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Author

Al Hussein, Hussein Laith

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**Understanding the Correlation Between Medi-Cal Enrollments and Heart Diseases Within
Ethnic Groups in California**

Hussein Laith Al Hussein

UC Center Sacramento

Department of Public Health - University of California, San Diego

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Introduction

As I started thinking about the research I wanted to do, I tried to focus on a certain group for my research, which was the MENA group and Medi-Cal. I come from El Cajon, a city known for a low-income Iraqi and Afghan population. It breaks my heart to know that a lot of its community uses Medi-Cal, and yet proper data doesn't exist to propagate advocacy and preventive care for chronic diseases that they may face. I felt like there wasn't that much research when it comes to health, and coming from an Iraqi background, I wanted to try and explore how much I can advocate for the MENA group, as they are misrepresented within the healthcare field. I knew finding data for this group would be troubling because the MENA group in categories such as surveys is automatically supposed to choose white as a default race, since a box doesn't exist. White became the default because, as MENA migrants started immigrating to the U.S, a case was brought to the Supreme Court to determine what the MENA group is classified as, since it was a new race coming in, it was an ambiguous group, so then white became the default in many situations (Lo Wang, 2022). This brings a lot of issues when trying to do research with this group, such as sifting data becomes much harder because the white category mixes everyone. From visiting certain areas, I know that San Diego, Orange County, and Los Angeles have some of the highest Middle Eastern populations, and yet they are still considered white, which makes it unfair for both the MENA and White groups, as it disrupts the accuracy of research and health statistics for advocacy and treatment. It's an effort to research for this community to better understand the uses of Medi-Cal for not only MENA but all ethnic groups. As of recent, they did pass a AB 91 bill that has gotten the inclusion of MENA group its race/ethnic box, which is a "victory for visibility, justice, and equity" in the space, but yet there must be patience for the next couple years to have the data that's beneficial to provide the best

solution and care to not only MENA group, but to all ethnic and minority groups within the state in regards to healthcare in the future. (*CAIR-ca Welcomes Governor Newsom Signing AB 91, Establishing MENA Data Reporting Category in California* | *CAIR California*, 2025).

Although it is an issue that still affects the needs of the MENA population, other groups may face the same obstacles. Having wide healthcare within the state is still important to provide for all groups, and it's one of the most important aspects of American society, especially in California, as it has one of the largest low-income populations of any state. Medi-Cal is the outlet for low-income families and individuals to earn the right to free healthcare within the state; therefore, it's a game-changer and needs more advocacy and support to help enroll individuals in the program. One of the chronic diseases that is a huge concern, not just in California but nationwide, is heart disease. There needs to be advocacy for heart disease, which is the primary cause of mortality within the state, in aspects including its care in Medi-Cal. There also needs to be advocacy for improvement in data to keep track and improve upon our future findings when it comes to mortality and improvement of care.

Medi-Cal can be one of the solutions that may help address mortality rates and the risk of heart disease across the state. If Medi-Cal coverage helps improve the issues with heart disease, that increase in the Medi-Cal program should decrease the mortality rate, and that's proof to our state that investing in Medi-Cal can increase preventive care throughout the state. Specifically, in this research, I am hoping to find a correlation between the percentage of Medi-Cal enrollment and the mortality rate of heart disease by exploring the years 2019 to 2022. I will explore the counties with the top 5 most enrolled counties within the state and assess different ethnicities amongst these different variables to see if certain ethnicities are impacted heavily.

Context and Significance

Medi-Cal was founded under the Welfare and Institutions Code WIC § 14000, and it was meant to support those who are in need of healthcare within the low-income population. Within the state of California alone, “15 million Californians relied on the program for health coverage in 2022” (California Code, Welfare and Institutions Code - WIC § 14000 | FindLaw, 2023).

Medi-Cal is very important for the population, as it has taken care of a lot of health-related services such as births, chronic illness, and emergency services.

Within the preventable heart disease space, it’s the leading cause of mortality in the United States and California. It’s common to find deaths within common heart illnesses such as coronary artery disease, heart attacks, hypertension, and many more. Many of these preventable heart issues are caused by behaviors that are encouraged within society, such as unhealthy eating, smoking, drinking, and so forth (Centers for Disease Control and Prevention, 2024). Not only does it have the highest mortality rate within the state, but it’s also an economic burden. Heart disease itself costs the country about \$417.9 billion from 2020 to 2021 to prevent the rise of the disease through preventive care (Centers for Disease Control and Prevention, 2024). Habits like these may be tough to break because of not only the encouragement within society, but also the lack of advocacy of services to help get rid of these addictions. Services like Medi-Cal help bridge that gap between advocacy for the communities that do not know anything about the health issue itself, and get help.

The reason why Medi-Cal enrollment is so important to California policy is that it will help our government and certain agencies within the state to pursue a path to advancing the program itself and its advocacy. Using correlational analysis of county-level data, it will showcase that there is a health disparity within Medi-Cal enrollments and heart disease mortality.

The correlation hopefully fulfills the research of other health disparities, improves, advocates, reduces disparity, and makes enrollment reach to those who are in need and makes enrollment much easier. It will also improve data accuracy when it comes to certain ethnic groups and what their needs are.

Literature Review

Cause-and-effect is closely related to how Medi-Cal enrollments could either decrease or increase the mortality of heart-related illnesses. A huge factor in Medi-Cal and how it expanded its benefits within the state of California is the Affordable Care Act. The Affordable Care Act was signed by President Obama, and its main goal was to expand health insurance coverage across the United States (KFF, 2024). This tremendously helped the low-income population of the state of California, as it is one of the largest states in the country that has this type of population. The act also expanded on how single adults who don't have families are also able to experience the benefits of Medi-Cal (KFF, 2024). A lot of the structures within literature about Medi-Cal tend to circle back to this act because of the wide expansion within the country, as well as the state itself. The Affordable Care Act has impacted this country, as it has improved insurance coverage, according to the KFF. The KFF is an independent source that focuses on health policy research; they collected many studies to showcase the Affordable Care Act on Medicaid expansion. Many of the studies that were collected by the KFF showcase that Medicaid expansion within certain states reduced the number of uninsured people due to the low-income community, as they are the ones that qualify, and also certain adult individuals may qualify as well (KFF, 2020).

Effects on Cardiovascular Health

Taking a look at cardiovascular health research is relevant to this project in this specific way because it contains literature of regions in the U.S that are suffering from cardiovascular disease, as well as its certain effects on ethnic groups. The research can also showcase disparities that might occur amongst different groups and regions. Literature can provide both mortality and hospitalization rates, which can help correlate with Medi-Cal enrollments to see if there's an existing disparity that needs to be solved. A paper by Baqar A Husaini explores hospitalization rates amongst ethnic groups that have faced heart attacks. The paper discovered that Black African and Hispanic Americans face higher rates of hospitalization due to heart failure than white Americans do. They also face a higher risk of heart failure, and hospitalization costs were too high, as seen for black Americans (Husaini et al., n.d.). Another paper by Sameed Ahmed M. Khatana explores the mortality rate of cardiovascular health and the expansion of Medicaid, and examines the effect of Medicaid on this specific issue. The research wanted to test the effect that the Affordable Care Act had on the country, and it was discovered that Medicaid in the newly expanded states saw a decrease in cardiovascular deaths, and within ethnic groups, African Americans and generally low-income death rates decreased (Khatana et al., 2019).

Medicaid's on Preventive Care

The whole point of having health insurance is to have constant preventative care for all issues that affect our health, which is why the Affordable Care Act played such a huge role in expanding healthcare for everyone. Another point is that this preventive care should be accessible to many, as that is what most Americans today face a lot of struggle in part of care, specifically in chronic diseases, search as anything that's cardiovascular involved. Medicaid expansion under the Affordable Care Act is so important because it allows for that competitive care to reach places that have never been reached before. In a paper by Steffani R. Bailey, she

explores how much preventative care exists for diabetes depending on insurance status. Her findings dictate that a person who is uninsured will result in “poorer diabetes control” (Bailey et al., 2015). This is because they can’t afford the services, even if clinics are hospitals. There has to be an advocacy for patients to understand how they can get help within the healthcare system, especially with the expanded coverage options via the Affordable Care Act (Bailey et al., 2015). Another way preventive care is expanded upon by Medicaid is in this study. In a study by Amy Finkelstein, it was tested in 2008 before the Affordable Care Act amongst low-income adults in order to see its effects on them and found out it was beneficial for that certain group. They discovered that Medicaid does increase in preventive care, as they saw more hospital and clinical visits in order to receive such care (Finkelstein et al., 2012). Medicaid allowed the people to get proper treatment and diagnosis for certain chronic illnesses diabetes and high blood pressure.

Within the literature that I examined, I do see certain gaps that I hope my research can cover. One of the gaps I saw within this literature was that it didn’t examine California as a whole, and not only that, but also not enough analysis at the county level. I hope that my research is able to break down California and its counties, and the way I’ll be doing this is by examining the top 5 most enrolled counties in Medi-Cal in the state, which are San Diego, Los Angeles, San Bernardino, Riverside, and Orange County. Another gap I saw was that it didn’t cover a continuous amount of years; it mainly covered the past couple of years, but not the recent ones. My research hopes to fulfill the 3 years between 2019 and 2022 because Medicaid has had time to expand amongst low-income adults in the country. A gap that the majority of the literature had was that it did not put huge emphasis on ethnicities. I hope to focus on the most predominant races in my study that are affected, which are White, Hispanic, and African Americans, and share how much of them apply. One of the last gaps I hope to bridge in my

research is to focus on advocacy for certain heart illnesses, as well as expanding Medi-Cal enrollment. A lot of studies are showing the results are offering solutions to how we can expand our medical care or prevent more of these heart issues. I plan to display the evidence and form advocacy to get things done within the state.

Hypotheses (Conceptual and Operational), and a Causal Mechanism

My underlying theory is that the more health-insurance enrollments there are, it will lead to an increase in access to preventive care and management of any chronic disease, which will then improve one's health and reduce mortality. My conceptual hypothesis is that with more higher enrollment and coverage of Medi-cal, there will be a decrease in the mortality of heart related diseases during the years of 2019-2022 because there would be more preventive care, which means more people will be able to go to hospitals and clinics to receive proper care on how to manage their preventable heart issues that will help decrease illness. My operational hypothesis would be that as Medi-Cal increases across the county level, the mortality of preventable heart illnesses such as hypertension, heart failure, and Ischemic would decrease from 2019 to 2022. The causal mechanism would be that with this hypothesis, there would be an increase in access to Medi-Cal within the state of California among the low-income, which would benefit a lot of the ethnic groups, specifically huge amounts of African Americans and Hispanics. Another causal mechanism is that with access to health insurance, there would also be an increase in preventive care, which is essential to heart disease, as such things as an unhealthy diet and smoking addictions can be taken care of much better since the minority now has access to these services. The causal mechanism would be that the cardiovascular risk would decrease, and the rates of heart disease mortality would decrease because there is an increase in health coverage and preventive care within the state and specific counties.

Research Design

In terms of my independent variable, that would be the Medi-Cal enrollment by each of the 5 counties, which are San Diego, San Bernardino, Riverside, Orange County, and Los Angeles, and that would be measured through a percentage between 2019 through 2022. I chose this specific variable to measure because it's able to show healthcare access within each county and displays that there would be an increase in insurance within the area. It's a way to see how much Medicaid was able to expand, and seeing its enrollments increase in different counties also displays the amount of the low-income population within each county. The data for the independent variable can be found in various databases, but a specific one would be through the CDHS (*Race/Ethnicity of Newly Medi-Cal Eligible Individuals - California Health and Human Services Open Data Portal*, 2016), which is a database that can be used to filter specifics about a population and county. As for the dependent variable, this will be measured by the mortality based on three types of heart diseases, which are hypertensive, ischemic, and heart failure, for every 100,000 individuals with preventable heart disease. This data would be available through the CDC, which can certainly also filter populations, counties, and the types of chronic illnesses to view. (CDC, 2024). I chose this specific variable to measure because Medi-Cal is able to improve these preventable heart issues through. Preventable heart issues can be taken care of by preventive care, treatment, which Medi-Cal is known to help solve. Two of the control variables that I want to focus on in this research were 1st the ethnicity. Ethnicity might influence the relationship between X and Y because certain biological factors may contribute to one's risk of heart disease. Another factor that can affect X and Y would be the location of the counties within the state of California. It can affect X because Medi-Cal might not have reached, for example, rural areas, and it can affect Y because not having a lot of Medi-Cal enrollments could either

decrease or increase the prevalence of heart disease within this area. For the control variables, I will make a rate for both Medi-Cal enrollments and heart disease mortality by dividing by the population of the ethnic group within each of the counties using the census data (*Census Reporter*, 2019). In terms of my unit of analysis and design structure of my research, I'm analyzing 5 counties, which have the highest enrollment within the scope of 3 years, and observing differences between Medi-Cal enrollment and the mortality rate of heart disease. This means that I will be observing multiple cases over time since the information that I will go through is continuous. The sample size of this research will be a 15-count per year, as 5 of the counties will be in California, and the temporal scope will range from 2019 to 2022, as the Affordable Care Act started having an effect in 2014, and this will show its effect in recent years.

Preview of Research Methods

In terms of the type of correlations that I will be running in my research, I will be using Pearson's R correlation. This type of correlational research examines if two continuous variables that are continuous variables have a significant relationship in any way, as both of these variables that I'll be dealing with have an increase and decrease over time. With the correlations, I will also be adding a regression line, as this will help see the correlation between Medi-Cal enrollments and the mortality of heart disease. It will also allow me to see how much of a difference the control variables make to the dependent and the independent variable. For the regression, I'll have to add a trendline in Excel. In terms of running statistical tests, Pearson r has its range from -1 to 1. -1 can mean a significant negative correlation, and 1 means a strong positive; anything else in between can be either a normal correlation or a weak one.

Results:

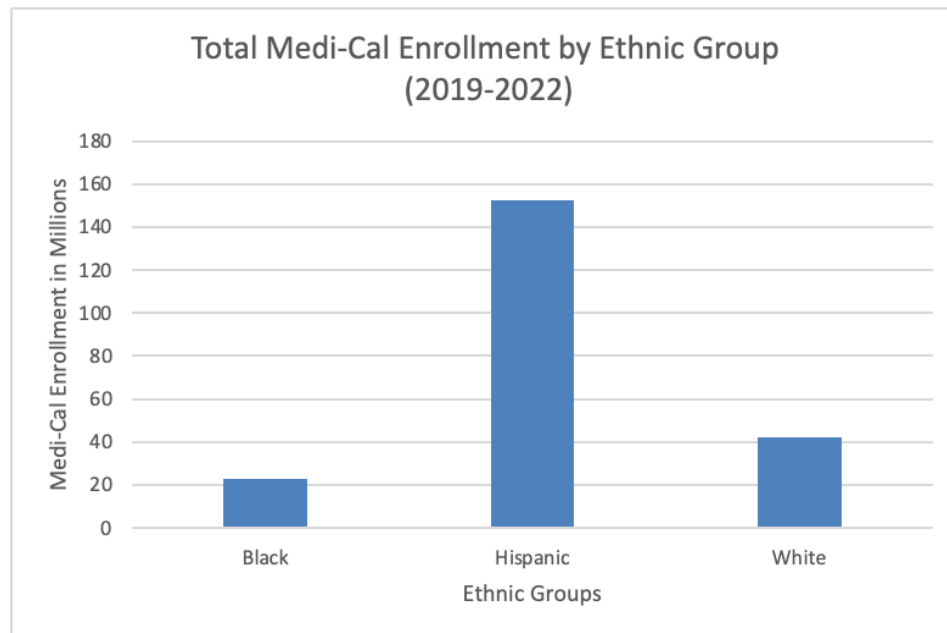


Figure 1: (*Data Source: CDHS*)

My 1st figure is a bar chart with each of the ethnic groups that I wanted to analyze, which were Black, Hispanic, and White. The data is pulled from the CDHS as they publicly release datasets that include many filters to process the data that is needed. The y-axis displays the number of enrolled medical enrollments in the millions, and the results of this bar chart display that across the 5 counties, the key takeaways are that Hispanics are the most enrolled in Medi-Cal between 2019-2022 and then by whites and blacks. The figure can make sense as the 5 counties that are examined are within the southern California region, therefore huge Hispanic populations all across.

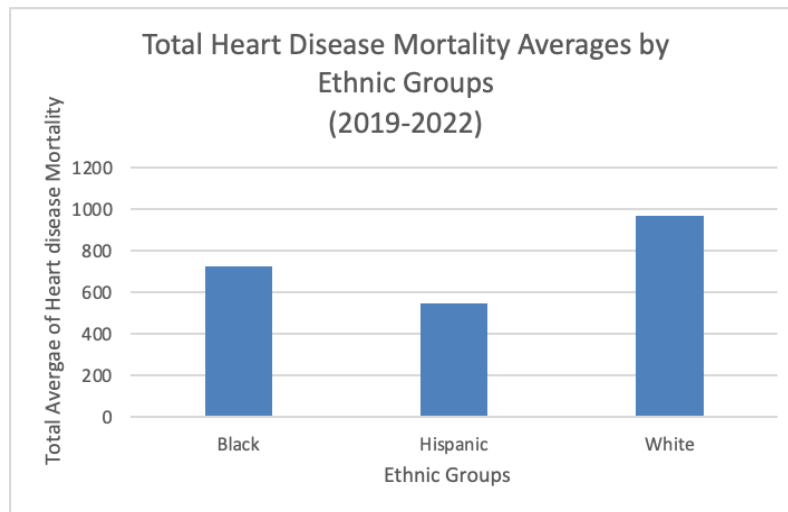
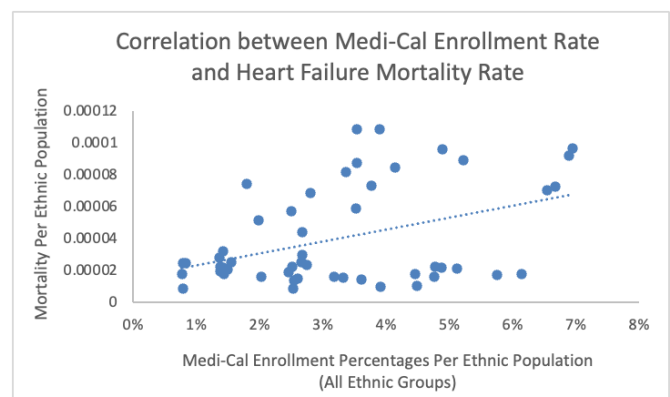
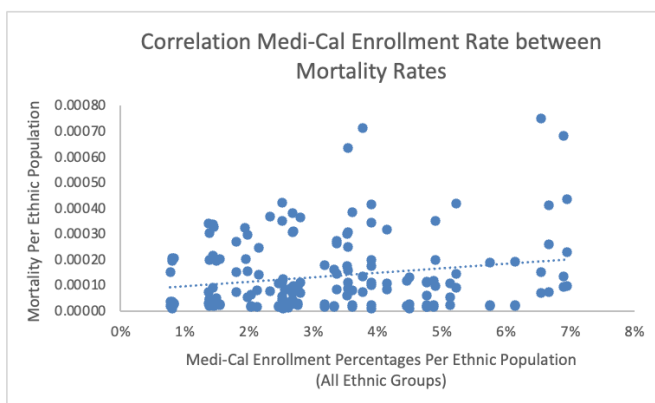


Figure 2: (Data Source CDC, 2024b)

The 2nd figure shows the average mortality of all 3 three ischemic heart diseases, heart failure, and hypertension, within the 5 counties in California, as well as the main ethnic groups, such as black, Hispanic, and white. The y-axis displays average mortality, and the x-axis displays the ethnic group. The main key takeaways were that the highest average mortality rate for heart disease would be among whites, followed by blacks, and then Hispanics.



Figures 3 and 4: (Datasource: CDHS, CENSUS, and CDC)

The 3rd figure displays the correlation between Medi-Cal Enrollment rate per ethnic population and the mortality rate of all 3 heart diseases per ethnic population. The way I was able to retrieve my independent variable was by taking the medical enrollments and dividing them by a control population of that ethnic group, so I'm able to get a rate for the x-axis. I also did the same for the mortality rate, where I divided the mortality rate by the control population of that ethnic group, which is the y-axis. This was done for each of the 3 heart diseases. For Pearson correlation, anything that is 0.4 or 1 and shows moderate to strong correlation, and anything below is a weak positive correlation. I performed a Pearson R correlation for each heart disease, all 3 heart diseases together. $r = 0.19693091$ (displayed in Figure 3), which defines the correlation to be a weak positive and is the weakest correlation. The strongest correlation out of the 3 heart diseases was heart failure, which was $r = 0.41164463$ (displayed in Figure 4). Followed by hypertensive $r = 0.393115064$ and Ischemic $r = 0.315757675$.

Discussion and Research Implications

As I said in my hypothesis, I believe that an increase in Medi-Cal enrollment would lead to a decrease in mortality from overall heart disease. My hypothesis did come as a shocker, and according to the weak positive correlations that I got, despite it being weak, a positive correlation meant that an increase in Medi-Cal enrollments meant that there was also an increase in the mortality rate within all three of the heart diseases. One of the strongest correlations that I had was with heart failure, showing that out of all three, the strongest positive correlation was that there are more heart failure deaths in correlation with a high number of Medi-Cal enrollments. I also predicted that Hispanics and blacks would rank amongst one of the top, and Hispanics were the top, but blacks were not, and instead, of white group was. I also predicted the higher mortality rate would be amongst blacks in Hispanics, but it turns out whites have the highest

mortality rate when it comes to heart disease, followed by blacks, and then. When it comes to the results, I believe there is a positive correlation between these two variables because of the population Medi-Cal serves.

Medi-Cal is a benefit to those who are in the low-income area, which means not only are they underprivileged, socioeconomic statuses are low as well. To my understanding, a person may have a clinic near them, but the environment that they live in may not allow them to get the care and management that they need for heart failure. For example, what if a person does have Medi-Cal, but this person may live very far from a clinic and does not have the resources to get to that clinic, which makes getting care much harder. Another example can be if they want to change habits, for example, their diet. How can they change their diet if they live in a food desert and can't acquire healthy foods? One's socioeconomic status plays a huge role when it comes to caring about one's health. If their socioeconomic status is very low, despite having benefits, they may not be of good use because they can't even use them in the 1st place. They can't drive, they can't take transportation to the clinic, and an area may have food deserts where they can't manage eating clean to prevent chronic disease from happening. All of these factors come that will affect one's use of Medi-Cal and other governmental benefits. My results allowed for a reflection that there needs to be advocacy, and to not just bettering Medi-cal and its services, but to also better once environment to use the benefits that they have received from the government, the state of California should uplift policies that better the overall results when it comes to the most essential things in life which are health and education Without the proper policies, people can not use the benefits to their advantages, which leads to an economic burden if we don't build an environment for the low-income and minorities to increase the use of these benefits.

Research Limitations and Research Extensions

A limitation that I had was the scope of the data that I was observing; I observed the data that was the majority during the pandemic and post-pandemic years, which may have affected the data that I had. I wish I had the data to access a decade from 2014 to 2024 because after 2014, the Affordable Care Act changed to allow single individuals to have Medi-Cal; it would have been nice to see data of a full decade rather than the three years that I had to do. Another limitation I say I had in doing my research is definitely could've added more control variables. I would've included ages to be a control variable and specifically something about the environment that would have affected the correlation. Another limitation I would say was focusing on the county level. I felt like if I had data on the individual level, the individual level would've had many different factors that may have affected correlation and had more precise data.

Knowing the information I know now, a study that I would like to see in the future is to see more ethnicity groups to be involved in study, it will be hard to find data for some ethnic groups like MENA, but the passing the AB 91 bill for example brings hope in the future for the other ethnicity for the collection of data to prosper to other studies in the future. I would love to see a research project that focuses on the exact individual variables when it comes to one's health. Knowing the person where they live and how they act and the habits that exist within them will always bring a more precise result. They may take a while; however, it will be worth seeing the results because they will be able to help with the encouragement of advocacy when it comes to certain issues with not just the health of any type of issue out there.

Conclusion

In conclusion, when it comes to the correlation of Medi-Cal enrollments and the mortality rate of heart diseases, it has resulted in a positive weak correlation amongst the total of all three

heart diseases, with the strongest of them being heart failure and the weakest of them being ischemic heart disease. The original hypothesis was to have many Medi-Cal to go up, and for heart disease mortality to go down. Fortunately, that was in the case; however, this result shines light on the Improvement of not just Medi-Cal benefits itself, but it also shines on the movement of one's socioeconomic status and the Improvement of low-income and underprivileged areas within the state of California. The results are meant to increase change and advocacy amongst the issues of heart health and improvement of one's living, such as their environment, and the encouragement to stay away from unhealthy habits. The research also shed light on the encouragement of tracking data, whether it's more data on a certain population or an increase in the temporal scope. Regardless of the more data that exists within academia, better results can be produced to support groups, governments, environments, and everything in between.

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