

Health Infrastructure Accessibility in San Joaquin, CA

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Approval Page

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Executive Summary

The purpose of this study is to assess the health infrastructure and accessibility in San Joaquin, California through the existing conditions of the city, reviewing various cities facing similar conditions, and creating potential solutions or recommendations to be implemented into the city to accommodate growth and overall well-being in the community.

Health infrastructure and accessibility is important to every community since it has the ability to influence the quality-of-care individuals are able to receive. When it comes to infrastructure, it is important to determine the underlying health conditions the local population faces and whether the services provided are adequate in serving the population. As for accessibility, many rural, low-income communities such as San Joaquin and a plethora of other communities in Central California face a variety of hurdles to obtain sufficient healthcare. While accessibility can be determined through many factors, this project views accessibility to healthcare through the lens of affordability (cost), distance to medical services, and transportation options to access healthcare, and emergency medical services. All these factors play a large role in determining the accessibility of healthcare for populations located in rural areas around the state and potentially around the country. The purpose of this project is to illustrate the disparity in healthcare access in many rural areas of California and potentially throughout the United States and help bridge the gap between affordable and accessible healthcare in health desolate areas.

Background and Existing Conditions

Age and Gender

According to the Fresno County Economic Development Corporation (EDC), the City of San Joaquin's estimated population in 2023 will be 4,272. In Figure 1.1 shown below, the age and gender of the City is displayed into five year age intervals, where blue indicates males and red indicates females. This shows there is an overall equal number of males to females in the City. Additionally, it illustrates that there is a greater percentage of younger people compared to older people. The population of the City demonstrates a balance between the younger and older age groups.

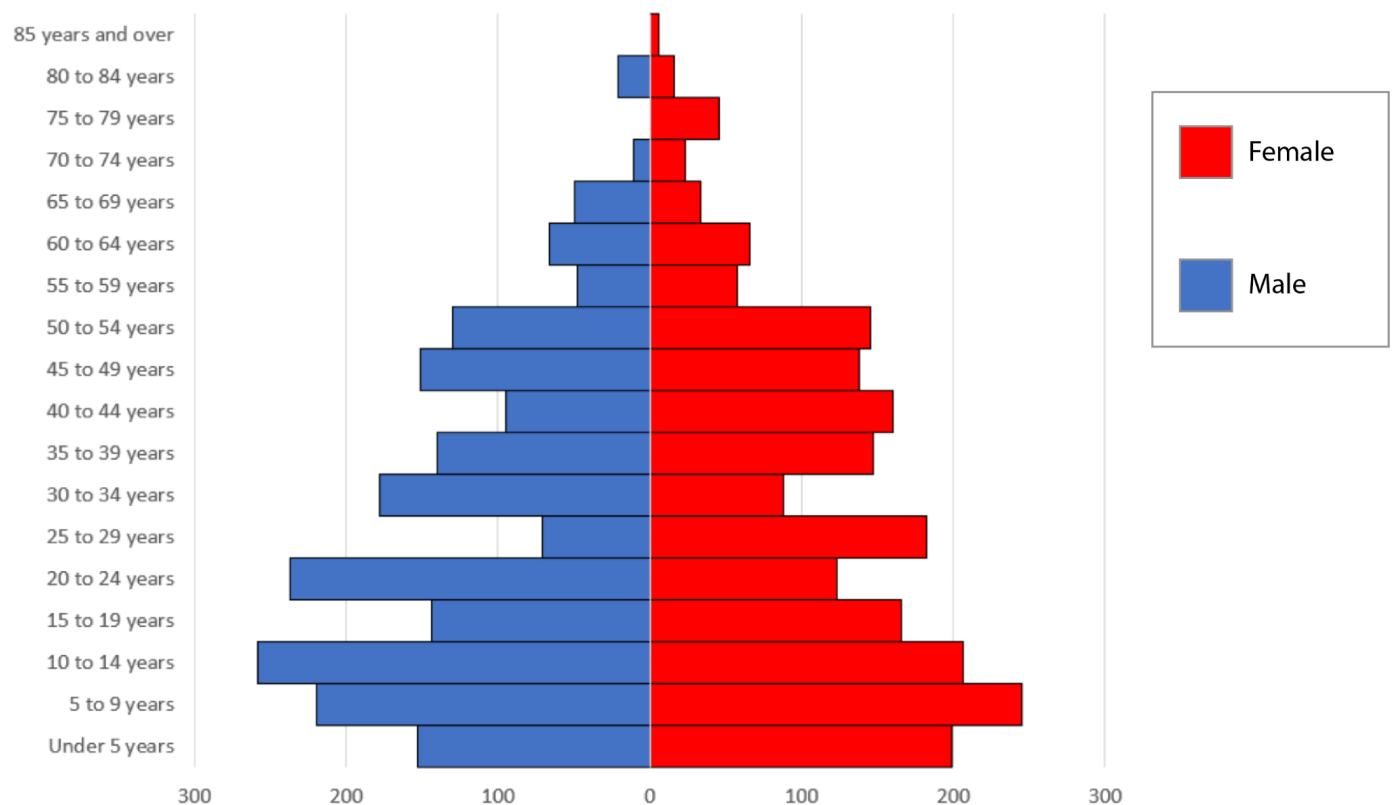


Figure 1.1: City of San Joaquin Population Pyramid (Source: American Community Survey, 5 Year Estimates, 2018, Table B05012).

Education

The City of San Joaquin's population of ages 25 and older show an average lower rate of educational attainment demonstrated in Figure 1.2 below. Roughly half of the City's population shows to have obtained less than a ninth grade education, while only 20 percent of the population obtained a high school education.

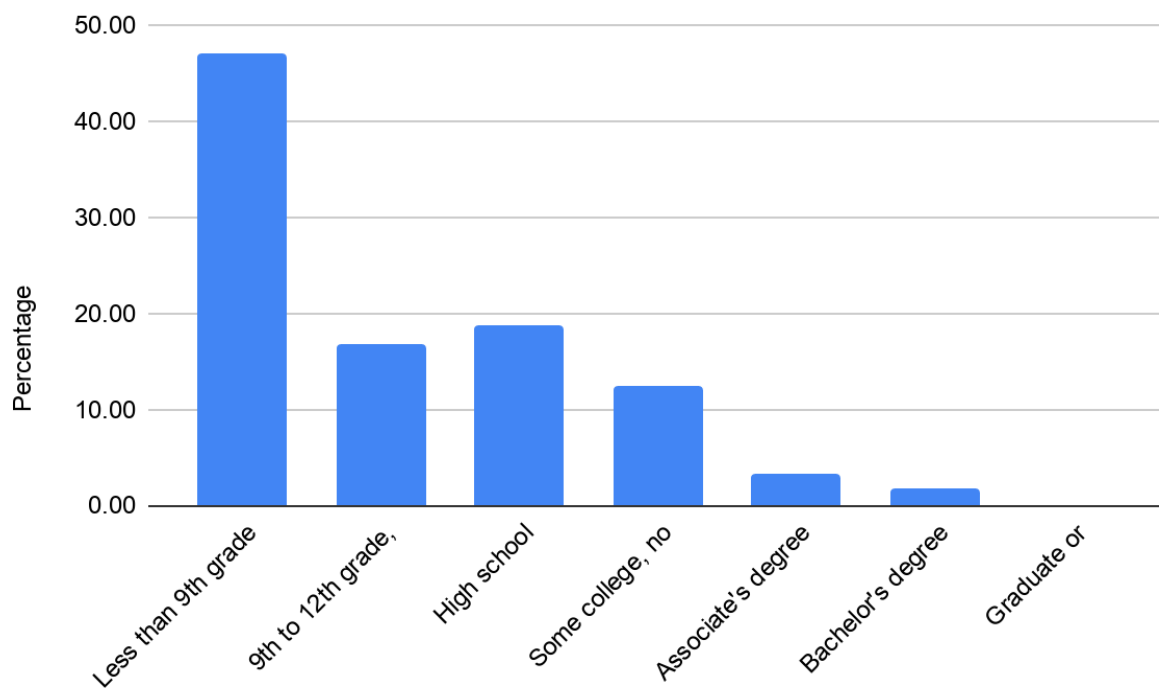
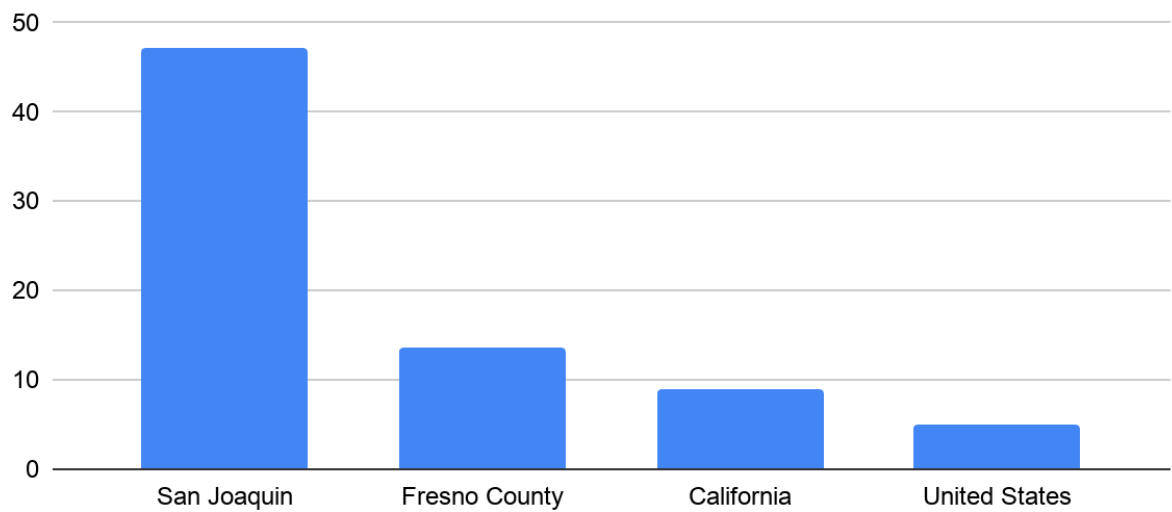


Figure 1.2: City of San Joaquin Percent Education of Population Age 25 and Older (Source: American Community Survey, 5 Year Estimates, 2018, Table S1501).

Figure 1.3 below shows the rate of San Joaquin residents ages 25 and older who completed less than a 9th grade education in comparison to the county, state, and country. This illustrates that the City's average education is significantly lower than average.



Percent of population 25 years and over who completed less than 9th grade in school.

*Figure 1.3: City of San Joaquin Percent Education of Population Age 25 and Older Comparison
(Source: American Community Survey, 5 Year Estimates, 2018, Table S1501).*

Income

The City of San Joaquin is considered a low-income community. The average household income in San Joaquin is approximately \$23,336 lower than Fresno County and is significantly lower than the state average by approximately \$45,984 shown in Figure 1.4 below.

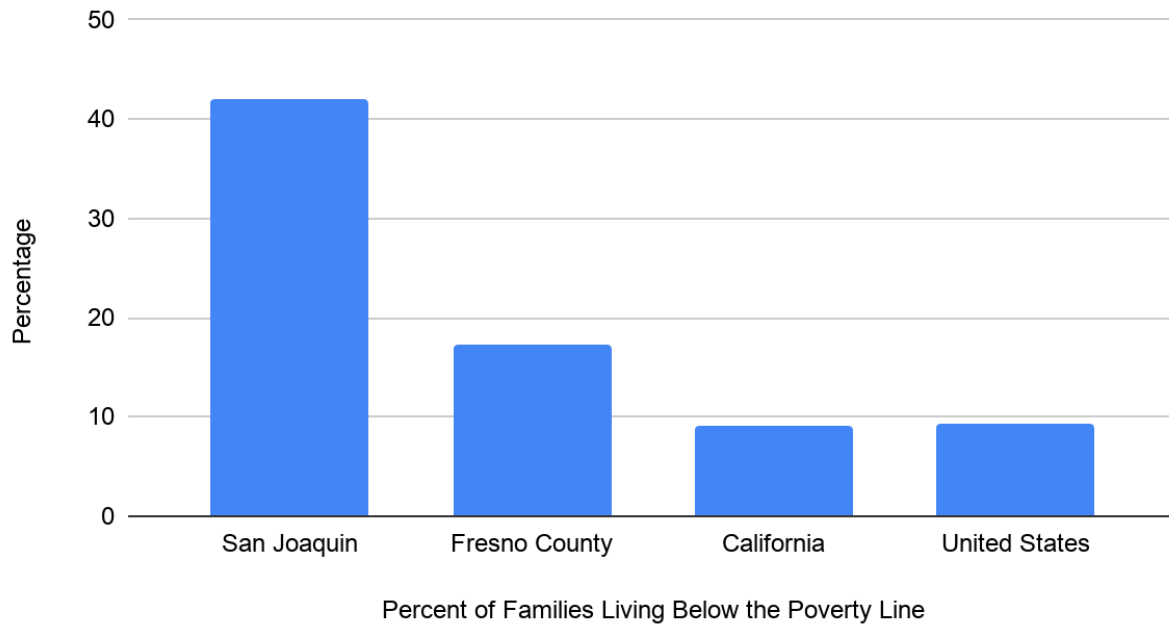


Figure 1.4: Percentage of Families in the City of San Joaquin Living Below the Poverty Line (Source: American Community Survey, 5 Year Estimates, 2018, Table S1702).

Table 1-1: Family Median Income by Size

Family Size	Median Income	Category	Number of Households	% of Households
2	\$16,979.00	Extremely Low Income	245	25%
3	\$16,875.00	Extremely Low Income	249	25%
4	\$35,435.00	Low Income	192	20%
5	\$40,682.00	Low Income	198	20%
6	\$56,458.00	Low Income	51	5%
7 +	\$121,250.00	N/A	46	5%

Family Median Income by Size in the City of San Joaquin (Source: American Community Survey, 5 Year Estimates, 2018, Table S1903).

This income disparity plays a large role in being able to afford medical services and transportation for medical services. Being primarily low-income and with large household sizes, it makes it increasingly more and more difficult to afford

basic necessities such as medical expenses. Another factor considered is the availability of health insurance, such as Medi-Cal and Medi-Care. Both are typically available to people of low-income status. However, it should be noted that some individuals depending on their immigration status would be ineligible to receive Medi-Care or Medi-Cal. Coupling both the low-income status with ineligibility to receive free medical services due to immigration status leaves a number of individuals unable to receive any medical services or attention.

According to the California Health Foundation, the Central Valley (Merced, Mariposa, San Joaquin, Stanislaus, and Tulare; Fresno, Kings and Madera Counties) have approximately 166,000 individuals who do not qualify for any medical assistance due to not eligible immigration status. (Dietz, Graham-Squire, Becker, Chen, Lucia, Jacobs, 2016). While this number does not properly reflect San Joaquin as a whole since it is a broad overview and scope of Fresno County and neighboring counties, it reflects how there is a large population of individuals who reside within the Central Valley who are immigrants and cannot receive medical treatment due to their immigration status.

Provided that San Joaquin has a strong foreign-born population, it is fair to acknowledge that many of these foreign-born populations likely are either unaware they are eligible to receive assistance, or they are ineligible due to their immigration status.

Nativity and Language

Approximately 46 percent (1,916) of the current population of the City of San Joaquin are foreign-born according to the 2018 American Community Survey (ACS). This is an overall higher percentage than the rest of Fresno County as a whole. Recent trends have shown the number of new foreign-born populations to decrease in the last few years, as 2010 had a lower percentage of new immigrants come into the City compared to the historical numbers before. (Fresno County Economic Development Corporation, 2015).

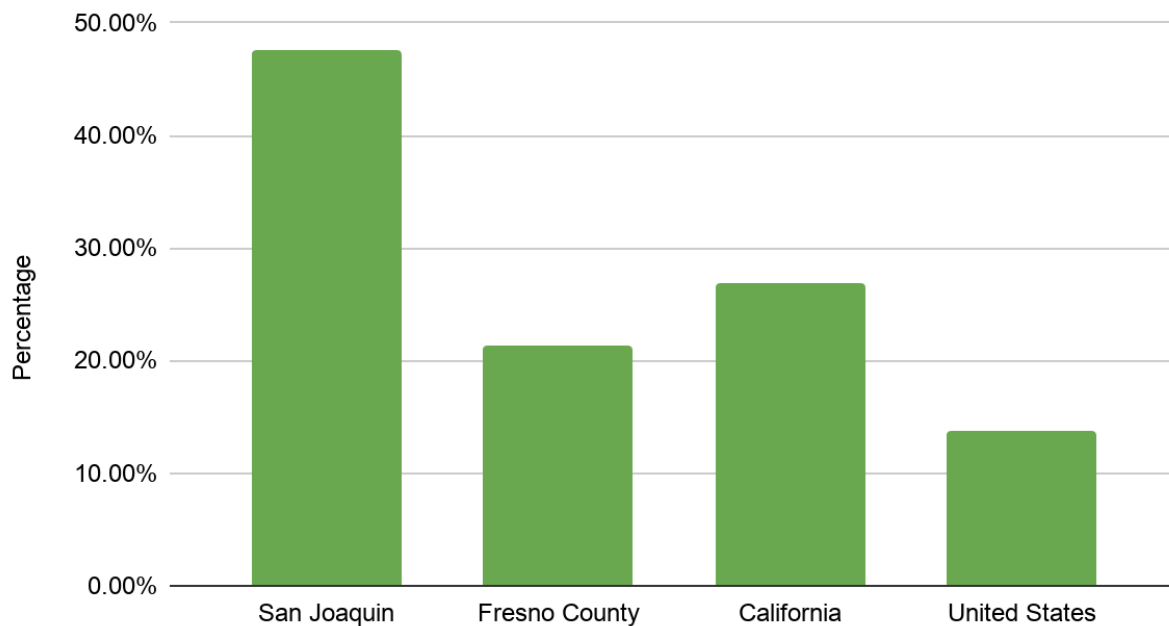


Figure 1.5: Percentage of Foreign-Born Residents in San Joaquin Comparison (Source: American Community Survey, 5 Year Estimates, 2018, Table B05012)

Furthermore, given the high amount of foreign-born population living in San Joaquin, it is evident to see that more than half of the population speaks English categorized as “less than very well.” As compared to the rest of the county, state, and country, this percentage is significantly higher than the average, shown in Figure 1.6 and Figure 1.7 below.

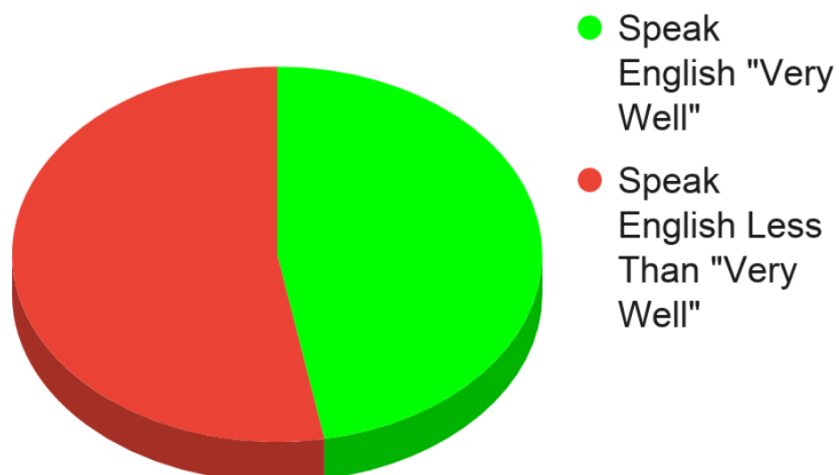


Figure 1.6: Percent of the City of San Joaquin Population Who Speak English “Very Well” (Source: American Community Survey, 5 Year Estimates, 2018, Table C116001).

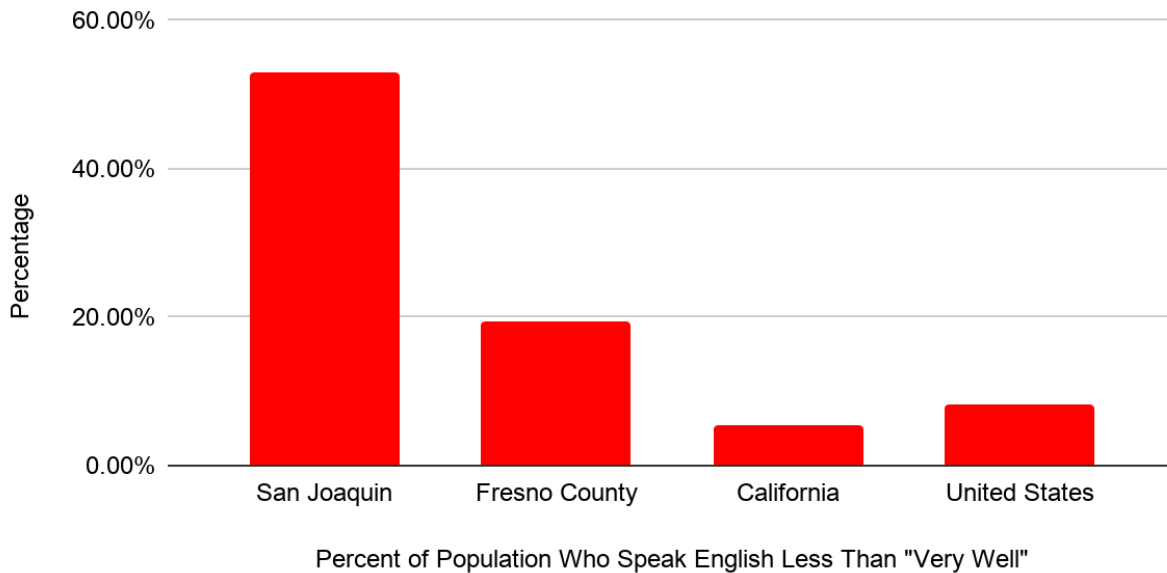


Figure 1.7: Percent of City of San Joaquin Population Who Speak English Less Than “Very Well” (Source: American Community Survey, 5 Year Estimates, 2018, Table C116001).

Air Quality

The City of San Joaquin is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and is listed as nonattainment for ozone, fine particulate matter (PM 2.5), and fine particulate matter (PM 10) in accordance with standards set by the State of California and the Federal Clean Air Act. This means that the air quality in the City is below the standards. There are several contributors to air pollutants in the City of San Joaquin as well as areas around the City which include transportation, construction, and agricultural operations. Air pollutants can be detrimental to the overall health of a community as Table 1-2 below shows potential health effects caused by these criteria pollutants (San Joaquin Valley Air Pollution Control District, 2010).

Table 1-2: Health Effects of Criteria Pollutants

Pollutant	Effects on Health and Environment
Ozone (O ₃)	<ul style="list-style-type: none">• Respiratory symptoms• Worsening of lung disease leading to premature death• Damage to lung tissue• Crop, forest, and ecosystem damage• Damage to a variety of materials, including rubber, plastics, fabrics, paint, and metals
PM 2.5 (Particulate matter less than 10 microns in aerodynamic diameter)	<ul style="list-style-type: none">• Premature death• Hospitalization for worsening of cardiovascular disease• Hospitalization for respiratory disease• Asthma-related emergency room visits• Increased inhaler usage
PM 10 (Particulate matter less than 10 microns in aerodynamic diameter)	<ul style="list-style-type: none">• Premature death & hospitalization, primarily for worsening of respiratory disease• Reduced visibility and material soiling

(Source: California Air Resources Board, 2020).

Existing Medical Services

The City of San Joaquin has a local health center located at 21890 W. Colorado Avenue called the Valley Health Team – San Joaquin Health Center. The health center currently provides medical, behavioral, and dental services for the community. The health center’s availability is limited to just being open on Monday, Tuesday, and Saturday. This medical facility’s primary service is to the local city, with limited health care services being provided. Any other emergency services or surgeries would be directed to the nearest hospital which is located in Fresno.

According to Fresno County Operations as of 2021, there are a total of nine hospitals within the county. As shown in Table 1-3, there are no hospitals within

the City of San Joaquin. Figure 1.8 below displays the location of the existing Valley Health Team – San Joaquin Health Center (shown in the red star symbol) and the distance of several, but not all, hospitals in Fresno County (shown in the blue location mark symbol) located in cities nearby San Joaquin. There are currently no hospitals located within San Joaquin, as the closest one is located in the City of Kerman, which according to Google Maps is roughly a 22 minute drive and within a 30 mile radius from the center of San Joaquin.

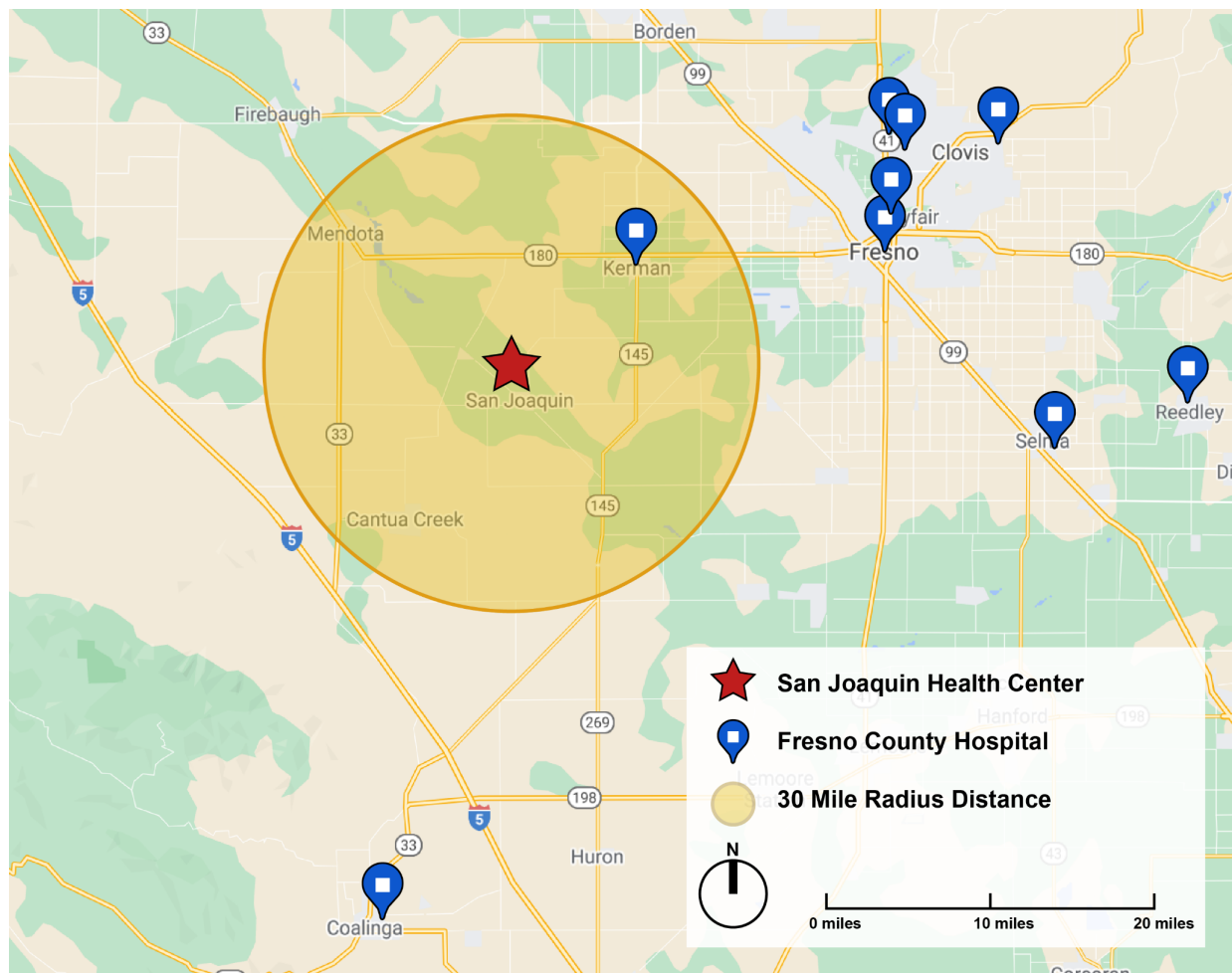


Figure 1.8: Map of Fresno County Hospitals Nearby the City of San Joaquin.

Table 1-3: Hospitals in Fresno County

Agency	Address	Distance from San Joaquin (Miles)
1. Coalinga Regional Medical Center	1191 Phelps Ave., Coalinga, CA 93210	~40.7 miles
2. Community Medical Center - Clovis	2755 Herndon Ave. Clovis, CA 93611	~40.9 miles
3. Community Medical Center	2823 Fresno St., Fresno, CA 93721	~30.2 miles
4. Kaiser Foundation Hospital	7300 N. Fresno St. Fresno, CA 93720	~36.8 miles
5. St. Agnes Medical Center	1303 E. Herndon Ave. Fresno, CA 93711	~37.6 miles
6. Adventist Medical Center - Selma	1141 Rose Ave. Selma, CA 93662	~41.9 miles
7. Adventist Medical Center - Reedley	372 W. Cypress Ave. Reedley, CA 93654	~34.5 miles
8. Veteran's Administration Medical Center	2615 E. Clinton Ave. Fresno, CA 93705	~31.6 miles
9. Valley Health Team - Kerman Health Center	449 S Madera Ave, Kerman, CA 93630	~15.2 miles

Existing Emergency Services

Fresno County has an official office of emergency services (OES) located on 1221 Fulton Street in the City of Fresno. The Fresno County OES maintains and develops the Fresno County Operational Area Master Plan, which serves as a guide for the county's response to emergencies and disasters. During the non-disaster periods, the Fresno County OES is responsible for coordinating information on Emergency Management training opportunities, updates, and enhancing crisis incident management systems and emergency plans. The office is open from Monday to Friday, from 8AM to 5PM. Fresno County's OES is located within the Department of

Public Health and is responsible for response, planning, and preparedness for disasters that occur in the fifteen unincorporated cities in the County, including the City of San Joaquin.

According to Fresno County Operations as of 2021, there are a total of seven ambulance provider agencies within the county. As shown below in Table 1-4, there are no ambulance provider agencies within the City of San Joaquin. The closest provider to the City of San Joaquin is the American Ambulance located in the City of Fresno, which is roughly 31 miles away and an estimated 33 minute drive.

Table 1-4: Ambulance Provider Agencies in Fresno County

Agency	Address	Distance from San Joaquin (Miles)
1. American Ambulance	2911 E. Tulare St., Fresno, CA 93721	~30.9 miles
2. California Highway Patrol Helicopter	3770 N. Pierce, Fresno, CA 93727	~34.8 miles
3. Coalinga City Fire	300 W. Elm Ave., Coalinga, CA 93210	~41.2 miles
4. Kingsburg City Fire	1880 Bethel, Kingsburg, CA 93631	~37.5 miles
5. Sanger City Fire Department	1700 Seventh St, Sanger, CA 93657	~44.4 miles
6. Selma City Fire Department	2857 A Street, Selma, CA 93662	~33.3 miles
7. Sequoia Safety Council	500 E. 11th Street, Reedley, CA 93654	~41.6 miles

Transportation

The City of San Joaquin has limited transportation options. There is only one existing public transportation option within the City being the county bus line. Even with a county bus running through town, it is extremely limited in terms of frequency and the number of stops. The San Joaquin Intercity bus route is the only bus that runs through San Joaquin at an infrequent rate. Examining the bus route map, if one were to have a medical emergency within San Joaquin and relied heavily on the intercity bus line as their main form of transportation, it would be difficult to reach the nearest hospital given all the obstacles inhibiting one from reaching their destination.

Other potential transportation services could include rideshare, such as Lyft and Uber. However, since San Joaquin is a rural community and far from the main metropolis of Fresno, there are extreme limitations and availability to any rideshare services reaching San Joaquin. If there were any rideshare services in San Joaquin, it would also not be as economically feasible for an extremely low-income community such as San Joaquin to be reliant on rideshare services as the primary transportation method to reach necessary services such as hospitals and medical offices.

Additionally, the Valley Health Team – San Joaquin does not offer any dial connections or taxi service as an option for patients to reach the medical office. Ultimately, San Joaquin is a city that is heavily reliant on personal automobiles as the main form of transportation. Without a personal vehicle, it would be difficult for any individual to travel further distances.

According to the research conducted on emergency medical services response times titled *Costs of Emergency Department Visits in the United States* by Brian J. Moore and Lan Liang, the average emergency medical response time in rural areas, such as San Joaquin, is 26 minutes. It is important to note that the determination of the level of service in San Joaquin was unable to be calculated,

as several attempts to contact various organizations in San Joaquin failed. Using a best estimate, the response time in San Joaquin would be similar, if not worse, given the distance emergency services would need to travel in order to get to the City from the nearby urban centers.

Medical Costs

Emergency services are a critical part of providing healthcare and services to the community. According to Dr. Brian Moore and Dr. Lan Liang's article in the Healthcare Cost and Utilization Project, *Costs of Emergency Department Visits in the United States, (2017)*, more than 13 percent of the U.S. population visited the emergency department in the year 2017. (Moore, Liang, 2020) Considering the population of the U.S. was approximately 325 million people at the time (United States Census, 2021), that would indicate over 42 million people needed medical assistance that required emergency services to respond. Interestingly enough, female patients are affected disproportionately compared to their male counterparts. According to Dr. Moore and Dr. Liang, 55 percent of the emergency department visits were from female patients compared to only 45 percent of the cases being male (Moore, Liang, 2020). Consequently, the cost of emergency department visits was also greater for females compared to males. The costs of visits could be an inhibiting factor for people who need emergency medical attention from receiving the care they need. According to the article, the primary payer of the emergency medical costs was Medicare. Medicare is the national healthcare primarily provided to citizens who are age 65 or older. With most of the emergency department costs being paid by Medicare, this likely means most of the patients being admitted to the hospital via medical emergency are likely age 65 or older.

When examining the cost of emergency department visits in rural areas, the age 64 and older represented the largest share of the cost of emergency department visits. The demographic of age 64 and older comprise more than 32 percent of the emergency department visits in rural areas, shown in Figure 1.9. As the population

ages, there will be a heavier reliance and demand for emergency medical services since research shows the average primary patient is 64 years old and older. Since San Joaquin’s demographic demonstrates that the average population in the City is still considered relatively “younger” than most municipalities, medical service costs will be a concern in the near future as the population continues to age.

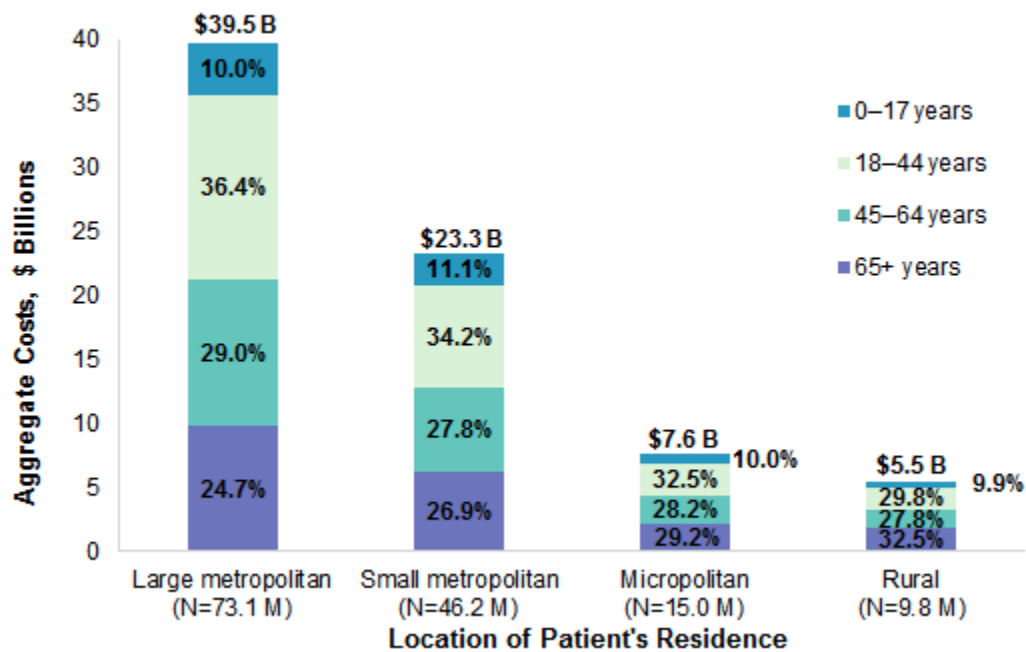


Figure 1.9: Emergency Department Visit Cost by Age and Location (Source: Moore, Liang, 2020).

In addition, in these rural communities such as San Joaquin, the predominant patients of these communities were from the lowest income population of these communities. This demonstrates how medical costs disproportionately affect low-income communities and impact them significantly more than middle to high income communities which do not heavily rely on government subsidies and assistance for healthcare.

Literature Review

Introduction

Literature and studies are important to review and analyze as they can provide a variety of resources and information to make well-rounded conclusions. In this research, different studies ranging from cost of insurance to transportation times were analyzed to understand the potential impacts these different variables could have on the viability of healthcare expansion. Additionally, this research provides more insight on potential policies or programs that can be created to help address any issues. It is important to note these studies are not entirely applicable to the City of San Joaquin, as some of them are conducted in various parts of the country that may have outlying factors that could have impacts on the results of the study. However, they all have compelling evidence that should be considered and could be potentially impactful in formulating findings and next steps for the future of healthcare in San Joaquin and other rural areas in the state of California.

Health-Care Utilization as Proxy in Disability Determination

There are various factors that affect an individual's access to and usage of healthcare services. This peer-reviewed article by the National Academies of Sciences, Engineering, and Medicine from Washington D.C. showcases many individual and societal determinants of healthcare utilization. Particularly, insurance and the ability to pay for medical services is a major factor to healthcare service accessibility. The major determinants of healthcare utilization mentioned in this article were categorized into two main factors: the health status of patients, and the need for healthcare services (Levesque, Harris, Russell, n.d.). The social determinants mentioned are:

- Education
- Economic stability
- Community safety

- Adequate housing availability
- Health food availability

According to the article, access to healthcare can be defined as “having timely use of personal health services to achieve the best possible health outcome: (IOM, 1993). Addressing both social and major determinants can begin at an individual scale. It is important to acknowledge that in order to provide improved access to healthcare, there needs to be a strong relationship between the patients and the providers through “mutual communication and trust” (AHRQ, 2010). Establishing clear and efficient communication between those in the healthcare industry and patients will promote a more inclusive healthcare system for communities and establish a stronger need for healthcare accessibility.

Patient-centred Access to Health care: Conceptualising Access at the Interface of Health Systems and Populations by Dr. Jean-Frederic Levesque, Professor Mark F. Harris of the University of New South Wales, Sydney, and Professor Grant Russel of Monash University provides a more structured definition of healthcare accessibility through the idea of the five dimensions of accessibility: “approachability, acceptability, availability and accommodation, affordability, and appropriateness” (Levesque, Harris, Russell, n.d.). Overall, they viewed that access was the opportunity to identify healthcare needs, to obtain healthcare services, and to have these services fulfilled. They saw healthcare access as a “continuum: even if care is available, many factors can affect ease of access to it” (Levesque, Harris, Russell, n.d).

Without a doubt access to healthcare is intertwined with the affordability of health insurance and a main factor of healthcare disparities. According to *Equitable Access to Care – How the United States Ranks Internationally* by Karen Davis from the Department of Health Policy and Management and Assistant Scientist Jeromie Ballreich both from John Hopkins School of Public Health, “low-income people and the uninsured have been greater in the United States than in other high-income countries” (Davis, Ballreich, 2014). The Kaiser Commission on Medicaid and the Uninsured explains that individuals who lack insurance

coverage have poorer access than individuals who are insured, as 20 percent of uninsured adults in 2015 went without necessary medical care due to the cost of it (Tolbert, Orgera, 2020). Additionally, they reported that uninsured individuals between the ages of 18–64 years old are more likely to have difficulties in affording medical care compared to those who are insured with Medicaid or private coverage (Tolbert, Orgera, 2020).

Distance from Medical Services to Treatment Correlation

The association between the differences in travel time and distance to medical services and the health outcomes of patients is a factor regarding the accessibility of healthcare infrastructure. Lessons and takeaways from this peer-reviewed article showcase the difficulties regarding studies involving public health accessibility and city planning that can affect the studies' results and data.

108 studies were conducted and met the inclusion criteria of this topic. A term coined by the authors of the article is the *distance decay association*, which they defined as being able to “identify that those who live closer to healthcare facilities have high rates of usage after adjustment for need than those who live far away” (Woo, Kygiou, Bryant, Everett, Dickinson, 2012). There was a variation in data due to differences in geographic location, the types of healthcare facilities, and inconsistencies in calculating travel times. Shown in Table 2–1 below are the results of the quality assessment of the studies. The authors expressed that the main area of concern was how the studies were funded (Woo, Kygiou, Bryant, Everett, Dickinson, 2012).

Table 2-1: Quality Assessment of Medical Service Studies

Table 1

Quality assessment of studies n (%)

	Yes	No	Unclear/partial
Did the study address a clearly focused question?	108 (100%)	0	0
Was the study population recruited in an acceptable way?	105 (97.2%)	0	3 (2.8%)
Did it include all the population or describe the population not included?	97 (89.8%)	7 (6.5%)	4 (3.7%)
Was the method used to calculate the distance/travel time reported accurately?	85 (81.5%)	23 (18.5%)	0
Was the health outcome accurately measured to minimise bias?	108 (100%)	0	0
Have important confounding factors been taken account of in the design or analysis?	90 (83.3%)	17 (15.7%)	1 (1%)
Is the funding source external to the organisation?	68 (63.0%)	16 (14.8%)	24 (22.2%)
Was the research peer reviewed?	101 (93.5%)	0	7 (6.5%)

Source: Kelly, Hulme, Farraghe, Clarke, 2016.

These studies were able to measure distance through different types of measurements, such as straight-line distances or road network-based distance (e.g. the shortest route or the quickest route). These measurements were conducted using geographic information system (GIS) software such as ESRI ArcGIS, MAPINFO, and ARCHinfo. Additionally, the studies utilized online routing websites such as Google Maps, Mellisa, and Mapquest (Kelly, Hulme, Farraghe, Clarke, 2016).

Another term coined by the authors is the *distance bias association* which is when their studies show evidence of an association between patients living further away from the healthcare facility and having better outcomes or higher access rates to healthcare service compared to those living closer. These studies were categorized under the three groups of: distance decay association, distance bias association, and no association (Kelly, Hulme, Farraghe, Clarke, 2016).

Overall, the results of these multiple studies were that 77 percent of the results “showed that patients living further away from healthcare facilities had worse health outcomes compared to those who lived closer” or a distance decay association (Kelly, Hulme, Farraghe, Clarke, 2016). Six out of the 108 studies showed a distance bias association, and 19 showed no association (Kelly, Hulme, Farraghe, Clarke, 2016). These health outcomes included survival rates from the health issue, the length of stay in the hospital, and non-attendance at follow-up medical appointments. Although these results were considered mixed, the limitations of each study should be acknowledged, such as this being the first synthesized evidence on the association between differences in travel time and distance to healthcare services and health outcomes. The results of these studies cannot be ruled out, but they should be considered within existing and new healthcare services, especially in tight-knit rural communities such as San Joaquin.

Emergency Medical Services Response Times in Rural, Suburban, and Urban Areas

Emergency response times can be an impacting factor that people consider when determining whether to utilize such services. In this article, it compares the response times for emergency services in rural, suburban, and urban areas, particularly linking the response between receiving the emergency 911 call and the response of emergency medical services. According to research, the average response time to a 911 call for emergency medical services is seven minutes from

the time of the 911 call to the arrival of the first responder. However, this average time doubles in time in rural areas to 14 minutes with one in ten of these emergency calls ending up having a more than 30 minute wait time (Gonzalez, Cummings, Phelan, Mulekar, Rodning, 2008). This increase of wait time has significant impacts on the individual as research shows the longer the response time and the lack of medical attention leads to worse conditions for any trauma patients and can lead to ultimately life threatening conditions. For small, rural cities like San Joaquin, it shows that emergency services are extremely important when it comes to the impact they can have on patients. Considering the nearest hospital with emergency services is located more than 30 minutes away by automobile, there is likely a correlation between the impact and severity of the trauma and the response times of emergency providers. (Gonzalez, Cummings, Phelan, Mulekar, Rodning, 2008).

Does Increased Emergency Medical Services Prehospital Time Affect Patient Mortality in Rural Motor Vehicle Crashes? A Statewide Analysis

Emergency medical services have the potential to save a person's life. Researchers conducted a study in Alabama analyzing and comparing the emergency response times in both rural and urban areas. It is important to note, this study was conducted in the state of Alabama which may have differing protocols or regulations compared to the state of California.

The methodology used to determine the relationship between Emergency Medical Service (EMS) and patient mortality rate was cross examined with EMS response times with the location of the patient calls and police vehicle crash records. The primary indicator for tracking an EMS call in this study is for car accidents or crashes. It is important to distinguish this for this study since EMS can be utilized for a multitude of reasons and crashes are a small sample size of the greater number of calls requiring EMS.

The result of the study illustrated and reaffirmed what was anticipated from the study. The study showed that EMS response times for rural areas were significantly slower than in urban areas. Interestingly enough, a significant number of accidents recorded and required EMS response were in areas determined as rural. Nearly 75 percent of all the accidents were in rural areas while only about 25 percent of accidents are in urban areas. The overall response, transport, and at-the-scene time in rural areas were nearly double the duration of the overall response times in urban areas. In cases in which mortality occurs, the total average response time in rural areas was approximately 42 minutes pre-hospital versus 25 minutes in urban areas (Pre-hospital is the time it takes for EMS to respond and transport patients to the hospital). Compared to the EMS response time with survivors, rural response times was an average of about 11 minutes compared to only nine minutes in urban areas. As one can see, the response time of EMS has a heavy impact on the survivability for patients. The survivability response time is less than half of the mortality response time for both rural and urban areas. The overall study demonstrated that response times have a great impact on mortality rates, as the increase in pre-hospital response time correlated directly with the higher percentage of fatalities (Gonzalez, Cummings, Phelan, Mulekar, Rodning, 2008).

Case Studies

Kettleman City, California

Kettleman City is a small census-designated place located in Kings County. The population of the city is 1,136 which is relatively smaller than San Joaquin. Similar to San Joaquin, Kettleman City has a predominantly Hispanic or Latinx population, with approximately 98 percent of the population being of Hispanic or Latinx descent. While examining the health services of this city, the only services they have are located at Aria Community Health Center. However, the services offered at this clinic are limited to just family medical, immunization, family planning, and pregnancy care. Given the limited services, in case of emergency or medical procedure, residents of Kettleman City would resort to going to a hospital within the county. The nearest emergency hospital within Kings County is the Adventist Health Selma located in Selma. According to Google Maps, driving to Adventist Health Selma from Kettleman City would take over 50 minutes. In case of emergency, this is the closest hospital or clinic that would provide emergency services. The remaining health centers in the nearby vicinity of Kettleman City are merely health clinics and centers that provide only simple services.

Similar to San Joaquin, there is a bus route that goes through the city. Unlike San Joaquin, there are more stops within the town as it makes it more accessible and usable by the community. At the same time, it is like San Joaquin in that it would not be a reliable form of transportation when it came to reaching the hospital as it would require multiple transfers of buses and likely the whole day to reach the nearby hospital.

One of the positives of Kettleman City is the establishment of a fire station within the city. Fire is an emergency service and would provide an emergency response in case of any medical emergency. It is currently unknown if there is where or if there are any ambulance services within the city. However, it is believed the emergency center that would be routed to would still be Adventist Health Selma.

Another positive aspect of Kettleman City includes the advanced planning of the city. The Health and Safety element in the Kettleman City General Plan addresses the expansion of emergency medical services upon the expansion of the city and its growing population. This is highly recommended since it is anticipating the future and the growth of the city and understands the limitations of the current facilities. Similar goals and policies should be suggested to rural communities that are continuing to grow, such as San Joaquin and other small cities.

Taft, California

The City of Taft is a small, rural city located in Kern County in Central California. It has an estimated population of 9,272 in 2019 (United States Census Bureau, 2019). While Taft's population is double that of San Joaquin and is overall a larger city, these two cities share similarities in terms of health infrastructure and accessibility.

Taft is an oil-based city established in the 1800's. It was founded primarily as an export center for Standard Oil (now known as Chevron). Today, Taft is still heavily dependent on oil, with a significant oil industry presence. Although it is no longer exporting at as high of a volume as before, oil still plays a large role in the community. When examining the health infrastructure in the city, there are two health clinics, Omni Family Health – Taft Health Center and the West Side Family Health. These two clinics differ since Omni Family Health is a small network of health clinics located in Kern, Kings, Fresno, and Tulare County. This is similar to the health clinic located in San Joaquin (Valley Health Team) since they are both small clinics that offer a range of medical specialties but do not provide emergency services. Both Omni Family Health and Valley Health Team are part of an extensive network of health clinics that provide to their local communities but with limited range (Omni Family Health).

On the other hand, West Side Family Health is a local health clinic that serves Taft and neighboring communities within Kern County. West Side Family Health not only offers the standard health services, but there is also an urgent care clinic. An urgent care clinic can be extremely beneficial to the community in case of any medical emergency. Although the urgent care is not open 24 hours, there are many benefits of having an urgent care in a small community since the next closest hospital with emergency services would be in Bakersfield. According to Google Maps, the travel time from Taft to the hospital located in Bakersfield via automobile, would take approximately 46 minutes without traffic and approximately a total distance of 40 miles. As mentioned in the literature review regarding emergency medical services response times and its correlation to mortality and trauma, any medical emergency requiring traveling long distances could result in negative consequences. The urgent care is an extremely beneficial entity to have within the city and as San Joaquin continues to grow and potentially reach the same size as Taft, establishing an urgent care could save many lives and reduce the travel times and distance for many patients facing medical situations.

Examining the City of Taft's General Plan, there are policies established within the City's Safety Element addressing the need for more emergency services. (City of Taft, 2017, p. 9.0-8) These policies are proactive in addressing both a current and future need for the city to expand their emergency services. Similar policies like these could be introduced and recommended to San Joaquin since both cities face similar issues in providing and expanding emergency services.

Tempe, Arizona

The City of Tempe is a community located in Maricopa County, Arizona which is located near the heart of the Phoenix Metropolitan Area. The population of the City as of 2019 is 195,805 (Fedorowicz, Schilling, Bramhall, 2020). According to 2018 American Community Survey data, the city is 56.8 percent white, 6.2 percent

Black, 22.4 percent Latinx, 8.8 percent Asian, and 2.4 percent Native American (Fedorowicz, Schilling, Bramhall, 2020).

In regard to public health, Tempe faces several health issues which include “heart disease, stroke, and cancer” (Fedorowicz, Schilling, Bramhall, 2020). due to inaccessibility to healthcare. 26.1 percent of Tempe is obese, and the community has 194.9 deaths from cardiovascular disease per 100,000 residents annually. It is important to note that Arizona State University is located in the city and so the population is young. This correlates to the community receiving emergency services are majority from young people.

Tempe’s Strategic Management and Diversity Office is creating a database and survey for their residents to assess health strategies and health disparities. Alongside the database and survey, they are creating a map that displays Tempe’s hospitals, clinics, and transit routes. This database and survey can be used as a framework or inspiration for San Joaquin and other communities that lack health infrastructure, as this surveying and mapping process allows the community to have a better understanding of social determinants of health “such as socioeconomic status, and facts of the built environment such as proximity to hospitals and access of fresh foods” (Fedorowicz, Schilling, Bramhall, 2020).

Community Engagement

Introduction and Limitations

Provided this research was conducted during the COVID-19 pandemic, there were limitations to conducting any community engagement or outreach. During this research, there were several attempts to reach out to numerous organizations within the City of San Joaquin and throughout Fresno County to provide insight on existing conditions of the healthcare infrastructure and accessibility. Despite numerous efforts to reach out to these organizations, it proved to be futile as the project received one response but was never able to remain in contact to gather any usable data. Unfortunately, because of not being able to conduct any community outreach, the research was based solely on existing conditions and information gathered preexisting online research and data. However, there are several community engagement strategies that could have been initiated. This section will review a potential community engagement strategy that could have been potentially utilized.

Health Impact Assessment

A Health Impact Assessment (HIA) is “a process that helps evaluate the potential health effects of a plan, project, or policy before it is built or implemented” (National Center for Environmental Health, n.d.). Conducting a HIA is beneficial after obtaining an establishing project, because it shows practical pros and cons of the project regarding public health (e.g., transportation and land use). It combines scientific data and public input to provide more pragmatic, tangible steps to proceed with the project to address these needs. HIAs can be a tool to shed light on impacted vulnerable populations and address their needs. The six major steps in a HIA are:

- **Screening:** identifying the plan, project, or policy decisions for which a HIA would be useful. This step is deciding whether to conduct a HIA and if so, what is the target for this HIA and how will it be used (National Center for Environmental Health, n.d.).
- **Scoping:** planning the HIA and identifying what health risks and benefits to consider. This step involves developing a research plan and outlining how the HIA team will accomplish this plan through models, questions, and workshops.
- **Assessment:** identifying affected populations and quantifying health impacts of decision. Through this step, “the current conditions of the project site or area of interest will be evaluated through quantitative and qualitative data. This step collects and synthesizes data through methods like GIS mapping, focus groups, and cost-benefit analyses” (American Planning Association, 2016).
- **Recommendations:** suggesting practical actions to promote positive health effects and minimize negative health effects. After establishing findings from the previous step, this step will “translate the assessment findings into feasible alternatives or modifications” (American Planning Association, 2016) to the project.
- **Reporting:** presenting results to decision makers, affected communities, and other stakeholders. This step would communicate and translate the findings to the target audience. This could mean through written reports or in person presentations.
- **Monitoring and Evaluation:** determining the HIA’s impact on the decision and health status. This last step will track the impact after the HIA has been conducted and generate the health determinants and outcomes from the project. Additionally, this would establish a timeline for the project (American Planning Association, 2016).

This tool would be beneficial for the San Joaquin community and promote improved accessibility to health infrastructure through several ways. It is typically a voluntary assessment tool and would involve engagement with community

members and stakeholders of the city (American Planning Association, 2016). Creating and sharing interactive GIS maps with the community can generate awareness of the issue and public need. One of the importances of a HIA is that it establishes baseline conditions through their third major step in the process. Establishing clear baseline conditions will provide evidence, measured data, and interest for the community issue. San Joaquin can obtain and initiate HIAs for their community because it is an organized process with existing resources and templates to use when beginning to conduct a HIA.

Findings

Introduction

The findings are based on the background information gathered from the San Joaquin Background Report compiled by the California Polytechnic State University's City and Regional Planning student-led studio advised by Professor Cornelius Nurworsoo during the Fall 2020 to Winter 2021 academic year and individual research. It is to be noted that there was attempted outreach to stakeholders of the community for feedback regarding healthcare, medical, and emergency services that San Joaquin provides. However, there was no response from these different agencies and the project's findings were based on the research, best intuition, and assumption of needs of the community.

Determination of Viability

San Joaquin has ample medical services to serve the immediate needs of the community. The existing medical facility, Valley Health Team – San Joaquin, provides the necessary services for the area with medical (adult and youth services), behavioral, dental, and chiropractic care. While this facility is smaller and has limited service hours, it provides the necessary services for a small, rural city like San Joaquin.

Examining the income of the City of San Joaquin, majority of the residents in San Joaquin qualify as low income and some even being extremely low income. The income disparity in San Joaquin compared to the rest of Fresno County is strikingly troublesome as the median income for the city is well-below the national, state, and county average income levels. As previously mentioned, those in lower income communities show a correlation to insurance unaffordability. This has major impacts in the determination of viability of establishing or expanding upon the medical services in the city. Considering most of the residents of the City are low income and likely do not have much of a disposable income to be spending

on unnecessary medical expenses, it would be ill advised to propose additional healthcare services in the area and for the proposed expansion to be paid for by the residents. Some potential healthcare expansion services include establishing a mobile health clinic that aims to provide services that are currently not available at Valley Health Team. The goal of this mobile unit is to have healthcare be accessible to all individuals in San Joaquin, while also being able to serve other small, neighboring communities that lack affordable healthcare. It would be considerable if these expansions of services were done in partnership with other local agencies as it would alleviate the burden of cost on the community. Not only will it relieve the burden of cost, but also create a repertoire with the community and establish good relations with local members of the community to show that Fresno County is committed to investing in smaller communities such as San Joaquin in the future.

Population of San Joaquin is also a major factor in determining the viability of expansion of healthcare services. As of 2021, the estimated population of San Joaquin is 4,119 according to the Fresno County Economic Development Corporation (County of Fresno, 2015). San Joaquin is a growing city, as the population numbers reflect. Even with the ample growth numbers over the years, the existing infrastructure and services being provided appear to be more than sufficient for the city. It is important to note, we have determined that if the city continues to grow at the current rate and further expand, goals and policies to address healthcare and growth should be considered as it would assist in avoiding overwhelming the existing health center. A potential policy that should be adopted into the city's existing community plan is to have expanded medical services once the city reaches a threshold population. Once the population reaches that point, it should be advised to expand services that are suited for the city.

Emergency services are a critical part of a community and the health of the community. While it is unclear whether there are any emergency services located within the city boundaries, emergency medical services play a crucial part in

providing timely care to patients. The nearest hospital with emergency services is located more than 30 minutes away. From the research conducted, the average emergency response time to rural areas is approximately 14 minutes with a one in ten chance it being longer than 30 minutes. When considering San Joaquin, the nearest hospital located more than 30 miles away by automobile, any patient requiring immediate medical attention would be heavily impacted. The project found that potentially establishing an emergency response post within the city would help address part of the problem by hopefully reducing the response time. Emergency response posts could be either or both a fire station or an ambulance post as fire stations are often the first responders when it involves medical emergencies. A fire station has dual effects as it serves as both a fire station for the local community in case of any fire emergency and as a first responder post.

Recommendations

Introduction

It has been determined that San Joaquin does not have the capacity nor the fiscal stability to support a medical or health center larger than the existing healthcare facility. Despite the lack of evidence or findings to support the creation or establishment of a larger facility, there are some necessary courses of actions that should be accounted for or considered for San Joaquin as the population of the City continues to grow larger. Some of the suggested next steps for San Joaquin are from Kettleman City and the City of Taft. An important note about the following is that they are not mandatory but highly recommended to account for population and city growth to maintain the current trends.

Population Growth Steps

There are some necessary courses of actions that should be accounted for or considered for San Joaquin as the population of the city continues to grow larger. One of the suggested next steps for San Joaquin are based upon Kettleman City's General Plan and the City of Taft's General Plan. An important note about the following is that they are not mandatory but highly recommended to account for population and city growth to maintain the current trends while addressing healthcare accessibility. Here, the goals, policies, and objectives created based on the framework on Kettleman City and Taft's General Plan can be used as a framework for potential future health guidelines or policy documents.

Goal HE 1: Accessible healthcare services.

Objective HE 1.1: Increase transportation options to healthcare facilities.

Policy HE 1.1.1: Establish a dial-in service to serve the local community.

Program HE 1.1.1.1: Establish partnership with local agencies to provide dial-in ride programs within San Joaquin.

Policy HE 1.1.2: Implement rideshare programs to San Joaquin's medical center once the population reaches a threshold of 5,075 people.

Objective HE 1.2: Establish a mobile health clinic.

Policy HE 1.2.1: Partner with regional hospital(s) to implement mobile healthcare clinics to serve rural communities.

Other potential programs that can be considered include establishing a mobile health clinic to serve San Joaquin and other neighboring small rural communities. As previously stated, the nearest hospital to San Joaquin is more than 30 minutes away by car. Furthermore, Valley Health Team – San Joaquin has limited hours and is only open a few days a week. With that in mind, providing a mobile health clinic that can serve small rural communities like San Joaquin on the off-days (non-coinciding with the days Valley Health Team is open) can help alleviate the health needs of the community while also potentially providing more services that may not be available locally. Similarly, a mobile health clinic can help supplement the existing infrastructure since it has been determined it would not be financially feasible nor advisable to establish a larger medical facility in San Joaquin. The mobile health clinic could potentially specialize in providing services that are currently not available at Valley Health Team which would also reduce the number of trips necessary to access healthcare.

Collaboration with Healthcare Professionals and City Planners

Establishing a stronger partnership between planners and health field professionals can better address communities' health issues. Allowing for more partnerships with city planners and public health professionals can increase one

another's capacity and create better strategies on addressing health issues in cities and promote better solutions for positive health outcomes (Fedorowicz, Schilling, Bramhall, 2020). Both public health professionals and city planners essentially strive for a similar goal: to promote the development of a community that supports a healthy quality of life, interconnectedness, safety and inclusion in communities (National Center for Environmental Health, n.d.). Historically, "public health and city planning officials worked together to tackle cholerae and tuberculosis by providing access to cleaner water and green spaces in the 19th century" (National Center for Environmental Health, n.d.) and should continue to work together in the 21st century for modern day chronic health issues like obesity and diabetes (National Center for Environmental Health, n.d.). As of now, there are more efforts to strengthen this partnership than ever. For example, the Centers for Disease Control and Prevention (CDC) has a toolkit specifically for public health and planning professionals to work together.

Some suggested steps the city can take is based on the Health Element from the City of San Pablo's 2030 General Plan update, such as their vision to promote "access to services and planning for people first" (Dyett & Bhatia, 2011). Several ways San Joaquin can create this partnership with its own community's healthcare professionals and planners can be to implement multilingual workshops and toolkits for healthcare and planning professionals to use alongside the San Joaquin community members. Additionally, like Tempe, Arizona, providing more healthcare resources such as a database, maps, and surveys can help professionals monitor long-term health data and allow for the community to openly access this health data.

Goal HE 2: A strong partnership between public health professionals and city planning officials.

Objective HE 2.1: Establish communication between the local American Planning Association (APA) division and San Joaquin public health staff.

Policy HE 2.1.1: Facilitate recurring meetings with the City of

San Joaquin, Fresno County Office of Emergency Services, and the Valley Health Team – San Joaquin Health Center.

Program HE 2.1.1.1: Provide multilingual workshops and toolkits for health and planning officials to participate with the local community.

Objective HE 2.2: Collaborate with Fresno County Department of Public Health to monitor city health data relating to risk factors and health outcomes.

Policy HE 2.2.1: Create a healthcare database to access San Joaquin's state of health and health disparities.

Program HE 2.2.1.1: Create surveys and maps with data to show health options (e.g., hospitals, clinics, transit routes) and highlight social determinants of health to the community.

Program HE 2.2.1.2: Develop a Medical Facilities Access Plan that can provide service to major medical facilities surrounding the City of San Joaquin.

Conclusion

Health infrastructure accessibility is a problem that many rural communities throughout the state of California face. Throughout this research process, this notion was reinforced since there is no prior research or plan for better infrastructure or accessibility.

For San Joaquin, the combination of the City's population and existing conditions created the necessity to address the health infrastructure and accessibility. It is clear San Joaquin is a growing city with lots of potential in the future. As of now, the City's infrastructure can manage the existing population. However, as the City continues to grow at its current rate, the infrastructure will need to further expand and accessibility in terms of transportation options will also need to be addressed.

The proposed next steps for San Joaquin highlight the needs and areas of concern which should be addressed in the near future for the City to continue to grow at its current rate. Again, these goals and policies are not required but highly recommended to adequately serve the growing population. Lastly, these suggestions do not only adhere to San Joaquin, but to any rural community that faces similar health disparities, since it has been noted that there are various cities and rural communities throughout California which face similar issues. It is the goal of this research to provide cities with better knowledge and background to alleviate future health problems.

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