THE ROLE OF RACE AND CLASS IN DETERMINING THE GEOGRAPHIC DISTRIBUTION OF HEALTHCARE FACILITIES AND HEALTHCARE EMPLOYEES IN LOS ANGELES COUNTY

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Past research, and data suggest both that race and poverty are significant factors in determining the number of facilities and healthcare employees in sub-regions of Los Angeles County. This report hypothesizes that race and poverty levels account for variations in the number of healthcare facilities and employees by sub-region in Los Angeles County. Empirical models presented in this report, support the hypothesis that race is a significant for in explaining the variation in Los Angeles County but do not support the hypothesis that poverty is a significant factor in determining the number of healthcare facilities or healthcare employees in a sub-region.

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INTRODUCTION

The purpose of this paper is to study the extent to which race and class influences a community's access to healthcare services by examining the location of healthcare facilities and the number of employees in a community. According to the Economic Census, employment in the healthcare industry in Los Angeles has grown by 23% since 1992. Despite this large increase in employment, there are significant disparities in access to healthcare services within the County. Most research on access to healthcare is measured by the number of employees, the number of residents with medical insurance and the health of residence in a community without taking in to account where facilities are located. In this report, access to healthcare is measured by the number of healthcare facilities and employees in a community. In addition, I have found no research that determines the marginal impact that race and class has on the number of facilities and employees in a community as I seek to do in this paper.

Within Los Angeles County there are dramatic geographical variations in the number of healthcare facilities even after controlling for differences in population. This report primarily focuses on hospitals, which are the largest employers in the healthcare industry and are responsible for providing basic emergency services. As the largest healthcare employer, trends in the hospital employment reflect the significant changes that have taken place in the healthcare industry as a whole. Table 1 shows the distribution of healthcare establishments and healthcare employment by industry sub-sector. While

doctor's offices account for the majority of facilities (81.7%), hospitals are the largest employer in Los Angeles County (40.9%)

Table 1: Percent distribution of employment and establishments in healthcare services in Los Angeles County, 2002

Establishment type	Establishments	Employment
1. Ambulatory Care	**81.7**	**30.1**
Offices of physicians	37.3	15.5
Offices of dentists	21.6	5.9
Offices of other health practitioners	18.2	3.9
Outpatient care centers	3.1	3.3
Other ambulatory healthcare services	1.5	1.5
2. Long Term and Residential Care	14.5	27.6
Nursing and residential care facilities	11.7	22.1
Home healthcare services	2.8	5.5
3. Hospitals, public and private	1.9	40.9
4. Medical and diagnostic laboratories	1.9	1.4

Source: United States Bureau of Labor Statistics

Several steps were taken to determine the impact that race and class have on access to healthcare. I first examine the demographics of low-income communities in Los Angeles County in relation to the location of healthcare facilities and facility closures. I then use a log-linear regression analysis to determine the marginal impacts that race and class have in determining the number of healthcare employees within communities across Los Angeles for the years 1992, 1997 and 2002. The units of analysis for the models are Census Defined Public Use Micro Areas (PUMAs) located within Los Angeles County. There are 66 Public Use Micro Areas within the County all which have a minimum population threshold of 100,000 residents and a maximum threshold of 200,000 residents. The location of facilities and number of employees is derived from State of California's Employment Development Departments Quarterly Survey of Employment and Wages and the socioeconomic variables were all derived using the 1980 and 1990 Census.

LITERATURE REVIEW

For this report I reviewed research from the 1960 to 2005. While race and class was often not the primary focus, most research indicates that some of the variation in the geographic distribution of healthcare facilities and healthcare employees is due to race/ethnicity and class. Empirical models presented in this paper are based more on the pre-1980's research to measure differences in access to healthcare. Most of the research conducted 1960 to 1980 focused on location decisions of healthcare practitioners with the intention of finding ways to increase the supply of practitioners in some areas. Although pre-1980's research on healthcare employment was rarely conducted for the purpose of studying access to healthcare, the literature is useful in identifying the key factors that determine the number of employees working in a region.

Sorkin (1977) studied the location decisions of all healthcare practitioners and found that community characteristics, such as the socioeconomic status of residents, influence their location decisions. Sorkin emphasizes that low-income communities have fewer healthcare professionals who are critical in meeting the needs of local residents. Additionally, they have worse health outcomes due to the lack of healthcare professionals. Sorkin also found that the location decisions of healthcare employees and facilities changes over time. Community characteristics that may be significant factors in determining the number of employees at one point in time may change from one time period to another. This concept will be revisited in the "Empirical Results" section of this paper.

Garston V. Rimlinger and Henrey B Steele (1963) focused on the location decisions and the distribution of doctors and found that high income areas have more physicians per person than low income areas because due resident's ability to pay. Victor Fuchs and Maria Kramer (1972) also studied the location decisions of doctors and found that, in addition to income, the presence of medical schools, the price of medical care, and the numbers of hospital beds were significant factors in determining the location of doctors. Benham, Maurizi, and Reder, (1973) studied the variations in the number of dentist by state. The report found that that factors determining the change in the number of dentist within a state were population, state personal income, volume of training facilities, degree of urbanization, average income of dentist in that state and the percent of persons who fail licensure exams.

There was an increase in the number of papers I found, written after 1980, that studied socioeconomic and regional disparities in healthcare for the purpose of reducing barriers in healthcare access as opposed to determining the location decisions of healthcare practitioners. Authors used indicators such as healthcare outcomes, healthcare costs and rates of uninsurance to measure the difference in access to healthcare among different population groups as opposed to their location decisions.

In general, post-1980's research places more emphasis on race/ethnicity as a key factor in determining healthcare access as well as the socioeconomic factors found in earlier research. While most of this research relies on data collected from patient surveys and

patient health outcomes I found 3 studies in peer-reviewed journals, written within the last five years (2000-2005) that focused on the variation in access to healthcare by geography and socioeconomic status in the United States. Weisfeld (2005) studied the intersections between socioeconomic status, geography and health outcomes. He found that geographic disparities contribute racial disparities in health. Morrison et al. (2000) studied the correlation between racial/ethnic composition by neighborhood in New York City and the supply of palliative care medications provided by pharmacist. The authors divided the neighborhoods into two categories: those that were predominantly white (over 80%) or predominantly non-white (less than 20%). The authors found significant differences in the supply of palliative care medications after controlling for age and crime rates. Wang and Luo (2005) used socioeconomic data from the 2000 Census and health data from the American Medical Association to determine geographic and non-geographic barriers to healthcare in Illinois. Using this data, the authors identified geographic areas that they determined were medically underserved. Race/ethnicity and class were both found to be significant factors in determining if a community is medically underserved.

In addition to the articles found in peer reviewed journals, a report by the World Health Organization (2002) found that race and class are barriers to accessing healthcare. “In the United States, some groups, such as Native Americans, rural African Americans and the inner city poor, have extremely poor health, more characteristic of a poor developing country rather than a rich industrialized one.” The unequal distribution of healthcare

facilities and healthcare employees are factors that contributes to poor health outcomes in economically disadvantaged communities of color.

Although, past research has contributed to the identification of key factors determining a community's level of access to healthcare, data limitations have restricted the level of analysis to large geographic regions such as comparisons by states, political districts or large metropolitan and rural areas. This project uses facility and employment data for the years 1992, 1997 and 2002, which allows for a deeper analysis of sub-regions in Los Angeles County.

HEALTHCARE ACCESS FOR LOW-INCOME COMMUNITIES OF COLOR IN LOS ANGELES COUNTY

An analysis of the geographic distribution of healthcare facilities and healthcare employees become increasing important as Los Angeles County's population of over 10 million people is expected to grow by 2.5 million people by 2020 (Southern California Association of Governments, 1998). In this section I used Los Angeles County demographic data, from the 2000 Census, and healthcare facility location and employment data, from the 2002 Quarterly Census of Employment and Wages, to analyze how race influences a community's access to healthcare. First I describe the demographics of the poorest communities in Los Angeles to highlight the correlation between race and class. Then I use maps to highlight the geographic disparities in access to care facilities.

Low-Income Communities in Los Angeles County

Los Angeles has often been referred to as the nation's poverty capital. Almost one in every five residents (17.9%) in Los Angeles County is living in poverty. Poverty levels are more concentrated in Los Angles City where 22.1% of people in 2005 were living in poverty. In addition, in 200?, Los Angeles experienced the highest rate of long-term unemployment in years. Many of Los Angeles' workers (%) are earning wages so low, they still qualify public assistance. Los Angeles County's unemployment has reached 9.1% and the City is facing a 10.2% unemployment rate.

Relationships between race/ethnicity and economic status in Los Angeles County are significant. There are large economic disparities among people of different races and ethnicities. People of color are disproportionately affected by poverty. Figure 2 shows the percent of Los Angeles County Residents living in poverty by race. Almost 1 in 4 Latinos and African Americans live at or below the poverty threshold. Inequalities are also evident with the high rates of unemployment among communities of color. County unemployment rates for Latinos and African-Americans are higher than the county average: 9.9% and 13.8% respectively. This is a stark contrast to the unemployment rate of whites which are more than 3% below the county average (5.8%).

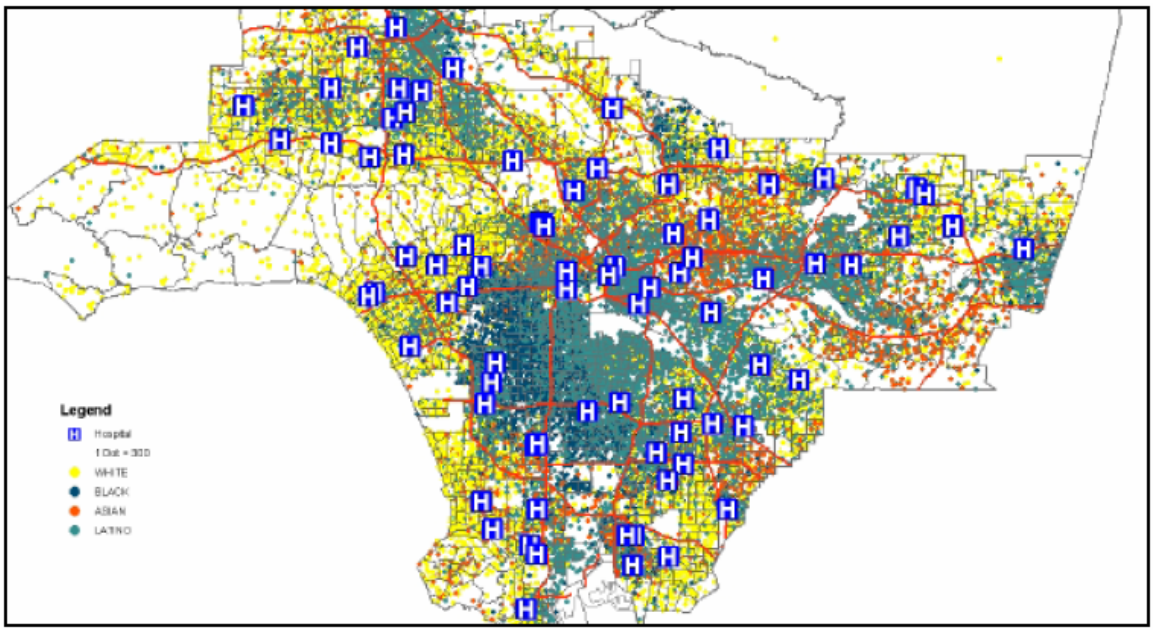
Low-income communities in Los Angles face multiple barriers in gaining higher quality jobs needed to escape poverty. Many people in low-income communities lack the skills necessary to obtain jobs that offer security and wages adequate enough to support their families. Thirty percent (1.77 million) of adults over 25 in Los Angles County have less than a high school education. In addition, 16% (1.4 million) lack the English skills needed for most jobs and educational settings.

Geographic Disparities

Racial discrimination, evidenced partly through residential segregation, affects health through numerous pathways, including the number of healthcare facilities available in a region (Bell et. al. 2002). Figure 1, shows the distribution of Los Angeles County residents by race and ethnicity as well as the location of all hospitals in the County. The

areas with the highest concentration of Blacks and Latinos are primarily located in South Central Los Angeles and South East Los Angeles where very few Hospitals are located.

Figure 1: Distribution of Los Angeles County Residents by Race 2000

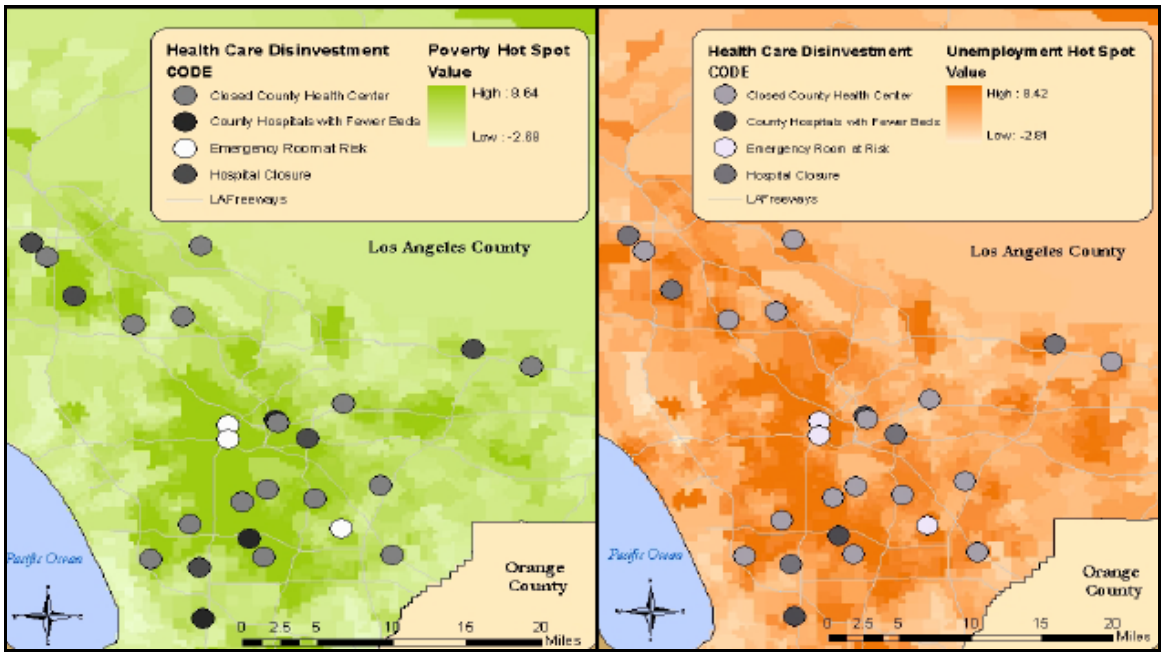


Source: 2000 United States Census Bureau and the California Office of Statewide Health Planning and Development, Healthcare Quality & Analysis Division

Figure 3 shows the correlation between areas with high concentration of poverty and unemployment and *all* healthcare facilities that have been closed or are under the threat of being downsized or closed. The darker areas indicate high concentrations of poverty and unemployment (Lee 2005). The facilities that have been closed or are under threat of closing are clusters around communities with higher concentrations of poverty and unemployment compared to the rest of Los Angeles County. Six of the 23 healthcare

facilities that have closed or downsized are located in South Los Angeles, one of the poorest areas within the county.

Figure 3: Distribution of Healthcare Facilities that Have Closed or Downsized by Poverty and Unemployment



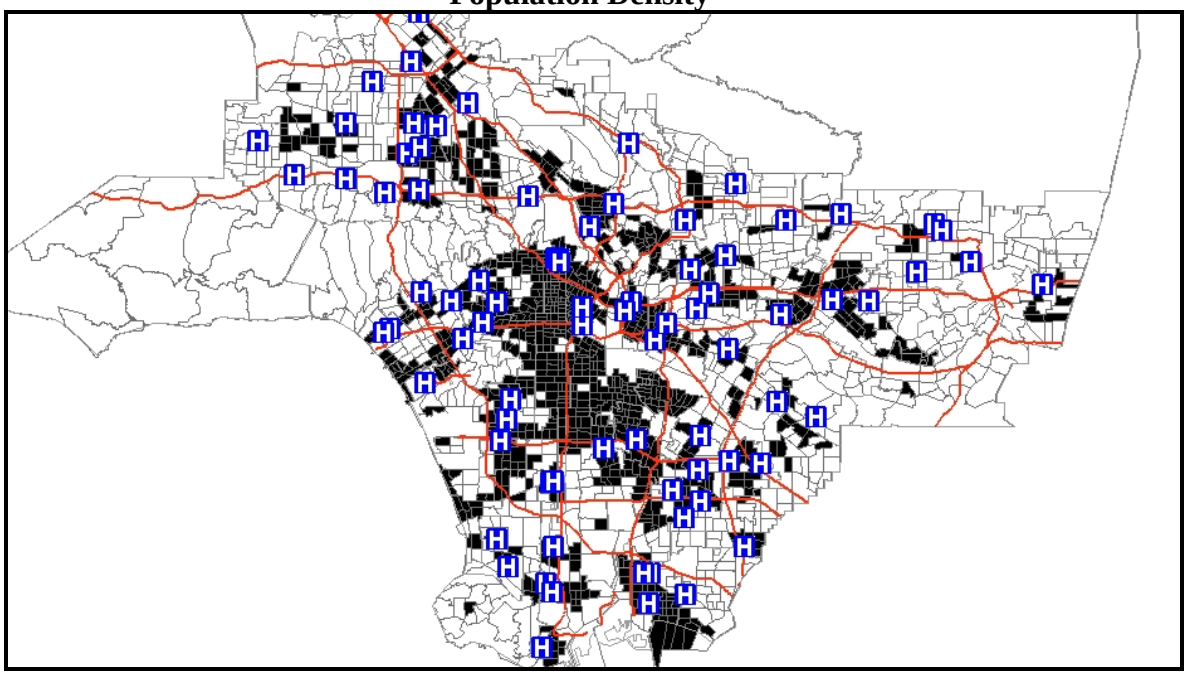
Maps Created by Joanna Lee, UCLA Urban Planning Department 2005

CASE STUDY: SOUTH LOS ANGELES

A case study of South Los Angeles reveals the significance of race and class by looking at the location of healthcare facilities, population density and the demographic composition of the area. South Los Angeles, the community with the highest rates of poverty, has the lowest number of hospitals that provide basic emergency service when accounting for population density.

Figure 6 identifies all of the hospitals in the County that provide basic emergency services. These are often the primary sources of healthcare for uninsured residents who avoid preventative care due to high cost. Friedman(2005) found that people living in poverty are more likely to use hospitals providing basic emergency services as their primary source of care, “The poor and the sick do not disappear because they lack health insurance…, the uninsured appear at the places of last resort, hospital and clinic emergency rooms…" The darker areas on the map are those with above average levels of population density compared to the rest of Los Angeles County.

Figure 6: Distribution of all Licensed Health Care Facilities in LA County by Population Density



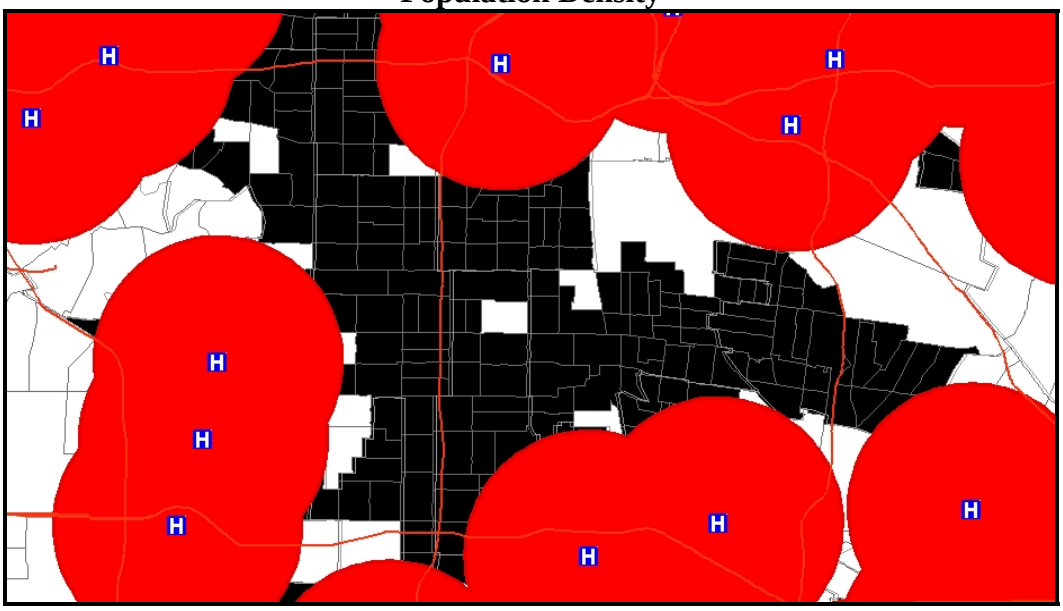
Data Source: 2000 United States Census Bureau and the California Office of Statewide Health Planning and Development, Healthcare Quality & Analysis Division

South Los Angeles is the only area with average or above average population density in Los Angeles County that does not have basic emergency services available within a three mile radius of its residents. Most county residents in census tracks, in densely populated areas, live within a three mile radius of a facility that provides emergency service, with the exception of South Los Angeles. More than 400,000 residents in South Los Angeles live more than three miles away from a facility that provides basic emergency services.

Figure 7 shows the census tracks that are not within a three mile radius of a hospital that provides basic emergency services. The areas shaded in red are areas within a three mile radius of basic emergency services. The census tracks shaded black are those with

population densities that have average or above average population density compared to the rest of Los Angeles County.

Figure 7: Hospitals with Basic Emergency Service in South Los Angeles by Population Density



Data Source: 2000 United States Census Bureau and the California Office of Statewide Health Planning and Development, Healthcare Quality & Analysis Division

The census tracts in South Los Angeles that are not within a three mile radius of a healthcare facility providing basic emergency services have the highest concentrations of poverty, uninsurance, and people of color in the entire County: 95% of thousands of residents of color: 35% African American and 60% Latino; 32% of residents live in poverty, 50% earn less than $25,000 a year; and 40% of the adults in the area do not have health insurance.

EMPIRICAL MODEL

In this section I use statistical models to the marginal impact that race and class have in determining access to healthcare facilities. The number of healthcare employees is used to measures a community's access to healthcare services. The number of employees by area was chosen instead the number of facilities due to the large variation in the level of employment by facility type. Factors that influence the number of healthcare employees within a given area depend on occupation and facility type. There are however a consistent set of variables in past research that have been significantly correlated with the number of healthcare facilitates and healthcare employees within a region.

A log-linear model uses employment (E) in the healthcare industry or its sub-sectors (i) in 1992, 1997 and 2002 (t) as the dependent variable. Separate models were tested for total employment by year and by facility type, hospitals and doctors offices, as they are expected to respond differently to community characteristics. Most of the independent variables were lagged by 12 years using the previous census, 1980 and 1990 to account for the time it takes for large institutions to respond to changing needs of the community. Due to data restrictions, the 1997 model uses seven year lags.

It is expected that the impact of community characteristics on the level of employment will vary by facility type. Therefore, employment was divided into four industry sub-categories. The four categories include: (1) Ambulatory care (outpatient facilities such as doctors offices and clinics), (2) Long-term residential care, (3) Hospitals, and (4)

Laboratories. Additional information on these industry sub-sectors can be found in Appendix A.

The total number of healthcare employees in an area is represented by the following functions:

(1) Employment $_{t}$ = f (race/ethnicity $_{t-7}$, percent in poverty$_{t-7}$, population over age 65$_{t-7}$, population density $_{t-7,}$ average pay in healthcare facilities $_{t-7,}$ property values $_{t-7,}$ ownership type $_{t-5}$), [1997 Model]

(2) Employment $_{t}$ = f(race/ethnicity $_{t-12,}$ percent in poverty $_{t-12}$, population over age 65 $_{t-12}$, population density $_{t-12,}$ average pay in healthcare facilities $_{t,}$ property values $_{t-12,}$ ownership type $_{t-5}$), [1992 and 2002 Model]

Percent Latino and percent white appear are the percent of a PUMA that is Latino or white. The number of healthcare employees in a sub-region is expected to have a positive relationship with percent of the population who are white an inverse relationship to the percent of the population who are nonwhite.

Percent of the population living in poverty was chosen as the indicator for a community's economic status. In addition to poverty, several measures of a community's wealth were tested in the model such as: unemployment rates, per capita income, and the percent of the population that receives public assistance.

The model controls for the percent of the population over age 65. The number of healthcare employees is expected to increase with and increase in the percent of the

population over age 65. The demand for healthcare increases dramatically once residents reach a certain age. Residents over 65 have the most illnesses and the greatest need for healthcare (Brizer, 1994). According to the Federal Bureau of Labor Statistics, employment growth in the healthcare industry will be driven by increasing demand for healthcare and social assistance because of an aging population and longer life expectancies. In addition, all literature from perr reviewed journals presented in this report controlled for age.

Population density was calculated using the total number of people in an area divided by the total square meters in the area. Employment is expected to increase in areas that have higher population densities Meheres et. al. (1996). Facilities are expected to locate in more densely populated areas if land is available. The largest institutions in the model are hospitals. Most hospitals in Los Angeles County were established before 1970 when there was more access to large parcels of land. Many hospitals closer to the downtown area were established between 1940 and 1960 when most of Los Angeles' population was concentrated in the city's center providing further evidence that facilities locate in more densely populated areas due to high demand for services (California Association of Public Hospital Systems, 2004).

Average pay was calculated by dividing the aggregate payroll in the third quarter of each year: 1992, 1997 and 2002 by the total number of employees. Aggregate payroll for each year was normalized to 2002 dollars. The use of average pay in the model accounts for the variation in wages in sub-regions across the County. Average monthly earnings in doctor's offices, hospitals and skilled nursing facilities vary as much as 40% by city

planning area (Flaming et. al. 2001). It is also believed that government-owned facilities pay less than privately owned facilities. However, a 2002 report by the Department of Health Services found no difference in pay when controlling for occupation and facility type.

Average pay also accounts the variation in the concentration of highly skilled and specialized labor. Sub-regions may have hospitals with a larger proportion highly skilled workers that are paid relatively higher wages such as surgeons as opposed to hospitals with higher concentrations of nurses or nursing assistants. This is necessary due to the lack of detail about facilities provided in the model.

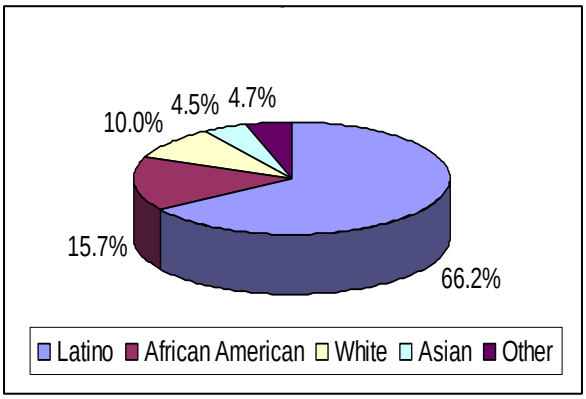
Property value is the aggregate residential property value in each PUMA. Residential property values are an indication of the degree of commercialization/industrialization, the type of zoning in the area as well as income and other economic characteristics (Alexander, 1968). Residential property values can be an indication of the type of zoning in the area as well as income. Some facilities and employees choose areas with higher residential property values due to increased amenities associated with more affluent areas such as parks, recreational areas, museums and other and coffee shops.

The model controls for the differences in the location and staffing patterns of private and county facilities. Ownership is the percent of facilities in the areas that are privately owned. For the purposes of this paper, ownership type is divided into two categories: county-owned facilities and privately-owned facilities. Due to the County health

system's mission of providing indigent care, the location decisions of County facilities will differ greatly from private facilities (Berlinger, Kovner and Adams, 2000). County owned hospitals are required by law to provide medical services to populations without access to private facilities. Therefore, the size and location of public facilities are more likely to be placed in areas where private facilities are not located; areas with high concentrations of poverty.

County hospitals are not only located in areas with high rates of poverty, they also tend to be located in areas with high concentrations of non-white populations. Figure 4 shows the racial/ethnic composition of Los Angles County's hospital patients. The majority of the patients served by the Los Angeles County's healthcare system are nonwhite.

Figure 4: Race and Ethnic Composition of Los Angeles County Public Hospital Patients



Data Source: California Association of Public Hospital Systems

In addition to the communities where they reside, the demographic composition of employees in government owned facilities versus privately owned facilities differ drastically. Public employees are more likely to work in facilities were they reside, increasing the level of responsiveness and cultural competency. Los Angeles County healthcare employees differ by gender, age and race. Private healthcare workers in Los Angeles are primarily female, Caucasian and between

30 and 44. Higher rates of public healthcare employees are African American, female and older than employees in the private sector (Berlinger, Kovner and Adams, 2000).

DATA

The basic geographic unit of observation is the Census defined 2000 5% Public Use Microdata Areas (PUMA). There are currently 67 PUMAs in Los Angeles County. PUMA boundaries usually follow the boundaries for counties and census defines places. For example, large cities may be made up of multiple PUMAs or small cities may be combined into one PUMA, PUMA boundaries will not cross city boundaries. To maintain confidentiality the minimum threshold for a PUMA must be at least 100,000 residents. If these areas exceed 200,000 residents the areas are divided into as many PUMAs as possible (United States Census Bureau, 2000).

While PUMA boundaries capture the difference in community characteristics, they are relatively large areas that are not based on demographics and like most other boundaries are not created based on demographics. There are limits to the level of accuracy regarding the impact of community characteristics such as race and income due to the size of PUMAs. Some PUMAS are very large due to low population density and cover several communities with large variations in demographics.

The California Department of Economic Development's Quarterly Census of Employment & Wages data were used to analyze employment and facility data for the years 1992, 1997, and 2002. The data are derived from the quarterly tax reports

submitted to the Employment Development Department by California employers.[1] The Quarterly Census of Employment and Wages provides detailed employment statistics by for each healthcare facility located in Los Angles county including: the number of employees, ownership type, facility type and addresses were available for each facility.[2]

The source of the 1980-2000 demographic data is the Urban Institute's Neighborhood Change Database and the 1990 and 2000 US Census. To obtain data by PUMA, 1980-2000 census tract data was normalized to 2000 census tracts then aggregated up using PUMA boundaries. Census tracts and PUMAs d not retain the same boundaries over time, therefore all data was aggregated by 2000 PUMAs.

[1] Each quarter, EDD edits and processes the data and sends the information to BLS in Washington, DC In general, ES202 monthly employment data represent the number of covered workers who worked during, or received pay for, the pay period which included the 12th day of the month.

[2] Employment includes most corporate officials, executives, supervisory personnel, professionals, clerical workers, wage earners, piece workers, and part-time workers. It excludes proprietors, the self-employed, unpaid family members, and certain farm and domestic workers.

EMPIRICAL RESULTS

Regression results are shown in the Table 2 below. There are separate regression results the years 1992, 1997 and 2002. Model results by industry are not shown as they do not differ significantly from the models reported. The results in the table include all of community characteristics that are expected to impact the level of employment by PUMA. The point estimates for percent poverty and percent Latino are expected to be negative indicating that there are fewer healthcare employees in sub-regions with higher numbers of people living in poverty and high concentrations of Latinos. Conversely, point estimates for percent White are expected to be positive indicating an increase in the number of healthcare employees in areas with high concentrations of Whites.

The community characteristics in the 1997 and 2002 models explain more of the variation in healthcare employment than they do for the 1992 models as reflected in the R^2 and F-statistics. This is constant with Sorkin's (1977) findings that factors determining the distribution of healthcare employees changes over time. This mirrors the dramatic changes that the industry underwent throughout the 1990s. The privatization of public services, the decrease in employer provided healthcare coverage for low-income communities, and the need to cut cost has placed a greater emphasis on factors such as race and poverty in determining the availability of healthcare services (Ito, 2002).

The empirical results provide little support for the hypothesis that income and race are key factors in determining healthcare the number of healthcare employees in a sub-region of Los Angeles County. Race/ethnicity was only significant for the variable percent white

(at the 10% level) in the 2002 model. The 2002 model results show that for every one percent increase in the proportion of a sub-region's population that is white, there is a corresponding increase in healthcare employment by .95%. However, the signs of the point estimates for the race/ethnicity variables are consistent with the hypothesis that race is a factor in determining the number of healthcare employees in an area. In addition, the point estimates for percent Latino become increasingly significant in the models over time and are close to the 10% level of significance in the 2002 model.

The PUMA boundaries themselves may have contributed to the lack of significance. PUMAs may not accurately capture groups of residents with similar population characteristics, economic status, and living conditions. While PUMAs do indicate the parts of the city that have the highest percentage of white people, some boundaries cross multiple communities that are heavily segregated.

A closer look at the areas within Los Angeles County that have the highest and lowest levels of Healthcare employment (the top and bottom 10%), indicates that race does play a role in determining the number of healthcare employees by region. Simple t-tests for the years 19992, 1997 and 2002, reveal that the areas with the lowest levels of healthcare employment have significantly higher concentrations of people of color (at the 5% level of significance). On average, the proportion of people of color is 16% higher in areas with the lowest number of healthcare employees.

The models for years 1997 and 2002 show a positive correlation between poverty rates and the number of healthcare employees in an area. While past research and geographic data show a decrease in access to healthcare when there is and increase in the level of poverty, the results do not support the hypothesis that healthcare access in terms of the number of employees, decreases with and increase in poverty rates. The model may not accurately control for the degree of industrialization in an area. Zoning and the degree of industrialization in sub-regions, impacts facility location and levels of employment but is not represented in the model. Some of the most impoverished communities in Los Angeles County such as the Central City and the Silverlake-Hollywood area are highly industrialized. These areas also have high concentrations of large healthcare facilities.

The only variable that is significant across all years and industries is average pay. The positive relationship between average quarterly pay and employment reflects the type of services and the concentration of higher paid professionals available in some areas versus others. This supports Flaming's (2001) findings that there are differences in average wages in Los Angeles City after controlling for occupation type. The area in Los Angeles City with the lowest average wages is South Los Angeles.

As expected, the number of employees increased significantly with the percent of the population over age 65 for the years 1992 and 1997 but not for the year 2002. The lack of significance for the year 2002 may be due to both the changes in the structure of the industry as well as the aging population. The 1992 and 1997 models support the findings by the Federal Bureau of Labor Statistics that employment growth in the healthcare

industry is partial driven by the aging population. The 2002 point estimate and level of significance for age does not support this projection.

Table 2: Model Results

	1992	1997	2002
INTERCEPT	**-6.061**	**-15.192**	**-14.655**
	(-0.906)	*(-2.051)*	*(-2.634)*
% AGE 65+	**8.401**	**9.361**	**2.449**
	(2.646)	(2.518)	(0.771)
% HISPANIC	**-0.051**	**-0.161**	**-0.656**
	(-0.077)	*(-0.255)*	*(-1.499)*
% WHITE	**1.071**	**0.964**	**0.950**
	(1.325)	*(1.49)*	*(1.942)*
% POVERTY	**0.883**	**4.233**	**4.172**
	(0.272)	*(1.688)*	*(2.541)*
POP	**0**	**-35.051**	**2.926**
	(-0.752)	*(61.799)*	*(0.063)*
PROPVAL	959.716	-5499.972	18423.581
	(0.562)	*(-1.082)*	*(1.612)*
PAY	**1.203**	**2.823**	**2.685**
	(2.928)	*(5.721*	*(6.866)*
% PRIVATE		**-0.682**	**0.311**
		(-1.692)	(1.076)
R^2	**0.341**	**0.585**	**0.676**
ADJ. R^2	**0.263**	**0.507**	**0.624**
F-STATISTIC	**4.365**	**7.504**	**13.031**

CONCLUSION

For decades, it has been widely acknowledged among academics that race and class are key factors in a community' access to healthcare. However, there has been little research conducted on the marginal impacts of race and class on healthcare access. The data presented in the paper provide conflicting results about the extent to which race and class play a role in determining the number of healthcare facilities and healthcare employees in sub-regions of Los Angeles County.

Many areas in Los Angeles have remained highly segregated since the 1970's allowing for more accurate comparisons by race and ethnicity. The empirical results show a correlation between race and the number of healthcare employment in sub-regions of Los Angeles; as the percent white in sub-regions increase, the number of healthcare employees in that region also increases. The empirical results also find that over time, race has become increasingly significant in determining the number of healthcare employees in sub-regions of the County.

However, economic restructuring in Los Angeles and the healthcare industry in particular has made it more difficult to determine a community's access to healthcare based on levels of income and poverty. Since the 1970's, there have been dramatic shifts in the healthcare delivery system which are not included in the data. The empirical results do not support the hypothesis that there is a negative correlation between poverty and healthcare employment in the County. The results found a significant positive correlation between poverty and the number of employees and a sub-region. Sub-regions with higher

concentrations of poverty are more likely to have higher numbers of healthcare employees available in their neighborhood.

It is also highly probable that many institutions built in what are now considered poor areas, where built before large demographic shifts took place within Los Angeles. For example, Downtown Los Angeles and is closely surrounding areas used to be a more wealthy and homogeneous region within the city. During this time, large institutions such as hospitals were built to meet local demand of affluent residents. While the demographics of the areas have shifted towered a more diverse population, many of the larger institutions still remain.

While the empirical results are less conclusive, the a closer look at geographic data supports the hypothesis that *both* race and class are key factors in determining the number of healthcare facilities by sub-region. Facilities that have closed or downsized are located in areas with concentrations of poverty that are above the county average. In addition the only area in Los Angeles County with no basic emergency services within a three mile radius controlling for population density is primarily non-white and has the highest rate of poverty in the entire County. Facilities that have cut services or closed altogether are located in areas with poverty rates far above the county average.

Geographic boundaries that more accurately reflect the race and class segregation in Los Angeles County as well as additional data on zoning within the geographic sub-regions

are needed to determine more precisely the degree to which race and class determine access to healthcare.

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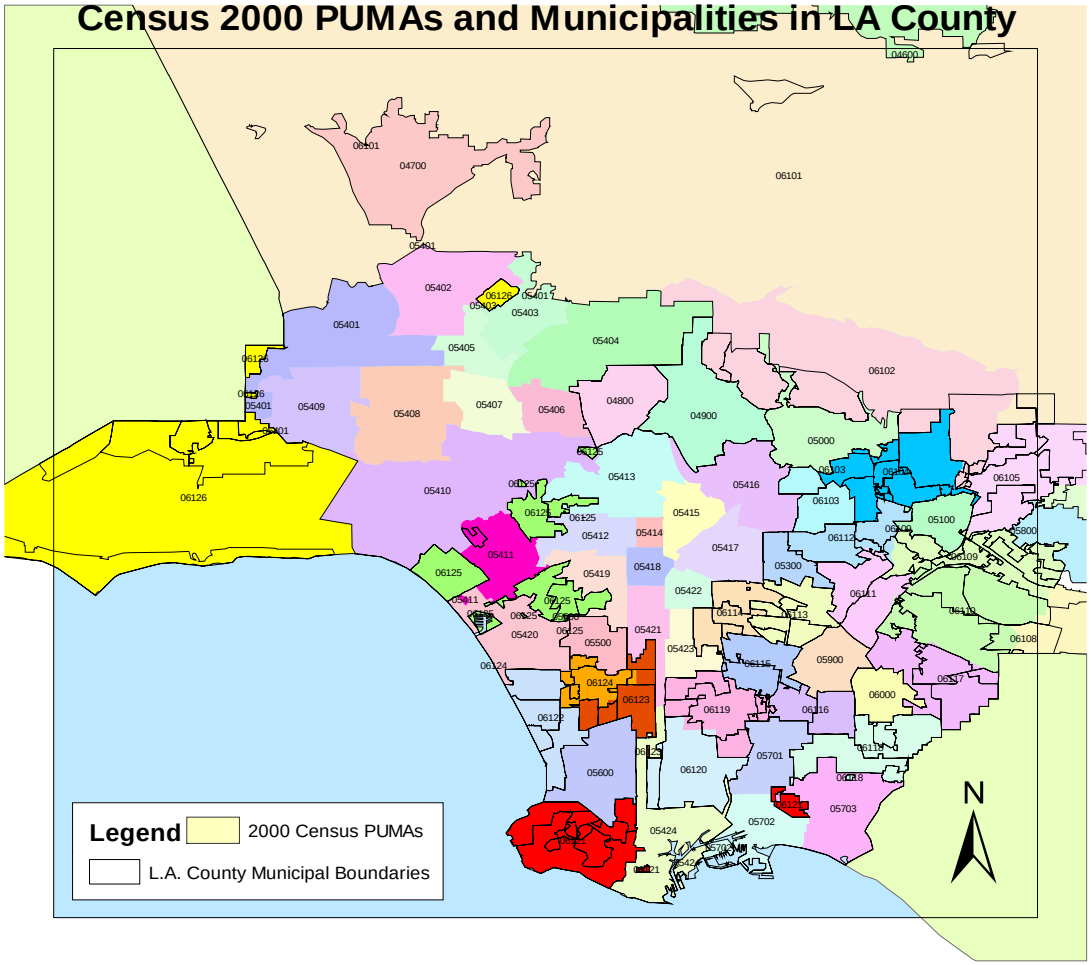
APPENDIX A: HEALTHCARE FACILITY CATEGORIES

1. **Ambulatory care**- Industries in the Ambulatory Healthcare Services subsector provide healthcare services directly or indirectly to ambulatory patients and do not usually provide inpatient services. Health practitioners in this subsector provide outpatient services, with the facilities and equipment not usually being the most significant part of the production process (Bureau of Labor Statistics, 2002).
2. **Long-term residential care** - Industries in the Nursing and Residential Care Facilities subsector provide residential care combined with either nursing, supervisory, or other types of care as required by the residents. In this subsector, the facilities are a significant part of the production process and the care provided is a mix of health and social services with the health services being largely some level of nursing services (Ibid).
3. **Hospitals**- Industries in the Hospitals subsector provide medical, diagnostic, and treatment services that include physician, nursing, and other health services to inpatients and the specialized accommodation services required by inpatients. Hospitals may also provide outpatient services as a secondary activity. Establishments in the Hospitals subsector provide inpatient health services, many of which can only be provided using the specialized facilities and equipment that form a significant and integral part of the production process (Ibid).
4. **Laboratories**- This U.S. industry comprises establishments known as medical laboratories primarily engaged in providing analytic or diagnostic services, including body fluid analysis, generally to the medical profession or to the patient on referral from a health practitioner (Ibid).

Most sub-sectors in the Healthcare industry can be compared over time using the SIC and NAICS crosswalk provided by the Economic Census.

APPENDIX B: LOS ANGELES COUNTY PUMA BOUNDARIES



Map created by the Los Angeles Economic Roundtable

APPENDIX C: CROSSWALK BETWEEN SIC, NAICS AND INDUSTRY GROUPINGS

1987SIC	1987 U.S. SIC Description	1997 NAICS	1997 NAICS U.S. Description
8011@	Offices and Clinics of Doctors of Medicine		
	. Surgical and Emergency Centers	621493	Freestanding Ambulatory Surgical and Emergency Centers
	. HMO Medical Centers	621491	HMO Medical Centers
	. Offices of Physicians, Mental Health Specialists	621112	Offices of Physicians, Mental Health Specialists (pt)
	. Offices of Physicians Except Mental Health	621111	Offices of Physicians (except Mental Health Specialists) (pt)
8021	Offices and Clinics of Dentists	62121	Offices of Dentists
8031@	Offices and Clinics of Doctors of Osteopathy		
	. Offices of Doctors of Osteopathy, Except Mental Health	621111	Offices of Physicians (except Mental Health Specialists) (pt)
	. Offices of Doctors of Osteopathy, Mental Health Specialists	621112	Offices of Physicians, Mental Health Specialists (pt)
8041	Offices and Clinics of Chiropractors	62131	Offices of Chiropractors
8042	Offices and Clinics of Optometrists	62132	Offices of Optometrists
8043	Offices and Clinics of Podiatrists	621391	Offices of Podiatrists
8049	Offices and Clinics of Health Practitioners, NEC		
	. Mental Health Practitioners, Except Physicians	62133	Offices of Mental Health Practitioners (except Physicians)
	. Offices of Physical, Occupational, Recreational, and Speech Therapists and Audiologists	62134	Offices of Physical, Occupational and Speech Therapists, and Audiologists
	. Other Offices of Health Practitioners	621399	Offices of All Other Miscellaneous Health Practitioners
8051@	Skilled Nursing Care Facilities		
	. Continuing Care Retirement Communities	623311	Continuing Care Retirement Communities (pt)
	. All Other Skilled Nursing Care Facilities	62311	Nursing Care Facilities (pt)
8052@	Intermediate Care Facilities		
	. Continuing Care Retirement Communities	623311	Continuing Care Retirement Communities (pt)
	. Mental Retardation Facilities	62321	Residential Mental Retardation Facilities
	. Other Intermediate Care Facilities	62311	Nursing Care Facilities (pt)
8059@	Nursing and Personal Care Facilities, NEC		
	. Continuing Care Retirement Communities	623311	Continuing Care Retirement Communities (pt)
	. Other Nursing and Personal Care Facilities	62311	Nursing Care Facilities (pt)
8062@	General Medical and Surgical Hospitals	62211	General Medical and Surgical Hospitals (pt)

8063@	Psychiatric Hospitals	62221	Psychiatric and Substance Abuse Hospitals (pt)
8069@	Specialty Hospitals, Except Psychiatric		
	. Children's Hospitals	62211	General Medical and Surgical Hospitals (pt)
	. Substance Abuse Hospitals	62221	Psychiatric and Substance Abuse Hospitals (pt)
	. Other Specialty Hospitals	62231	Specialty (except Psychiatric and Substance Abuse) Hospitals
8071	Medical Laboratories		
	. Diagnostic Imaging Centers	621512	Diagnostic Imaging Centers
	. Medical Laboratories, Except Diagnostic Imaging Centers	621511	Medical Laboratories
8072	Dental Laboratories	339116	Dental Laboratories
8082	Home Health Care Services	62161	Home Health Care Services
8092	Kidney Dialysis Centers	621492	Kidney Dialysis Centers
8093	Specialty Outpatient Facilities, NEC		
	. Family Planning Centers	62141	Family Planning Centers (pt)
	. Outpatient Mental Health Facilities	62142	Outpatient Mental Health and Substance Abuse Centers
	. Other Specialty Outpatient Facilities	621498	All Other Outpatient Care Centers
8099@	Health and Allied Services, NEC		
	. Blood and Organ Banks	621991	Blood and Organ Banks
	. Medical artists	~~54143~~	~~**Graphic Design Services (pt) 143/49**~~
	. Medical Photography	~~541922~~	~~**Commercial Photography (pt) 139/30**~~ [3]
	. Childbirth Preparation Classes	62141	Family Planning Centers (pt)
	. Other Health and Allied Services	621999	All Other Miscellaneous Ambulatory Health Care Services

@ indicates time series break greater than 3% of the 1992 value of shipments for the 1987 industry.

[3] Category not included in the empirical model.