15) with the exception of suburb elementary and middle schools, which were slightly below the median per-student spending. The values for minimum and maximum per-student spending had a very large range but, because the SEEK funding formula allows districts to raise additional local revenue (Tier 1 is partially matched by the state whereas there is no matching for Tier 2 local revenue), it is difficult to ascertain whether these differences were due to additional local revenue rather than discrepancies in funding distribution within the school district. For example, per-student spending at rural elementary schools ranged from $5,977 (well below the 10th percentile) to $28,043 (well above the 90th percentile). Almost 40% of elementary students are in rural schools so, based on this data, horizontal equity is problematic. It might have been possible to refine these values with either additional years of data or with more specific data, breaking out school-level funding by source, that is, by listing local, state, and Federal funds as separate values.

Average Per-Student Funding by Level	NCES City	Suburb	Town	Rural	Median	10th Percentile	90th Percentile
Elementary	$15,843	$13,558	$14,371	$14,102	$13,715	$11,097	$18,997
Middle	$14,275	$12,348	$13,217	$13,732	$12,849	$10,216	$18,101
High school	$15,085	$13,885	$14,750	$14,348	$13,379	$10,704	$19,409

Minimum Per-Student Funding by Level	NCES City	Suburb	Town	Rural	Median	10th Percentile	90th Percentile
Elementary	$9,613	$7,874	$9,095	$5,977	$13,715	$11,097	$18,997
Middle	$7,463	$7,133	$7,232	$1,299	$12,849	$10,216	$18,101
High school	$11,149	$7,226	$8,173	$7,377	$13,379	$10,704	$19,409

Maximum Per-Student Funding by Level	NCES City	Suburb	Town	Rural	Median	10th Percentile	90th Percentile
Elementary	$28,192	$39,140	$31,887	$28,043	$13,715	$11,097	$18,997
Middle	$18,625	$25,517	$33,241	$35,267	$12,849	$10,216	$18,101
High school	$23,955	$30,696	$53,425	$42,332	$13,379	$10,704	$19,409

Figure 15

A close examination of per-student spending by school level and NCES category has identified multiple strong relationships between per-student spending and FRPL-eligible enrollment, although those relationships vary by NCES category and school level. Because this capstone considered very dissimilar schools (e.g., city elementary schools versus rural elementary schools), future research might consider focusing more specifically on schools within a single NCES category, such as city elementary schools, to identify district allocation patterns within a group of schools that are more similar. Some researchers have expressed concerns that the pandemic may exacerbate the opportunity gap (Feuer, et al., 2020; Werner & Woessmann, 2021). Based on the results of this research, it would be interesting to compare these results to post-COVID school spending data, to ascertain whether the strength of these relationships shift over time.

Many researchers have considered the consequences of inequitable school funding allocations over the past several decades, identifying issues with the lack of intrastate horizontal and vertical equity that fails to provide comparable educational opportunities for K-12 public school students. Houck states that "as educators and policymakers attempt to grapple with increased performance expectations and diminished budgets, they will need to make difficult decisions about when and how to allocate resources to schools" (Houck, 2010). Utilizing ESSA-required school-level financial data to continually examine decisions about intrastate and intra-district resource allocation will provide more accurate information to district and state policymakers, ensuring they work toward equitable access to resources for all students.

Works Referenced

Burke, S. M. (1999). An Analysis of Resource Inequality at the State, District, and School Levels. *Journal of Education Finance*, 435-458.

Cornell Law School. (2020). *Ad Valorem Tax*. Retrieved from Legal Information Institute: https://www.law.cornell.edu/wex/ad_valorem_tax

Cummins, S. J., Stevens, A., Alexander, A., Nelson, D., Riley, C., Ligouri, B., & Seiler, M. (2021, October 5). *Funding Kentucky Public Education: An Analysis Of Education Funding Through The SEEK Formula.* Retrieved from Kentucky General Assembly: https://apps.legislature.ky.gov/CommitteeDocuments/351/13520/OEA%20SEEK%20Report%20(final).PDF

Darden, E. C., & Cavendish, E. (2011, April 15). Achieving Resource Equity Within a Single School District: Erasing the Opportunity Gap by Examining School Board Decisions. *Education and Urban Society, 44*(1), 61-82. Retrieved from https://journals.sagepub.com/doi/full/10.1177/0013124510380912

ESEA Network. (2021). *Federal Education Programs Summary.* Retrieved from ESEA Network: https://www.eseanetwork.org/about/esea-programs-summary

Feuer, M., Bass, H., Espelage, D., Ladson-Billings, G., Palincsar, A., Tate IV, W. F., . . . Wortham, S. (2020, November). *COVID-19 and Educational Inequities.* Retrieved from National Academy of Education: https://3e0hjncy0c1gzjht1dopq44b-wpengine.netdna-ssl.com/wp-content/uploads/2020/11/COVID-19-and-Educational-Inequities_The-Long-View.pdf

Houck, E. A. (2010, September 13). Intradistict Resource Allocation: Key Findings and Policy Implications. *Education and Urban Society, 43*(3), 271-295. Retrieved from https://journals.sagepub.com/doi/10.1177/0013124510380234

KDE. (2020, July 9). *School Report Card.* Retrieved from KDE: https://education.ky.gov/districts/tech/sis/Documents/2020SRCReportingImpactChanges.pdf

KDE. (2021, October 21). *SEEK and SEEK Funding*. Retrieved from KDE: https://education.ky.gov/districts/SEEK/Pages/default.aspx

KDE. (2021). *Taxes*. Retrieved from KDE/Taxes: https://education.ky.gov/districts/SEEK/pages/taxes.aspx

KDE. (2021, July 26). *Title I, Part A – Improving Academic Achievement of the Disadvantaged.* Retrieved from KDE: https://education.ky.gov/federal/progs/tia/Pages/default.aspx

KDE. (2022, January 26). *District Financial Audits*. Retrieved from KDE: https://education.ky.gov/districts/FinRept/pages/district-financial-audits.aspx

KDE. (2022, March 22). *KSIS Data Standards*. Retrieved from KDE: https://education.ky.gov/districts/tech/sis/Pages/KSIS-Data-Standards.aspx

KDE. (2022, February). *School Report Card Glossary*. Retrieved from KDE: https://www.kyschoolreportcard.com/glossary?year=2021

KDE. (2022, March). *School Report Card--Lee County*. Retrieved from KDE School Report Card: https://www.kyschoolreportcard.com/organization/5604/financial_transparency/spending/spending_per_student?year=2020

Knight, D. S. (2017). Are High-Poverty School Districts Disproportionately Impacted by State Funding Cuts? School Finance Equity Following the Great Recession. *Journal of Education Finance, 43*(2), 169-194. Retrieved from https://www.jstor.org/stable/45093658

Kolbe, T., Atchison, D., Kearns, C., & Levin, J. (2020, June). *Carsey School of Public Policy.* Retrieved from University of New Hampsire: https://carsey.unh.edu/sites/default/files/media/2020/06/20-11882_7._primer_policyscan_v3.pdf

Shores, K. A., & Ejdemyr, S. (2017, July 31). *Pulling Back the Curtain: Intra-district School Spending Inequality and Its Correlates.* Retrieved from Elsevier SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3009775

The Prichard Committee. (2015, August). *Uploads.* Retrieved from The Prichard Committee: https://prichardcommittee.org/wp-content/uploads/2015/08/4.5.SEEK_.EdGuides2015.pdf

The Prichard Committee. (2021, July). *Uploads.* Retrieved from The Prichard Committee: https://prichardcommittee.org/wp-content/uploads/2021/07/SEEKExplainer.July2021.pdf

U.S Department of Education. (2018, October 24). *Improving Basic Programs Operated by Local Educational Agencies (Title I, Part A)*. Retrieved from U.S Department of Education: https://www2.ed.gov/programs/titleiparta/index.html

U.S. Department of Education. (2017, January 4). *Every Student Succeeds Act (ESSA).* Retrieved from ED: https://www2.ed.gov/policy/elsec/leg/essa/essafactsheet170103.pdf

Warner-King, K., & Smith-Casem, V. (2005, August 1). *Addressing Funding Inequities Within Districts.* Retrieved from Center for Reinventing Public Education: https://crpe.org/addressing-funding-inequities-within-districts/

Werner, K., & Woessmann, L. (2021, October). *The Legacy of Covid-19 in Education.* Retrieved from Brown University Annenberg EdWorkingPapers: https://www.edworkingpapers.com/ai21-478

Weston, S. (2021, July 26). *The SEEK Formula is a Potent Equity Tool.* Retrieved from https://prichardcommittee.org/the-seek-formula-is-a-potent-equity-tool/