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PPD 631
April 14, 2013
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GIS Final Project
Correlation of Parks with Obesity Rates in Los Angeles

Introduction

Cities are naturally dense areas and the space within them is used for various needs including residential, commercial, and public areas. With such a large concentration of people to an area, the wellbeing of the residents of a city should be a serious concern. The dynamic of the city involves a fast-paced environment and sometimes physical exercise and recreation can be downplayed. With a population of nearly four million in the city of Los Angeles, this is a great concern for health effects like the rise of obesity rates (U.S. Census Bureau, 2013). Parks and recreational facilities therefore are essential assets to the function of cities and their people. These areas are often the only sources of fitness and recreational activities in neighborhoods. Parks also provide cleaner environments through air and water purification, indirectly benefitting residents (APA). My hypothesis is that if there is such a strong tie between public health and recreational facilities like parks, the lack of these facilities will result in a prominence of health-related issues like obesity. I would like to put this to the test by using ArcGIS to create maps of Los Angeles to visually portray the correlation.

Problem

The city of Los Angeles is a dense metropolis with millions of residents, and these people are in need of more physical activity as the obesity epidemic is taking a strong hold in the United States. In a UCLA study of park space in Los Angeles took up only 10% of the city area whereas San Francisco covered 25.4% (Loukaitou-Sideris, 2006). This is a striking contrast when San Francisco's population density more than doubles that of Los Angles and San Francisco spends triple the park expenditures per resident than Los Angeles does.

In the public health realm, obesity is a leading issue that is highly researched and discussed. Most recent studies this year indicate a rise in childhood obesity in Los Angeles, especially in low-income neighborhoods (Stobbe, 2013). One factor to this can be the low park per capita rate in Los Angeles, again especially in low-income areas. The Trust for Public Land (2006) connects the need for physical activity and the obesity epidemic as "America's Twin Plagues," indicating that these two need to be tackled down together with more availability and access to parks. With such a low investment made in park space by L.A., I would like to map out this correlation and see how the figures look throughout the city.

Using GIS is an appropriate tool to my study because of the strength of its spatial tools. I can convert the data I accumulate into simple, legible maps to analyze my findings. ArcGIS will be able to process my data into layers that overlay the consistent areas to visually put park space and obesity information together.

Data

Most all of my data came from the county of Los Angeles. The county has extensive data on its land use by city including the different types of parks and recreational areas like golf courses and sports. I came across a plethora of information on the LA County GIS Portal about the different public services information through shapefiles through a resource link provided on the class website. The data I procured from this website are shapefiles for the county, city, and council districts of Los Angeles to set the borders for my map. I also acquired information on LA County general land use as well as an interesting GIS file on proposed bike plans that I wanted to look at if I had the time.

The rest of my information was taken from the LA County Department of Public Health GIS Map Viewer online. I got in touch with our past guest speaker Doug Morales, and he directed me to several surveys conducted on obesity rates in the county as well as the GIS map viewer. It was difficult at first to extract information from the online viewer. I had to highlight or 'select' the parts of the county I was analyzing and export the data to two .csv files, one for council district and one for citywide data. The raw data on parks per capita and childhood obesity rates for 2005 and 2008 were exported in these files.

Process

Putting the data together in ArcGIS was overwhelming at first with all the files I had accumulated. Admittedly, I saved more files than I needed just in case my research question might change course, so I had to unzip and organize these files. Before starting on a map, I opened ArcCatalog to create a database to import my files to for this project. I literally catalogued my sources and this made the process of adding data layers in ArcGIS much easier.

When I opened a blank map on ArcGIS, I added data for the county, city, and council districts of Los Angeles to determine that they were all aligned. I then added the data layers for land use and LA County parks. Upon looking at the land use layer, I customized it to only show values of parks and recreational facilities: beaches and marinas, golf courses, historical parks, natural areas and wildlife sanctuaries, recreation centers, regional parks and gardens, and sports complexes. The data layer for LA County parks was not as useful and I had to remove it because it only showed few parks (about 2-3). I imported the rest of my data, which was in the form of the .csv files.

The majority of my time was spent clipping layers because I wanted to look at the city of Los Angeles and most of my data was countywide. This took a considerable amount of time with the several layers I had. I then looked at the attribute tables of the county layer and council district layer and used join to connect the data I retrieved from the online map viewer. I used join to connect the value of city names between the county layer and the .csv file with data by cities. I used join again to connect the value of council district number between the council district layer and the remaining .csv file. These processes proved to be successful after several attempts of using different values to join with.

Analysis and Results

I put together three maps to signify the correlation between the lack of park and recreation space and childhood obesity. First, I put together a map of the city of Los Angeles with some of the clipped data layers as well as information joined to the council district layer. I turned on graduated color layer properties to the parks per capita value for each council district, and this is depicted as the different shades of green. According to Loukaitou-Sideris, parks per

capita refers to park acreage per 1000 persons (2006). I represented the 2008 childhood obesity rates through graduated symbol properties in red, indicating more children with bigger symbols. Through this map, I was able to discern some correlations. The districts with the least childhood obesity had the most park per capita except for District 5 which showed an irregularity with less obese children and less park space. But Districts 2, 3, 4, 11, and 12 contain the most park space per capita with the least childhood obesity. The rest of the districts portray park-poor areas with the highest obesity presence in the city, confirming my hypothesis (Figure 1).

The next map, Figure 2, depicts the same council districts and childhood obesity. In addition, there is a visual of the parks as well as recreational facilities in the city. The most prevalent in the city are regional parks, gardens, natural areas, and wildlife sanctuaries. The next most considerable area is golf courses, but this is a unique area because of its exclusivity and may be a special factor as it is only for those who can afford the sport. But as shown in the next map, it is consistent with the previous parks per capita map. The districts with the least childhood obesity (Districts 2, 3, 4, 11, and 12) are covered with the most parks, gardens, and natural areas. Again in the remaining districts with high obesity, there are few signs of natural areas or parks, so these observations may indicate the importance of such areas to public health. The uniqueness in District 5 is solved in this map because where it lacks in parks, it has several golf courses and harbors natural areas and wildlife sanctuaries that come in from District 11.

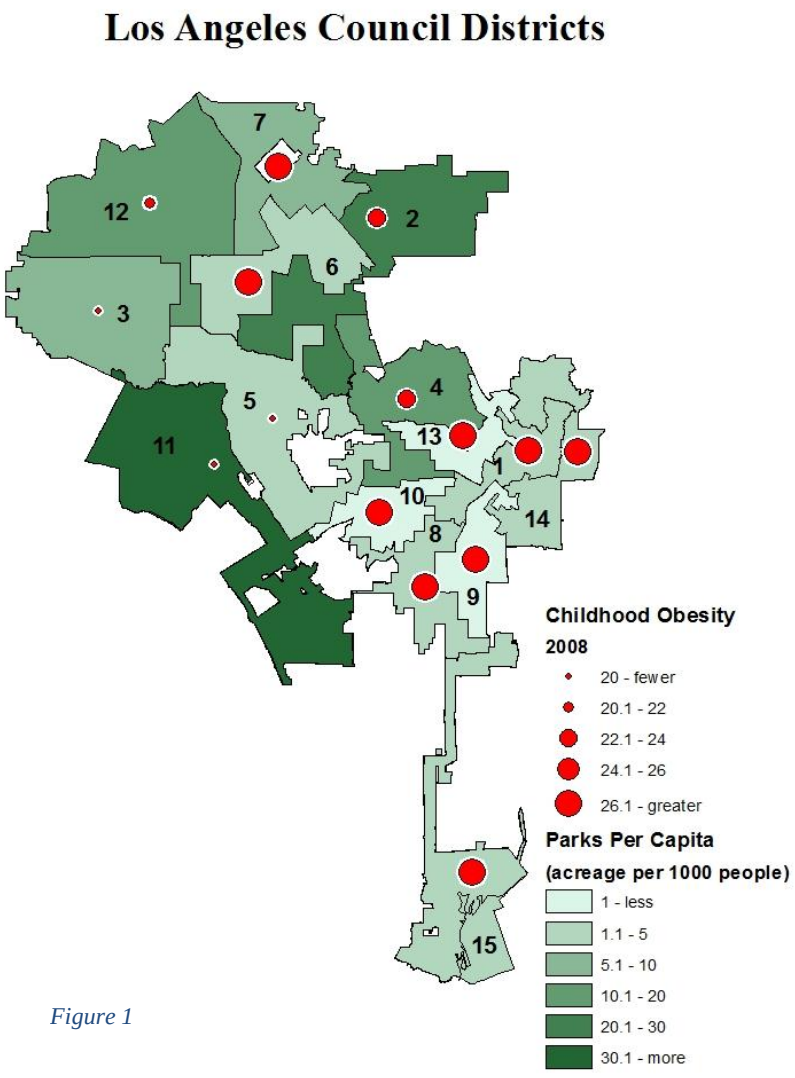

Figure 1

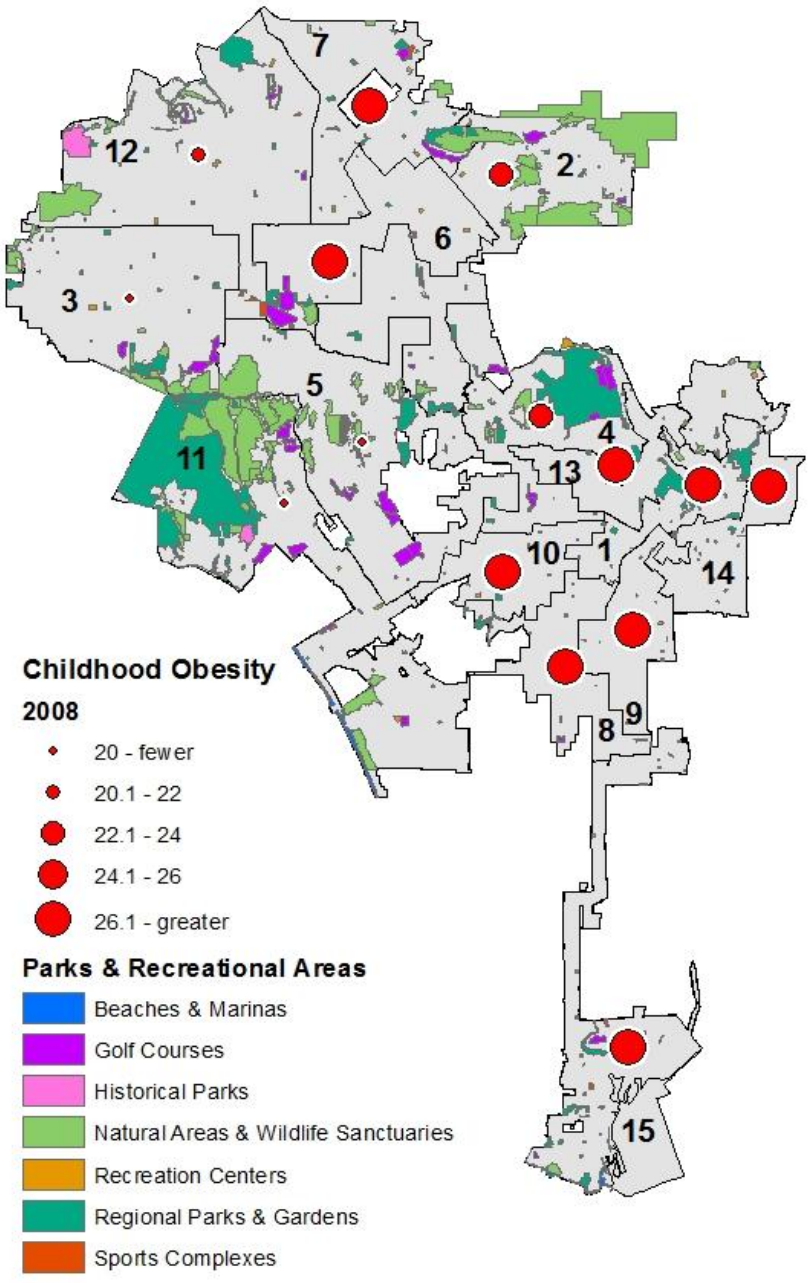
Los Angeles Council Districts
7
12
2
6
3
5
11
4
13
10
1
14
8
9
15
Childhood Obesity
2008
20 - fewer
20.1 - 22
22.1 - 24
24.1 - 26
26.1 - greater
Parks & Recreational Areas
Beaches & Marinas
Golf Courses
Historical Parks
Natural Areas & Wildlife Sanctuaries
Recreation Centers
Regional Parks & Gardens
Sports Complexes

Figure 2

In addition to these maps, I decided to see if the trend was consistent throughout the county. With the county data I already had, I put the childhood obesity and parks per capita layers together. The results proved to further strengthen my hypothesis because the range of obesity and parks per capita widens throughout the county. The city dealt with childhood obesity mostly in the twenties range while county wide cities had greater and lower obese averages. There is less park per capita in cities around Los Angeles but also much greater averages on the outskirts of the county. As shown in Figure 3, the inset maps show minimal obesity rates in the tens or lower in areas above 100 parks per capita (in blue) and beach sides where recreation is high (in red). The county map shows how much more apparent the obesity problem lessens with more park space and recreational facilities.

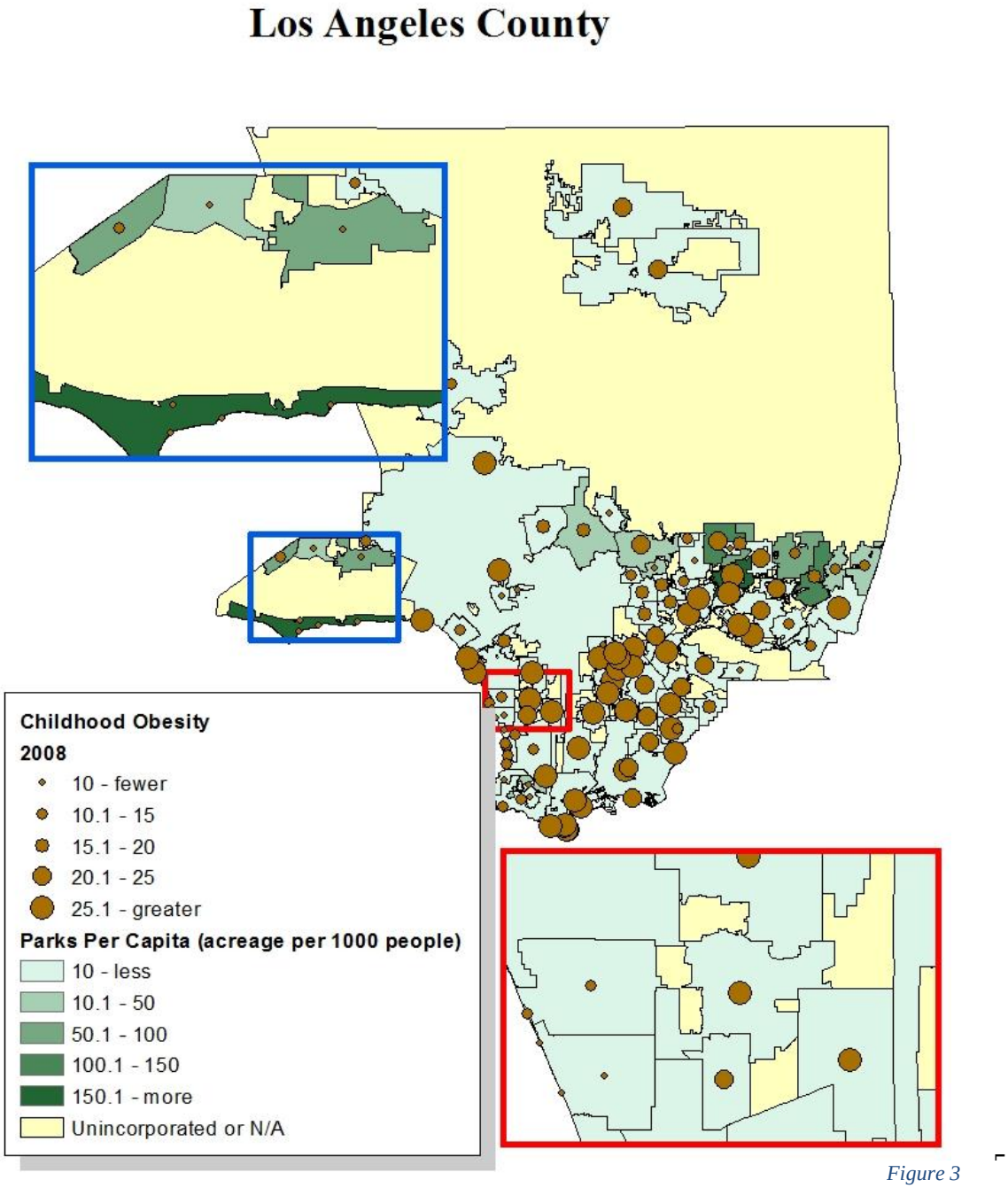

Figure 3

Data Limitations

I did not come across much limitation on data as I initially expected, but the opposite happened. I had too much data that I wanted to use but that I could not fit in one assignment. I had information on childhood obesity in 2005 and 2008, but because of the similarity of the results, I chose not to use the 2005 survey data. The DHP GIS Viewer also had data on years of potential life lost and life expectancy for each area, which could have strengthened, or perhaps weakened, my research question. I mentioned previously the shapefile I acquired on proposed bike plans throughout the county, and this could be one of the solutions to ameliorating the problem of physical inactivity in the city.

If I had more time to expand on my research and put together more maps to synthesize my data, there are some other issues I would like to address through GIS methods. I would like to look at other health factors that the epidemiology unit of LA County have considered and see how a better environment like more parks can also help with those problems. I would also like to research vacant lots and see their plausibility to be used as parks or recreational facilities. Another important issue that I would like to address is the residents in the city and their fair access to parks. It could be that lower income neighborhoods do not have access to good public facilities and higher income neighborhoods have better ones. Neighborhood income levels could attribute to the obesity issue, and it would be an interesting study to pursue.

Conclusion

The planning question I had about the correlation between the lack of recreational space and childhood obesity opens up a broader perspective. The city of Los Angeles does show a distinct relationship with less recreation space and more obesity, but the rate of obesity throughout the districts is at a consistent level in the twenties. In comparison to the county map, we see that the city of LA is fixed in high levels of obesity and low rates of parks per capita. The correlation I predicted is true both at a city level and then extends to a larger scale in the county. Since 2011, there are almost four million residents in the city of LA and 10 million in the county (U.S. Census Bureau, 2013). The city represents half of the county, so nearly half of LA County is in need of more parks with the high obesity rates.

This means that the city of Los Angeles is in greater need of areas for physical activity than I previously assumed. The whole city is in need despite the trend of slightly less obesity levels in districts with slightly more parks per capita. Some cities farther from the heart of the county exhibit parks per capita at 100 or higher and the implications of less obesity make a far greater difference. Figure 2 shows that natural areas, parks, and gardens make an impact in encouraging exercise and lowering obesity. The importance of parks and recreational space reach farther than the public health realm. It would be of interest to environmental improvement, economic development, and aesthetics toward the city. My project may barely scratch the surface of what further research can be made of looking into parks in the city.

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