

PM 566 Final Project - California Supplier Diversity and Net Income

AUTHOR

Norma Marshall

Background and Research Question

To accelerate efforts to reduce health care disparities, hospitals and health systems increase their efforts in core areas such as staff and leadership diversity and cultural competence. However, the economic relationship between healthcare systems and the communities they serve are growing in importance.

Supplier diversity refers to when an organization procures goods and services from a variety of businesses, including those that are at least 51% owned, managed, and operated from marginalized and minority groups. These include women, veterans, African Americans, LGBTQIA+, and more. The private sector, including the healthcare industry has incorporated supplier diversity programs into their business practices after historically being adopted by the federal government and its contractors. According to the Harvard Business Review, supplier diversity programs are important in combatting social injustice and systemic racism in the US as they actively include diverse representation and inclusion in hospital operations and supply chains. In addition, for the moral and ethical arguments, supplier diversity programs have commercial in hospitals and health systems. These benefits include greater innovation and value through cost reductions, expansions of external partnerships, local job creation, better understanding of supply chain sourcing process and sources, and easier compliance with government and grant contracts.

On an annual basis (individual hospital fiscal year), individual hospitals and systems report detailed facility level financial data to the Department of Health Care Access and Information (HCAI). This data includes detailed facility level data on services capacity, inpatient/outpatient utilization, revenues, and expenses by type and payer. In addition, the Health and Safety Code Section 1339.85-1339.87 requires individual hospitals with operating expenses over \$50 million to report hospital supplier and diversity reports explaining the hospitals' supplier diversity statement and procurement efforts regarding minority, women, LGBT, and disabled veteran enterprises. Each hospital also reports tier 1 and tier 2 spend for each category of diverse suppliers. Tier 1 spend refers to the total amount of procurement dollars that an organization spends directly with a certified diverse supplier. Tier 2, on the other hand represents the total amount of procurement

dollars that an organization spends with a given supplier, who then sources products and services from another certified diverse supplier. Tier 2 relationships enable hospitals to increase diversity spend while working with existing suppliers or with suppliers who may possess rare capabilities.

Medi-Cal eligible patients are also a significant portion of the population in California, making up a large portion of the state's healthcare system. The HCAI's financial report also reveals the revenue generated by hospitals from Medi-Cal patients, offering valuable insights into the economic pressures that hospitals face while serving this demographic. As the hospitals system increasingly rely on reimbursements from Medi-Cal, it is important to examine how hospitals' procurement practices might influence their financial performance, including revenue from Medi-Cal patients.

This report merges the annual financial data and supplier diversity reports for 2023 to answer the question **Are California hospitals with diverse suppliers profitable?** Supplier diversity aims to increase innovation and drive down prices for supplies and goods through competition while also aiming to improve health equity and combat social injustice in the US through business practices. This exploratory data analysis aims to see if funds dedicated to goods and services from diversely owned businesses can lead to better financial outcomes.

Methods

A novel dataset was collected by merging two data sets, HCAI's Hospital Annual Financial Disclosure Report for 2023, and HCAI's Supplier Diversity report from 2023. Required by state law, supplier diversity and financial data are reported each year to the HCAI. Datasets were merged on the shared hospital name variable to create a comprehensive data containing both supplier diversity and financial metrics for each hospital.

Following the merge, several variables indicating procurement from diverse backgrounds were recoded to be used as numeric variables, allowing for quantitative analysis. Address related variables were recoded into latitude and longitude variables to facilitate geocoding using the tidygeocoder package for recoding and the leaflet package for visualization.

Frequency tables were generated to view top hospitals in net income, supplier procurement from different backgrounds, and demographic data. Maps were generated to locate the top performing hospitals and correlations were run to quantify the relationship between supplier procurement and hospital net income. Pearson's correlation coefficient was then calculated to assess the linear relationship between procurement ratios for each diversity category and net and Medi-Cal revenue. This quantified the economic impact of diversity procurement on hospital revenue. The correlation analysis allowed for the identification of any significant relationships between hospitals that allocate a higher percentage of procurement to minority suppliers and their corresponding medical revenue..

Demographics

In this report there are 372 hospitals with both financial and supplier diversity data reported the to the HCAI in 2023. On average these hospitals report earning over 24 million dollars over the course of the year and spend over \$9.6 million on supplies from diverse suppliers, totaling about 9 percent of the total dollars spent on the procurement on supplies annually.

A majority of these hospitals (320) serve urban areas in California, as demonstrated by large clusters of hospitals around major cities such as San Francisco, San Diego, and Los Angeles. Over 53% of the hospitals are nonprofit, including church related facilities. Average dollars spent on Tier 1, Tier 2, and total suppliers by each minority group were also reported (Tables 1–4).

Table 1. Summary Table of Hospital Data

Total Hospitals	Average Procurement from Diverse Suppliers	Average Total Hospital Procurement	Average Net Income
372	9577526	115754584	24413739

Table 2. Frequencies of Urban/Rural Hospitals

MSSA	Frequency
Rural	52
Urban	320

Table 3. Frequencies of Hospital Types)

Type_Control	Frequency
City or County	23
District	17
Investor - Corporation	50
Investor - Limited Liability Company	57
Investor - Partnership	11
Non-profit Corporation (incl. Church-related)	198
State	6
University of California	10

Table 4. Average Procrument Per Diverse Supplier (Tier 1/2/Total)

Ethnicity	Tier 1 Average	Tier 2 Average	Total_Average
African_American	1302770.29	185646.895	744208.59
Hispanic_American	588348.67	254509.757	421429.21
Native_American	35539.83	24126.947	29833.39

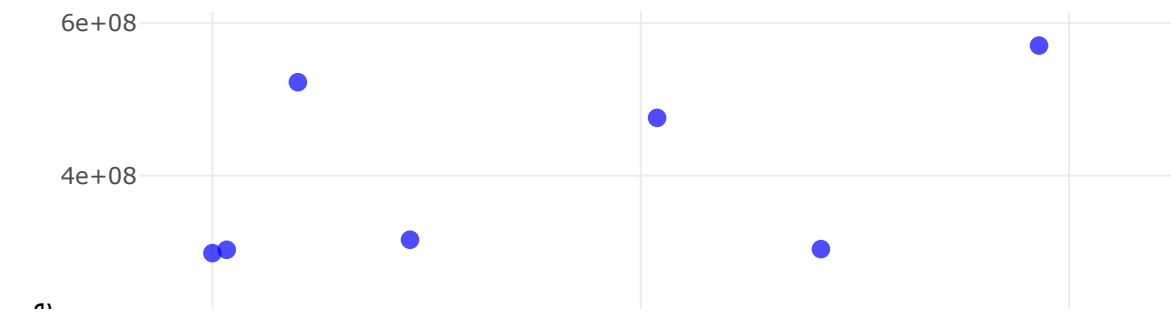
Asian_Pacific_American	1390579.95	1167240.569	1278910.26
Unknown_Minority	1449526.52	2139327.069	1794426.80
Minority	3861468.02	3529534.212	3695501.12
Women	1447968.35	3235173.272	2341570.81
LGBT	160599.12	6298.884	83449.00
Disabled_Veteran	356259.99	102076.073	229168.03
	462651.84	8936.943	235794.39
Total	5197962.10	6548381.092	5873171.60

How much are hosptials spending on supplies from minority owned businesses?

Washington Hospital in Fremont spends in the most on minority owned suppliers, followed by Stanford Health Care. These two hospitals hwoever, are major outliers compared to other hospitals in California. The interactive figure below omits these two hospitals to better depict the distribution of hospitals spending and spending n minority owned businesses. However its important to realize that any possible correlations could be driven by these two major hospitals. In specific categories, Kaiser Permanente in Santa Clara spends the most on African American suppliers while Stanford leads for Hispanic and Asian/Pacific Category. Washington Hospital in Fremont also is the top performer in the unknown minority category while, such as Kaiser Foundation Hospital - San Diego and Contra Costa Regional Medical Center, lead in categories like total women-owned and LGBT-owned suppliers, respectively (Table 5).

Table 6 shows the top-performing hospitals in terms of procurement from diverse suppliers, with Washington Hospital - Fremont leading in both “Total Unknown Minority” (76.71%) and “Total Minority” (80.61%). Langley Porter Psychiatric Institute excels in procurement from Asian Pacific American suppliers, accounting for 64.61% of its total procurement. Other hospitals, such as Providence Little Company of Mary MC - San Pedro and Kaiser Foundation Hospital - Modesto, show strong commitment to supporting women and disabled veteran-owned businesses, with 76.16% and 28.84% of procurement from these groups, respectively.

Interactive Scatter Plot of Combined Total vs. Net Income



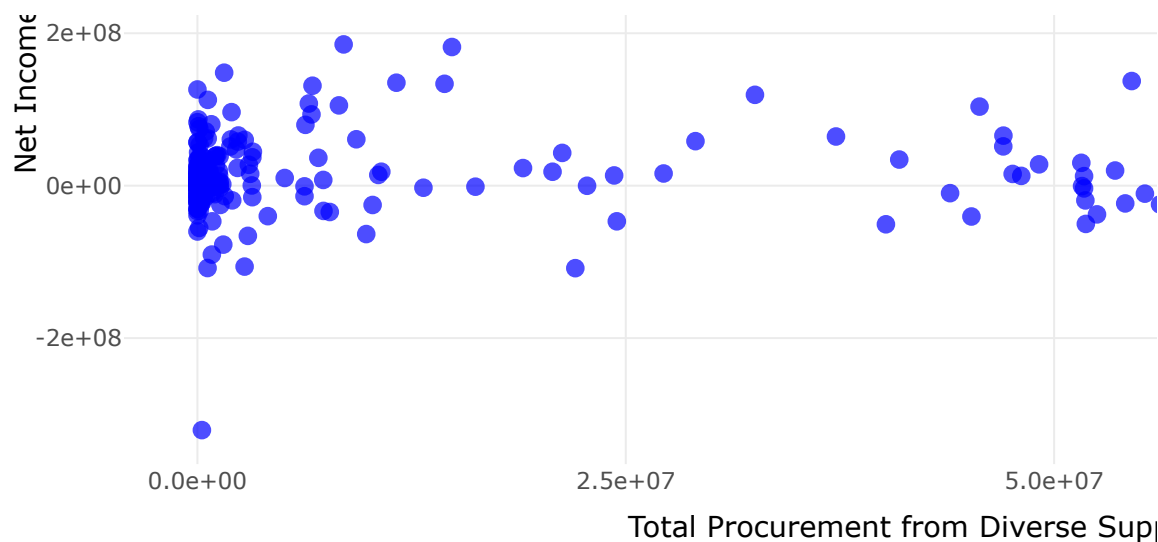


Table 5. Combined Total Spent on Minority Owned Suppliers

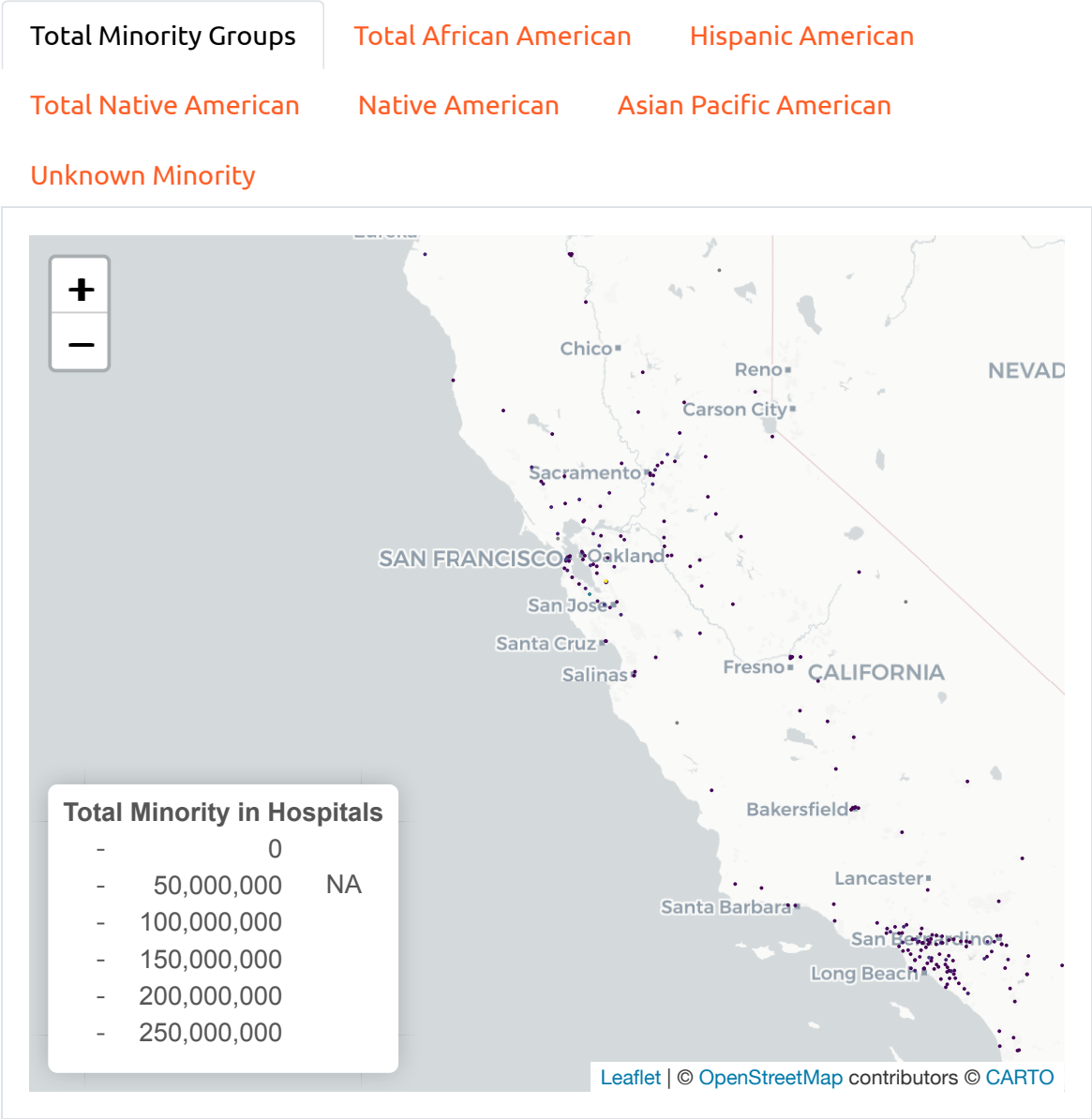
Hospital Name	Combined Total
WASHINGTON HOSPITAL - FREMONT	265276375
STANFORD HEALTH CARE	113963711
CHILDREN'S HOSPITAL OF ORANGE COUNTY	66667480
UCSF MEDICAL CENTER	54596986
KAISER FOUNDATION HOSPITAL - SAN DIEGO - CLAIREMONT MESA	50859953
KAISER FOUNDATION HOSPITAL - DOWNEY	46252720
KAISER FOUNDATION HOSPITAL - SANTA CLARA	45552873
KAISER FOUNDATION HOSPITAL - RIVERSIDE	38359794
KAISER FOUNDATION HOSPITAL - LOS ANGELES	37618486
CEDARS-SINAI MEDICAL CENTER	35384829

Table 6. Top Performing Hospitals by Category (percentage of of total procurment from diverse suppliers)

Top Hospital	% of Total Procurement	Category
L.A. DOWNTOWN MEDICAL CENTER	22.349809	Total_African_American
CENTRAL VALLEY SPECIALTY HOSPITAL	20.592258	Total_Hispanic_American
VIBRA HOSPITAL OF NORTHERN CALIFORNIA	6.802721	Total_Native_American
LANGLEY PORTER PSYCHIATRIC INSTITUTE	64.608417	Total_Asian_Pacific_American
LANGLEY PORTER PSYCHIATRIC INSTITUTE	64.608417	Total_Asian_Pacific_American
WASHINGTON HOSPITAL - FREMONT	76.707966	Total_Unknown_Minority
WASHINGTON HOSPITAL - FREMONT	80.610506	Total_Minority
PROVIDENCE LITTLE COMPANY OF MARY MC - SAN PEDRO	76.156133	Total_Women
CONTRA COSTA REGIONAL MEDICAL CENTER	14.718012	Total_LGBT

Where are the most diverse hopstials located?

Across categories and in total, a majority of hospitals that spend the most money on diverse suppliers reside in the bay or Los Angeles areas. However, there are a significant number of hospitals that spend a lot of money suppliers from women and disabled veterans in Southern California. Hospitals in northern California include a few state and University of California hospitals including UC San Francisco and Stanford (Refer to Interactive figure below).



What hopstials make the most money?

Regardless of supplier diversity, the top earning hospitals are in the bay area or Los

Angeles/Orange County areas. Cedars_Sinai, LA General, UCLA, and Childrens Hopsital are in the top 10 earning hospitals in California, however this does not mean they spend the most on supplies from minority owned businesses. (Table 7)

Most hospitals in the plot below net the average amount in income every year, with some like Eden Medical Center earning the least amount of income.

Table 7. Top 10 Hospitals by Net Income

Hospital Name	Net Income
STANFORD HEALTH CARE	808452386
CEDARS-SINAI MEDICAL CENTER	570706272
RADY CHILDREN’S HOSPITAL - SAN DIEGO	522677659
LOS ANGELES GENERAL MEDICAL CENTER	475854337
EL CAMINO HEALTH	315951240
RONALD REAGAN UCLA MEDICAL CENTER	303667992
HOAG MEMORIAL HOSPITAL PRESBYTERIAN	302767652
SHARP MEMORIAL HOSPITAL	298370158
CHILDREN’S HOSPITAL OF ORANGE COUNTY	234476380
KAISER FOUNDATION HOSPITAL - SANTA CLARA	231096595

Is diverse supplier procurement correlated with net hospital income?

To investigate whether or not the relationship between supplier diversity and net income for a hospital can vary between these two types of procurement from diverse suppliers. Correlations were ran between net income and supplier procurement.

There is moderate positive correlation between Tier 1 suppliers that are Hispanic, and women owned (0.59,0.60), as well a s total procurement from Hispanic owned suppliers. There is also a slight negative correlation between tier two supplier procurement from suppliers that are women owned, LGBT owned, and overall (<0) suggesting a negative correlation between increasing tier 2 procurement form diverse suppliers and net income. (Table 8)

Table 8. Correlation of Diverse Groups with Net Income in Tier 1, Tier 2, and Overall Procurement

Ethnicity	Tier 1 Correlation	Tier 2 Correlation	Total Average Correlation
African_American	0.1351333	0.0108867	0.1448981
Hispanic_American	0.4996018	0.0342794	0.5595856
Native_American	-0.0771883	0.0647724	0.0402558
Asian_Pacific_American	0.4564692	0.0483986	0.4980953

Unknown_Minority	0.0431228	-0.0720286	0.0159320
Minority	0.0431228	-0.0720286	0.0159320
Women	0.5396509	-0.0679769	0.5538011
LGBT	0.0602355	-0.0788490	0.0664886
Disabled_Veteran	0.2228526	-0.0021662	0.1661443

What about Medi-Cal Revenue?

Medi-Cal revenue is an important factor to consider when looking at procurement from diverse suppliers because hospitals that serve a higher proportion of Medi-Cal patients may face different financial pressures compared to those with a more commercially insured patient base. The correlation analysis shows that the relationships between diverse supplier procurement and Medi-Cal revenue are mostly weak and negative for several minority groups, indicating limited impact or a lack of strong association. However, procurement from diverse suppliers can still be a strategy to fulfill diversity and inclusion goals, potentially improve cost efficiency, foster local engagement, and ensure compliance with government contracts, which may influence financial outcomes and help advance community health equity objectives. (Table 9)

Table 9. Correlation of Percentage of total Procurment from Diversie Suppliers with Medi-Cal Net Revenue

Variable	Correlation with Medical Revenue
Total_African_American	-0.1457466
Total_Hispanic_American	-0.1192614
Total_Native_American	-0.0728584
Total_Asian_Pacific_American	-0.1193689
Total_Unknown_Minority	-0.0441306
Total_Minority	-0.0787851
Total_Women	-0.0588632
Total_LGBT	0.0478172
Total_Disabled_Veteran	-0.1052064

What are hospitals saying in their commitment to supplier diversity?

Each hospital is also required to report a supplier diversity statement to state their commitment to procuring from diverse suppliers. W To identify common themes, I highlighted the top 20 unique words and 3-word phrases to identify common themes in supplier diversity statements.

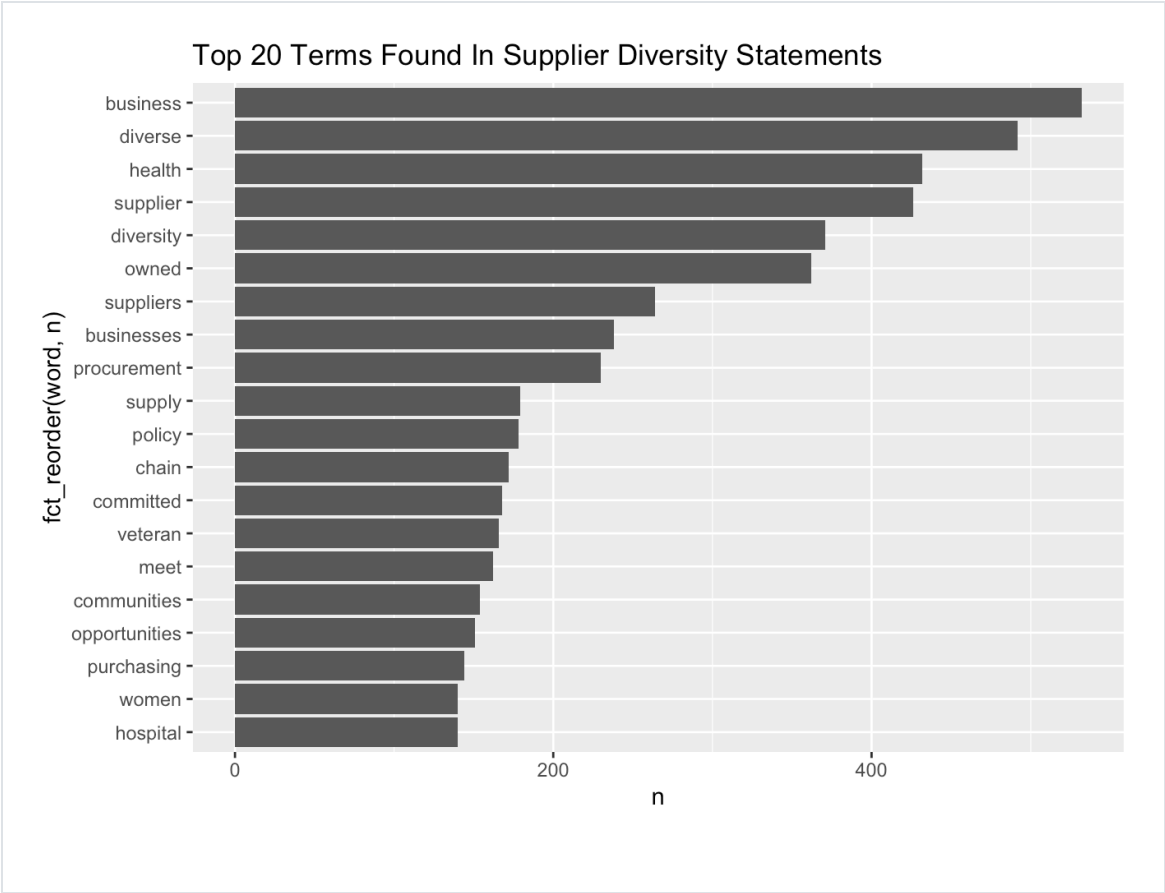
From this analysis suppliers have a strong commitment to procuring from diverse suppliers in order to support the business needs of the hospitals. They also aim to drive some sort of competition, possibly between suppliers to lower prices.

It is also important to note that many individuals submitting these reports on the behalf of hospitals may not choose to submit a diversity statement, but reported something to meet the requirement, thus many entries may have smaller nonsense terms like “N/A” or “relies on the University of California procurement policies”.

Top Terms Found in Supplier Diversity Statements

Top Tokens

Table 10. Top 5 TF-IDF values by hospital type



Supplier Diversity Statments

If you want to see the supplier diversity statement for a specific hopsital of your choosing you can enter in the search bar below!

Show

5

 entries

Search:

Hospital_Name	Supplier_Diversity_Statement
	Adventist Health is committed to providing equal oport compete and participate in the sourcing and procuremer creating an inclusive supply chain that recognizes and va

1	ADVENTIST HEALTH AND RIDEOUT	strengthens the relationships with the communities we s Health's Vision Statement: Compelled by our mission to l wholeness, and hope, we will transform the health exper physical, mental, and spiritual health; enhancing interact affordable.
2	ADVENTIST HEALTH BAKERSFIELD	Adventist Health is committed to providing equal opport compete and participate in the sourcing and procuremer creating an inclusive supply chain that recognizes and va strengthens the relationships with the communities we s Health's Vision Statement: Compelled by our mission to l wholeness, and hope, we will transform the health exper physical, mental, and spiritual health; enhancing interact affordable.
3	ADVENTIST HEALTH CLEARLAKE	Adventist Health is committed to providing equal opport compete and participate in the sourcing and procuremer creating an inclusive supply chain that recognizes and va strengthens the relationships with the communities we s Health's Vision Statement: Compelled by our mission to l wholeness, and hope, we will transform the health exper physical, mental, and spiritual health; enhancing interact affordable.
4	ADVENTIST HEALTH DELANO	Adventist Health is committed to providing equal opport compete and participate in the sourcing and procuremer creating an inclusive supply chain that recognizes and va strengthens the relationships with the communities we s Health's Vision Statement: Compelled by our mission to l wholeness, and hope, we will transform the health exper physical, mental, and spiritual health; enhancing interact affordable.
5	ADVENTIST HEALTH GLENDALE	Adventist Health is committed to providing equal opport compete and participate in the sourcing and procuremer creating an inclusive supply chain that recognizes and va strengthens the relationships with the communities we s Health's Vision Statement: Compelled by our mission to l wholeness, and hope, we will transform the health exper physical, mental, and spiritual health; enhancing interact affordable.

Table 11. Hospital Supplier Diversity Statements

Showing 1 to 5 of 372 entries

Conclusion

Overall, preliminary data suggest a potential positive relationship between procurement from supplier diversity and increased income for hospitals. This remains a critical priority for hospitals and medical centers throughout California. Notably, some of the highest-earning hospitals are not allocating significant resources to diverse suppliers. Further analysis with greater statistical power is essential to clarify this relationship. It is important to address health equity gaps and combat systemic racism and injustice by actively investing in and procuring from minority-owned businesses.

A potential other area of analysis could also include removing/isolating the amount of money spent on suppliers that are the industry standard. For example, Epic Health Systems is one of the industry leaders in electronic medical record software applications and holds medical records of 78% of patients in the United States. Its CEO and founder is businesswoman Judith Faulker who is was called “the most powerful woman in healthcare” by Forbes in 2013. n this dataset, as an industry leader, Epic Health Systems would still be categorized as a minority supplier due to Judith Faulkner’s ownership status. This presents an interesting dynamic, as Epic’s influence and widespread use could skew the analysis of diversity spend, highlighting funds allocated to suppliers who are industry giants. Examining the data specifically for minority suppliers who are not major players in their industries could provide valuable insights into how funds are distributed among smaller, potentially emerging minority-owned businesses and the unique challenges they face in achieving industry traction and growth.