

RAPID HEALTH IMPACT ASSESSMENT

Proposed Closure of Alta Bates Campus Berkeley, CA



Final Report

December 2018

**RAPID HEALTH IMPACT
ASSESSMENT**

**Proposed Closure of Alta Bates
Campus, Berkeley, CA**

Authors:

*Jason Corburn, PhD
Amanda Fukutome
Marisa Ruiz Asari
Jennifer Jarin
Vaughn Villaverde*

Research Assistants:

*Laura Atukunda
Riya Desai
Cindy Ochieng*

Report design:

Marisa Ruiz Asari

Institute of Urban and
Regional Development
University of California Berkeley
2018

Table of Contents

Page	
5	<u>EXECUTIVE SUMMARY</u>
8	<u>INTRODUCTION</u>
8	Proposed Closing of Sutter Alta Bates Campus, Berkeley, CA
9	Overview Of Potential Health Issues from an Urban Hospital Closing
11	What is Health Impact Assessment (HIA)?
12	Scope of this Rapid HIA (RHIA)
12	Key RHIA Focal Areas
13	Hypothesized Impact Pathways
17	Rapid HIA Methodology
18	<u>OVERVIEW OF ALTA BATES HOSPITAL</u>
19	Alta Bates Campus Patient Utilization
20	Emergency Department
20	Hospital Service Area
26	<u>SUMMIT CAMPUS IMPACTS</u>
26	Campus Utilization & Capacity to Absorb Alta Bates Campus Patients
28	Sutter Health Plans for Summit Campus expansion
30	<u>IMPACT ON VULNERABLE POPULATIONS</u>
31	Pregnant Women & Newborn Babies
32	People of Color
34	People with Disabilities
34	Uninsured & Publicly Insured Patients
35	The Aging and Elderly
36	Mental Health & Suicide Prevention
36	Homeless People
37	Adverse Impacts on Vulnerable Communities in the Alta Bates Hospital Service Area
42	<u>IMPACTS ON UC BERKELEY STUDENT HEALTH CARE</u>
46	<u>IMPACT ON EMERGENCY SERVICES</u>
47	Alta Bates Emergency Department (ED) Utilization
47	Analyses of Travel Times to Alta Bates vs Summit Campus Emergency Departments
50	Impacts on Ambulance Travel Times
53	Ambulance Diversion
53	Regional Emergency Department impacts
56	<u>DISASTER EVENT IMPACTS</u>
58	Potential Impact from Chevron Refinery Fire
60	<u>ECONOMIC IMPACTS</u>
61	Alta Bates Campus as an Economic Base Multiplier
63	<u>APPENDIX</u>
66	<u>REFERENCES</u>

Figures

Page	
5	Figure 1. HIA Key Findings Overview
7	Figure 2: Likely Health Impacts from the Closing of Alta Bates Medical Center, Berkeley, CA
10	Figure 3. Alta Bates Closure key milestones time line
11	Figure 4. Health Impact Assessment process
12	Figure 5. Rapid Health Impact Assessment guiding research questions
14	Figure 6. Hypothesized Impacts from Alta Bates Campus birthing center closing
14	Figure 7. Hypothesized Impacts from Alta Bates Campus Emergency Department (ED) closing
15	Figure 8. Hypothesized Impacts of Alta Bates Campus ED closing on Emergency Medical Services
15	Figure 9. Hypothesized Impacts of a Regional Disaster on ED access without Alta Bates Campus
16	Figure 10. Hypothesized Impacts from Alta Bates Closing on Local & Regional Economy
17	Figure 11. Examples of inputs to Rapid HIA
19	Figure 12. Alta Bates Campus ED patient discharges (2016) from cities impacted by the DMC hospital closure
19	Figure 11. Alta Bates Campus utilization overview 2016
22	Figure 13. Increased Alta Bates Campus discharges from Contra Costa County & regional zip-codes
22	Figure 14. Alta Bates Campus Hospital Service Areas: RHIA & CHNA defined
24	Figure 15. ED Visits by Cause: Comparing the RHIA Defined Alta Bates Campus HSA to State and County Rates
31	Figure 16. Outcomes for largest birthing centers in Alameda & Contra Costa Counties, 2016
32	Figure 17. Number of live births across regional birthing centers 2016
33	Figure 18. Percent race/ethnicity in the HSA compared to county and state rates
34	Figure 19. Alta Bates Campus expected payer source 2016
37	Figure 20. Total Homeless patients at select East Bay hospitals 2016 - 2017 ⁶
38	Figure 21. Alta Bates Summit Medical Center CHNA Communities of Concern
40	Figure 22. High Health Care Need Communities in the RHIA defined HSA
41	Figure 23. Heart Disease ED visits per 10,000 residents for all ZIP Codes in the RHIA defined Alta Bates Campus HSA
41	Figure 24. Select ZIP Codes - Asthma and Diabetes ED visits per 10,000 residents
43	Figure 25. Student vs Alta Bates Campus mental health care utilization
48	Figure 26. Travel times to Alta Bates & Summit Campuses from ZIP Codes in the HSA
52	Figure 27. Emergency response time line
54	Figure 28. Additional ED visits/year hospitals can absorb before exceeding (ACEP) standard
55	Figure 29. Alta Bates & Summit ED utilization & American College of Emergency Physicians' recommended capacity
59	Figure 30. Emergency Department patient surge volume after Chevron refinery fire, Richmond, CA, 2012
62	Figure 31. How hospitals contribute to regional economies

Maps

Page

9	Map 1. Alta Bates Campus & Regional Hospital Network
18	Map 2. Alta Bates Campus and affected buildings
21	Map 3. Rapid Health Impact Assessment defined Hospital Service Area (HSA)
23	Map 4. Large volume increases in Alta Bates Campus ED discharges from West Contra Costa County 2013 - 2016
25	Map 5. Comparing RHIA & CHNA defined Hospital Service Areas
27	Map 6. Summit Campus and affected buildings
38	Map 7: 2016 CHNA defined service area CHVI scores
39	Map 8: Percent Uninsured across Census Tracts in the RHIA defined Service Area
39	Map 9: Percent of Families (with Children) in Poverty across Census Tracts in the RHIA defined Service Area
44	Map 10. Population density in ZIP Codes surrounding UC Berkeley, Alta Bates Campus, and Summit Campus
49	Map 11. Projected Heart Disease ED Visits & Travel Times to Summit Campus for ZIP Codes North of Alta Bates Campus
50	Map 12. Travel times to Alta Bates vs. Summit Campus at 5:30pm from select ZIP Codes in the Alta Bates HSA
57	Map 13. Surge event: Earthquake along the Hayward Fault



ALTA BATES HOSPITAL

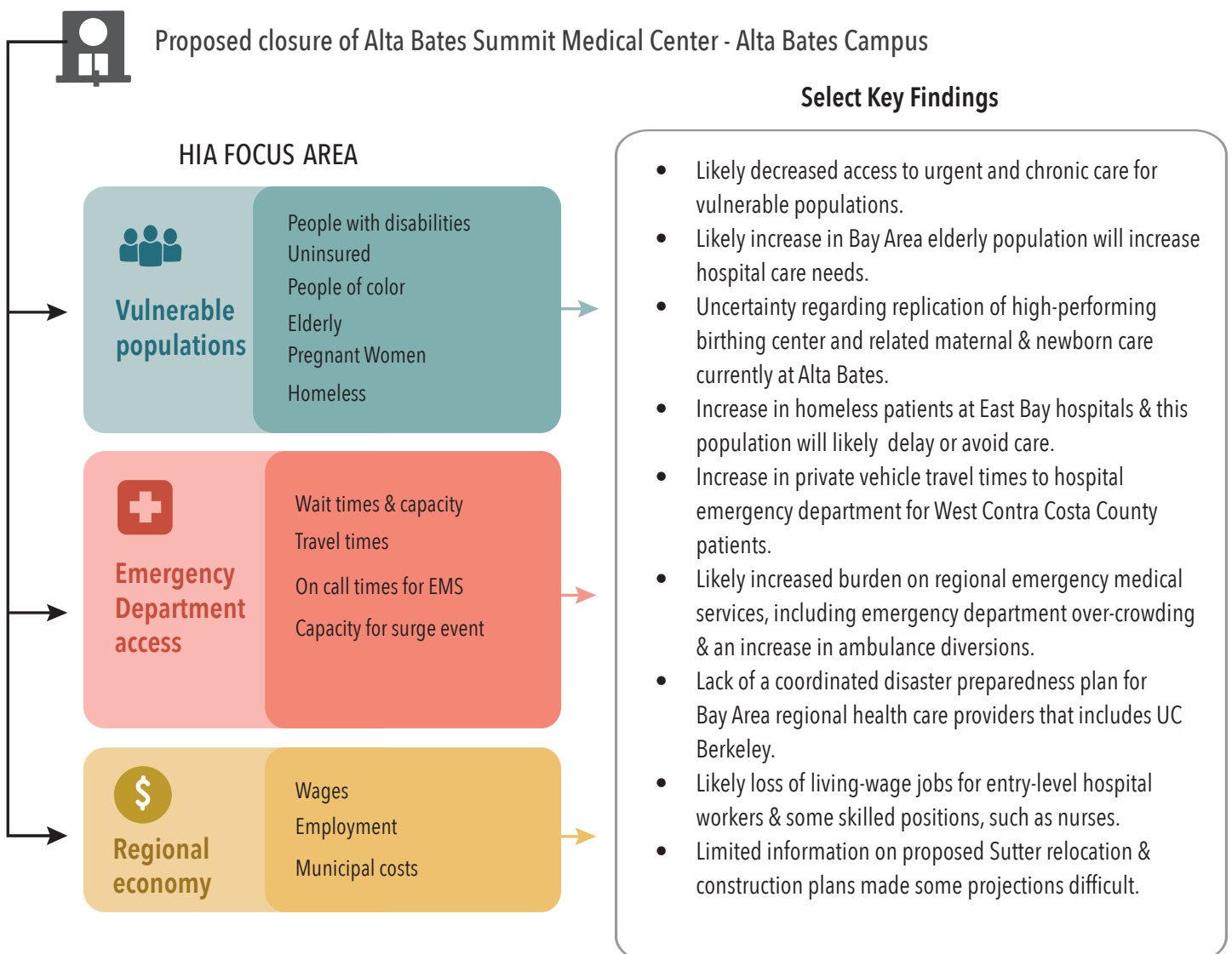


EXECUTIVE SUMMARY

■ Sutter Health has proposed to close Alta Bates Campus in Berkeley, California, by 2030. Alta Bates Hospital serves the City of Berkeley and the entire East Bay with **347 beds, 22 Emergency Department treatment stations, about 50,000 Emergency Department (ED) patients, and over 5,000 births in 2017. In 2016, the hospital billed almost \$2 Billion in patient revenue.**²⁻⁴ Sutter Health has determined that

state-mandated earthquake safety upgrades would be too costly to keep the major functions of the hospital open. Sutter Health stated in 2016 that they plan to relocate most inpatient care and emergency services from the Alta Bates Campus site in Berkeley to an expanded Summit Medical Campus in Oakland approximately three miles from the Berkeley campus.

Figure 1. HIA Key Findings Overview



This **Rapid Health Impact Assessment (RHIA)**

was commissioned by the City of Berkeley's, Alta Bates Regional Task Force and highlights some of the likely health impacts from the closure of Alta Bates hospital. More specifically, the Rapid HIA focuses on the health impacts to: (1) already vulnerable populations, such as the elderly, the uninsured, and people of color; (2) University of California, Berkeley, students; (3) emergency medical services, including travel times to the emergency room and regional emergency room capacity in the case of a disaster, and; (4) the local economy.

Alta Bates Campus has served as a regional community health asset since its founding in 1905 by nurse Alta Alice Miner Bates. Alta Bates has the greatest number of hospital-births out of all hospitals in the East Bay. Further, Sutter Health's own 2016 Community Health Needs Assessment (CHNA) report noted that the Alta Bates Summit Medical Center Service Area currently serves a large percentage of the region's vulnerable communities with high chronic health care needs.

Alta Bates Campus also has one of the highest volume emergency departments (ED) in the East Bay. The ED has experienced a sharp increase in patients from West Contra Costa County, many of whom were likely served by Doctors Medical Center (DMC) in San Pablo, which closed in 2015. **In 2017 the Alta Bates Campus ED was operating at about 6,000 visits above the capacity recommended by the American College of Emergency Physicians.**⁴

Research from across California and the United States has found that hospital closures in urban areas can displace patients, particularly those already vulnerable, from familiar and usual sources of care, and overburden the hospitals that remain open. More specifically, Emergency Department (ED) closures can adversely impact regional morbidity and mortality.

Overall, we found that the closing of Alta Bates Campus will have potentially significant adverse health impacts related to: birthing/obstetrics; ED care for the elderly, uninsured, homeless and people of color; private vehicle travel times for certain areas of the East Bay, particularly Western Contra Costa County; disaster response capacity, and; some UC Berkeley student health care needs. We also found that the closing of the Alta Bates campus will adversely impact employment for low-wage workers, reduce spending in the local economy and potentially reduce community-based health promotion investments.

A summary of the likely impacts appears in Figure 2. We describe the key impact, the likely magnitude of impact on a scale of 1-3 stars, with 3 being the greatest impact, and offer examples of key data for each impact.

This RHIA utilized a detailed review of the scientific literature, existing provider data, and interviews with select professionals to estimate likely impacts. However, the projected impact analyses and some conclusions were limited due to the fact that Sutter Health did not provide detailed relocation and re-construction plans for either the Summit or Alta Bates campuses. The findings here are based on available hospital and public health data. Despite these limits, we find that the closing of the Alta Bates hospital campus in Berkeley, CA, will likely have significant adverse public health impacts on populations along the corridor from Berkeley to San Pablo unless specific actions are taken to increase ER and inpatient care access for already vulnerable populations, increase existing hospital emergency department capacities and increase 24-hour urgent care facilities, especially those serving West Contra Costa County.

Figure 2: Likely Health Impacts from the Closing of Alta Bates Medical Center, Berkeley, CA

(Magnitude: 1 = less likely to 3 = highly likely)

Key Issue	Likely Health Impact	Magnitude of impact	Examples of Supportive Data
Birthing/obstetrics	Reduced access to high quality prenatal, birthing & neonatal care	***	Over 5,000 births per year at Alta Bates - highest in the region Current birthing center has excellent maternal & infant outcomes
Elderly care	Delayed care, increased severity of disease & likely avoidable hospitalizations	*	Already high % Medicare serving facility; senior population increasing Hospital closures have resulted in delayed care & increased mortality for elderly
Uninsured & homeless	Delayed care, increased unnecessary hospitalizations, increased care costs & potential spread of infections	**	About 41% of patients in 2016 were Medi-Cal or uninsured 600% increase in homeless patients at Alta Bates between 2016 - 2017
People of color	Delayed care, increased unnecessary hospitalizations, increased care costs & some increase in unnecessary deaths	***	Over 63% of patients at Alta Bates were people of color (PoC) in 2016 West Contra Costa County has high % PoC utilizing Alta Bates & will experience greatest increased travel times to reach Summit campus
People with Disabilities	Accessibility barriers due to increased distance and unfamiliarity with relocated services	**	12% of the population in the HSA are living with a disability, of which at least 61% are racial/ethnic minorities
UC Berkeley Students	Loss of familiar ED & in-patient care; loss of some emergency mental health & suicide prevention	**	Estimated 4,000 UCB student visits to Alta Bates ED per year About 2 ambulance transfer per day from Tang Health Ctr. to Alta Bates Loss of familiarity & proximity of care may adversely impact students
Emergency Department	Increased crowding at EDs across the region, increasing wait times; Increase travel times to ED for some; Increased 'time-on-task' for many regional EMS providers.	***	Loss of 22 ED treatment stations at Alta Bates Increase private vehicle travel times to Summit hospital during PM peak rush hour, with some areas needing over 50 minutes to reach ED. Summit will need to double current ED capacity to accommodate all Alta Bates patients Berkeley EMS reports 10-12 min. increase in transport times to Summit compared to Alta Bates, which would add on average 2 extra hours of EMS 'time-on-task' per day if Alta Bates closes
Disaster preparedness	Loss of ED capacity to treat earthquake & fire victims, potential increase in avoidable deaths & hospitalizations; likely increased cost of long-term care.	***	Est. 900 people needing ED care in first days of HayWired scenario earthquake & 1,000-1,200 from a major fire at Chevron in Richmond w/out Alta Bates. Regional ED capacity in an emergency/disaster will be significantly compromised without Alta Bates Concentrating ED capacity in fewer locations may limit access during a disaster if roadway network to those facilities is compromised.
Economics	Local government EMS spending increase; low wage workers disproportionately lose jobs; Nurses may also be adversely impacted; local service economy suffers	*	Potential increased cost to local governments to provide additional EMS services due to longer time on task Potential loss of nurses out of region, increasing shortage of skilled practitioners Estimated loss of \$20M to local economy from annual hospital contracting & services

INTRODUCTION

Proposed Closing of Sutter Alta Bates Campus, Berkeley, CA

■ Sutter Health announced in 2016 that it will close its Alta Bates Campus in Berkeley and consolidate its current inpatient and emergency services approximately three miles away at its Summit Campus in Oakland, CA. Sutter Health has stated that the closure of the Berkeley hospital campus is expected to occur gradually, with full closure occurring by 2030 (Sutter Health, 2018). Some services have already been relocated from Alta Bates Campus to Summit Campus, such as the cardiac catheterization lab, which began to close as early as 2010.

Alta Bates Campus was established in 1905 by a nurse named Alta Alice Miner Bates. In 1906 the facility became the emergency hospital for many in the East Bay, especially as hundreds of San Franciscans fled to Berkeley after the Earthquake and Fire of 1906. Between 1910 and 1912, the hospital built two wings and had about 40 beds. In 1928 a new hospital was opened on the same site with 112 beds. In 1985, the 1928 building was replaced with a 300 bed, three story structure, that exists today (Sutter Health, 2018).

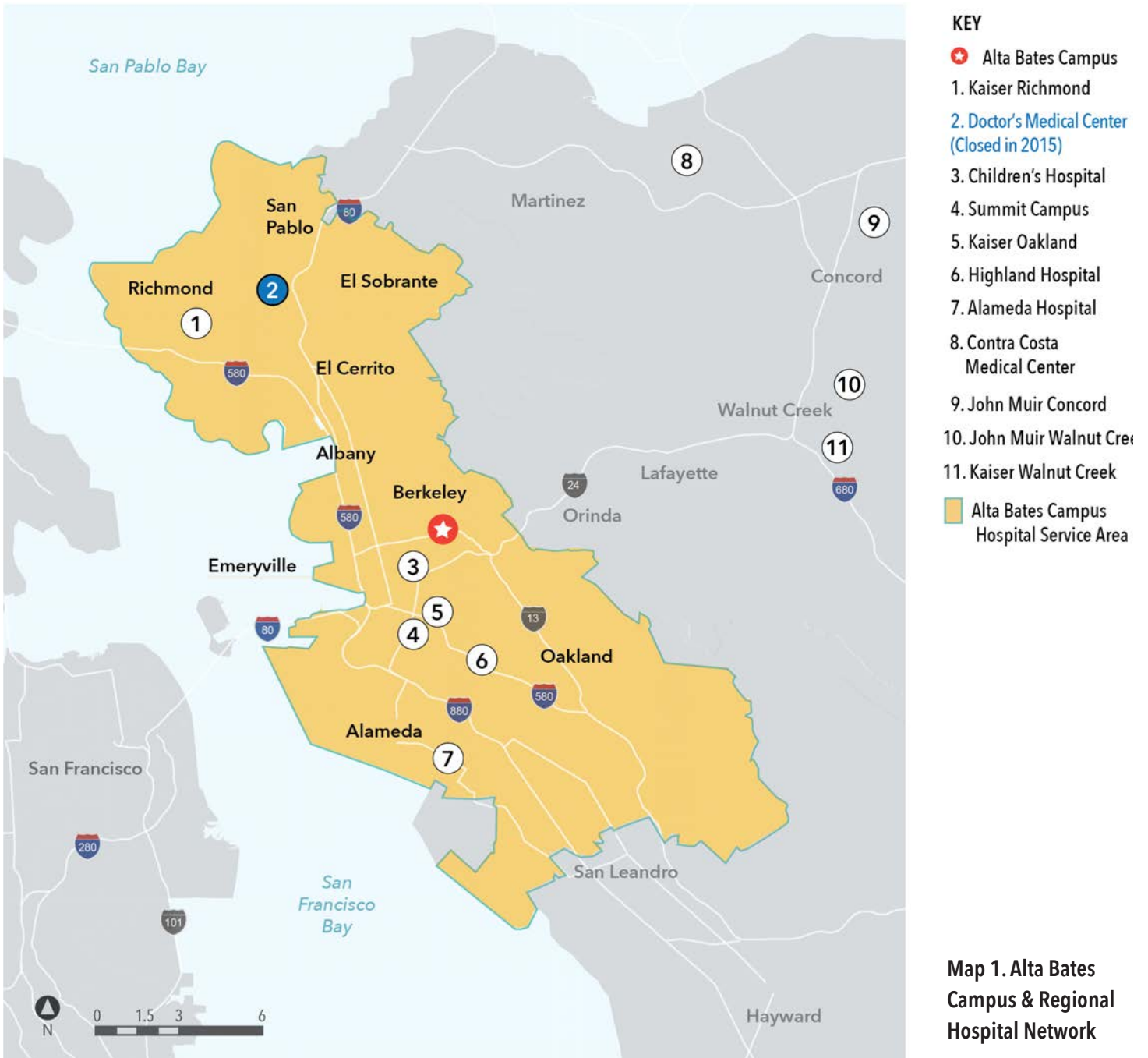
Alta Bates Campus currently serves the City of Berkeley and the entire East Bay with 347 beds and 22 Emergency Department stations, generating approximately \$1.89 billion in total patient revenue in 2016.^{1,4} Alta Bates Campus is one of the only hospitals serving the East Bay corridor from approximately San Pablo in Contra Costa County to Berkeley in Alameda County (see regional hospital network Map 1). Without access to Alta Bates Campus, West Contra Costa County residents will likely rely on Kaiser-Richmond, which has limited capacity, and hospitals located

18-25 miles east, such as Contra Costa Regional Medical Center and John Muir Hospital (Alta Bates averages 9 miles from most West Contra Costa County origins).

In response to the announcement of the proposed closure of the Alta Bates Campus, the Mayor's Office of the City of Berkeley convened the Alta Bates Regional Task Force to explore ways to prevent this closure and keep Berkeley's only acute and emergency care hospital open. The Berkeley City Council voted in 2016 to work to keep the hospital open, and the Task Force is one venue where information and policy alternatives are being explored. The Task Force is comprised of officials from Alameda and Contra Costa Counties, and the cities of Alameda, Albany, Berkeley, El Cerrito, Emeryville, Oakland, San Pablo, and Richmond, California. The task force also includes stakeholders from labor unions, non-profit organizations, the University of California Berkeley, and members of the public.

The Task Force commissioned this Rapid Health Impact Assessment (RHIA) in the Spring of 2018, to better understand the potential impacts of the hospital closure on health care utilization and access to emergency medical services (EMS).

Research on hospital closures suggests that the events can displace patients from usual sources of care and force them to access facilities that may lack their prior medical records. Emergency Department (ED) closures can adversely impact morbidity and mortality in a region. The closure of an ED can have a significant impact on a region as patients may have to travel farther to obtain care and the remaining EDs have to



bear the extra patient volume, especially for patients experiencing time-sensitive illnesses requiring prompt intervention. EDs provide care not only for the critically ill, but also for those unable to access care by other means, and are seeing a rising trend in patient volume in both the US and California. Significant increases in ED volume create a strain on existing emergency care capacity and emergency medical service providers, and can adversely impact patient health outcomes.

Overview of Potential Health Issues from an Urban Hospital Closing

Research in the public health, medical and health care services literatures suggests that urban hospital closures can have adverse impacts on population health, access to care and patient outcomes. However, research also suggests that whether or not a hospital closure will adversely impact access and/or patient outcomes can

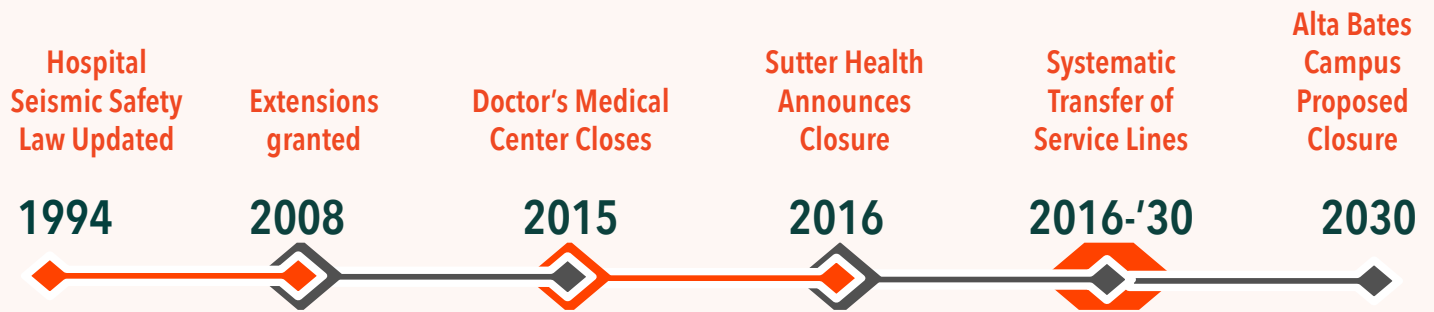


Figure 3. Alta Bates Closure key milestones time line

depend on a host of factors, such as if there are other high-performing institutions in close proximity, if these institutions are accessible to the poor, and if these same institutions can serve additional patients, particularly in the ED (Hsia & Shen 2011; Joynt et al., 2015; Liu et al., 2014). Urban hospital closures have seen an increase in both California and the US. Most recently and related to this trend, **Doctors Medical Center (DMC) in San Pablo, California, closed in April 2015. Since that time, as we will highlight in more detail below, residents living in Northwest Alameda County and West Contra Costa County have become increasingly reliant on the Alta Bates campus for emergency and inpatient care.**

Hospital closures can have a significant impact on emergency department (ED) access. A 2015 national survey by the American College of Emergency Physicians titled "Review of the Evidence on the Use of the Emergency Department by Medicaid Patients and the Evolving Role of Emergency Medicine Physicians," revealed that patients in crowded EDs have a greater likelihood of experiencing long wait times, leaving without being seen by a physician, feeling unsatisfied with their care, and having worse medical outcomes including delays in diagnosing myocardial infarction and increased mortality rates. Horwitz, et al., (2010) reported that only 67% of acutely ill ED patients were seen within the recommended times in the US. In 2009, Pines, et al., reported on the complication

rate of patients with acute coronary syndrome (ACS) as a function of crowded versus non-crowded EDs, and found a significant increase in serious complications (approximately 6% vs. 3% incidence of death, cardiac arrest, heart failure, late myocardial infarction, arrhythmias, stroke, or hypotension) in those patients presenting during overcrowded EDs.

ED overcrowding may also reduce the quality of care and increases medical errors, as the emergency staff may have to continually focus on new patients. ED closure can also eliminate hospital capacity for accommodating critical incidents such as infectious disease epidemics and disasters, another issue we explore in more detail below.

The locations of urban hospital closures do not seem to be randomly patterned, as Sager (2013) and Ko et al. (2014) found that racially segregated communities and especially predominantly African-American neighborhoods are more likely to experience a hospital closing than predominantly white, Latino or Asian-American majority neighborhoods. Nationally, one in three urban African-Americans receive their primary and other care at a hospital while for whites this is about one in six.

A 2014 investigation by the Pittsburgh Post-Gazette/Milwaukee Journal Sentinel revealed that people in poor, urban neighborhoods are

less healthy than their more affluent neighbors, but more likely to live in areas with physician shortages and closed hospitals (Thomas, 2014).

A more detailed review of the medical literature is included in each section below, and suggests that urban hospital closings can have adverse impacts that disproportionately impact already vulnerable populations - such as the elderly, people of color, and the homeless - emergency department access, regional emergency management systems, and the local economy.

What is Health Impact Assessment (HIA)?

Health Impact Assessment (HIA) uses a combination of procedures, methods and tools to analyze the potential, and sometimes unintended, effects of a policy, plan, program or project on the health of a population and the distribution of those effects across population groups. HIA is a process that aims to create healthier communities by providing decision-makers with an

understanding of the potential health impacts of a proposed project, and makes recommendations that could reduce adverse impacts. Importantly, HIA does not endorse or oppose a project or policy; rather, the purpose of conducting an HIA is to inform stakeholders and decision-makers about the population health implications of proposed actions, to identify and examine trade-offs, and to encourage the exploration of health promoting alternatives.

A Rapid or sometimes called a “desktop HIA”, does not include the extensive community and stakeholder input of a typical HIA or original data collection, such as surveys. Instead, the **Rapid HIA (RHIA) utilizes existing data and limited stakeholder engagement to generate analyses that can inform ongoing policy debates and identify areas for additional study.** The key stages of the HIA process are highlighted in Figure 4, and this RHIA includes the first three major steps of screening, scoping and assessment. While there is no single best

approach to HIA, each HIA process should reflect the needs of its particular context. This Rapid HIA aims to extend the knowledge and awareness for communities and decision-makers about select health equity issues raised by the proposed closing of Alta Bates hospital in Berkeley, California.

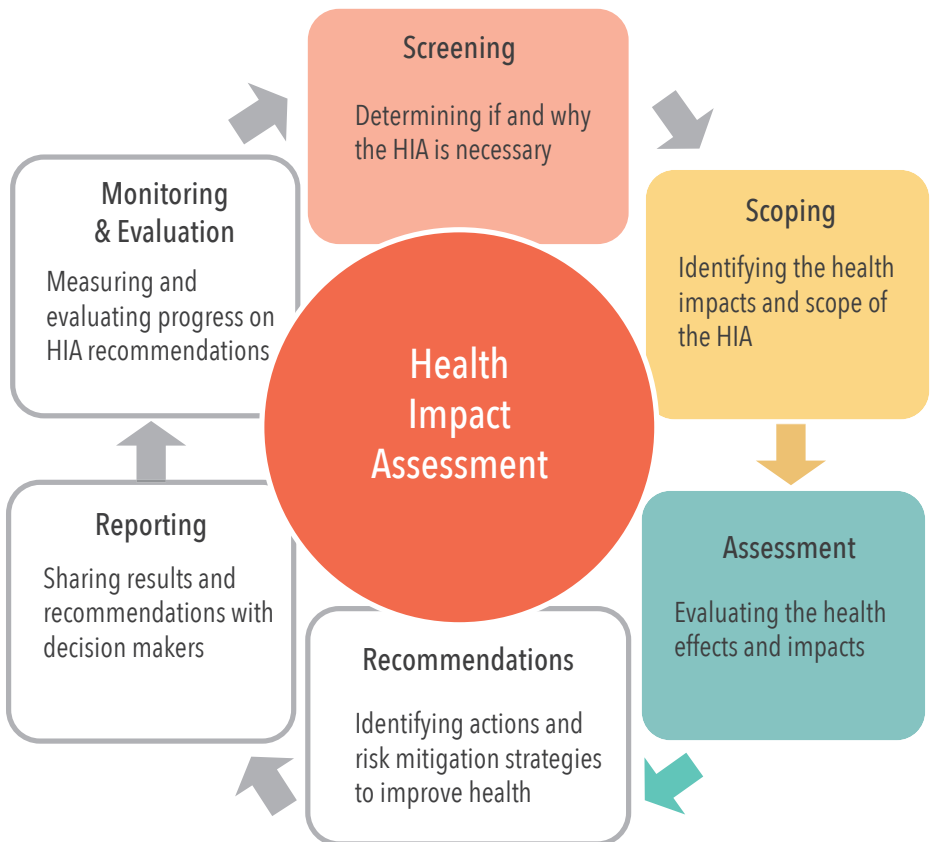


Figure 4. Health Impact Assessment process

*Figure adapted from Mecklenburg County

Scope of this Rapid HIA

On July 27, 2017, the City of Berkeley, California's Community Health Commission voted to authorize a scope of work for a Health Impact Assessment analyzing select impacts from the proposed closing of Alta Bates Campus. After reviewing this preliminary scope, a revised scope of work was developed by Professor Jason Corburn and University of California, Berkeley (UCB) researchers at the Institute of Urban and Regional Development (IURD), in consultation with the Health Commission and other City of Berkeley stakeholders. A Rapid HIA screening and scoping document was produced by UCB in December 2017. City of Berkeley staff commented on and suggested revisions to the initial draft scope of work (SOW). A final SOW was developed by Professor Corburn based on feedback and a preliminary review of availability data.

Since a detailed closing plan, including specific time frames and services, was not provided by Sutter Health, this RHIA was not able to offer detailed analyses of potential impacts from the removal and/or relocation of inpatient services. The RHIA analyses are based on the best and most up-to-date information we were able to obtain from Sutter Health on the closing and relocation of services from Sutter's website and the Sutter Vision for 2030: <https://rebuild.altabatessummit.org>.

Key RHIA Focal Areas

Based on consultation with the Alta Bates Regional Task Force and key stakeholders, we refined this RHIA to focus on the following areas:

1. Impacts on vulnerable populations, including but not limited to low-income, under and uninsured populations, people of color, elderly, pregnant women, and those with

Rapid HIA research questions:



Vulnerable populations

How might the proposed closure impact already vulnerable populations such as those who are low-income, people of color, the elderly, the uninsured, UC Berkeley students, and expecting mothers?



Emergency Department Access

How might the proposed closure influence access to emergency department care for Bay Area residents, particularly travel times & in the event of a major disaster, such as an earthquake or fire?



Regional economy

How might the proposed closure impact local jobs and the regional economy, such as from reduced hospital spending?

Figure 5. Rapid Health Impact Assessment guiding research questions

- limited transportation options;
2. Impacts on health care and emergency department services for University of California, Berkeley students;
 3. Impacts on Emergency Department access and regional ED capacity;
 4. Impacts on Emergency Medical Services (EMS), specifically to paramedic 'time-on-task;'
 5. Impacts on regional hospitals' disaster response ED capacity, particularly in the case of an earthquake and fire, and;
 6. Impacts on local employment and the regional economy.

Hypothesized Impact Pathways

Based on the six agreed upon focal areas described above and the three key RHIA research questions (Figure 5), the research team performed a preliminary review of the scientific literature on hospital closures, ED closures in urban areas and previous studies of the impacts of hospital closures, specifically the report on the closure of Doctors Medical Center. The authors of this RHIA **hypothesize at least five potential pathways between the closure of Alta Bates Campus and population health outcomes**, informed by a preliminary research review. These hypothetical scenarios are highlighted in the Figures 6-10 and described below. **In each pathway diagram, a up arrow indicates a likely increase while a down arrow indicates a likely decrease.** The hypothetical scenarios helped to further refine our review of the literature and data analysis. The hypothesized pathways of potential impacts from the closing of Alta Bates hospital included:

Scenario A: Birthing center closes (Figure 6)

In this scenario, we hypothesized that the Alta Bates Campus birthing center & related prenatal and postpartum care, including the NICU, close and there is some replication of these exact services in any one location in the region.

Scenario B: Emergency Department closes (Figure 7)

In this scenario, the Alta Bates Campus ED closes and some additional capacity is provided for at Summit in Oakland.

Scenario C: ED closes & regional ED patients increase (Figure 8)

In this scenario, we hypothesized the Alta Bates Campus ED closes & the remaining open hospitals in the region experience increased ED patients.

Scenario D: Disaster & ED access (Figure 9)

In this scenario, we hypothesized potential impacts to ED access during a disaster in the absence of Alta Bates Campus.

Scenario E: Economic Impacts (Figure 10)

In this scenario, we hypothesized potential economic impacts to jobs and the local economy from the closure of Alta Bates Campus.

Figure 6. Hypothesized Impacts from Alta Bates Campus birthing center closing

Scenario A:

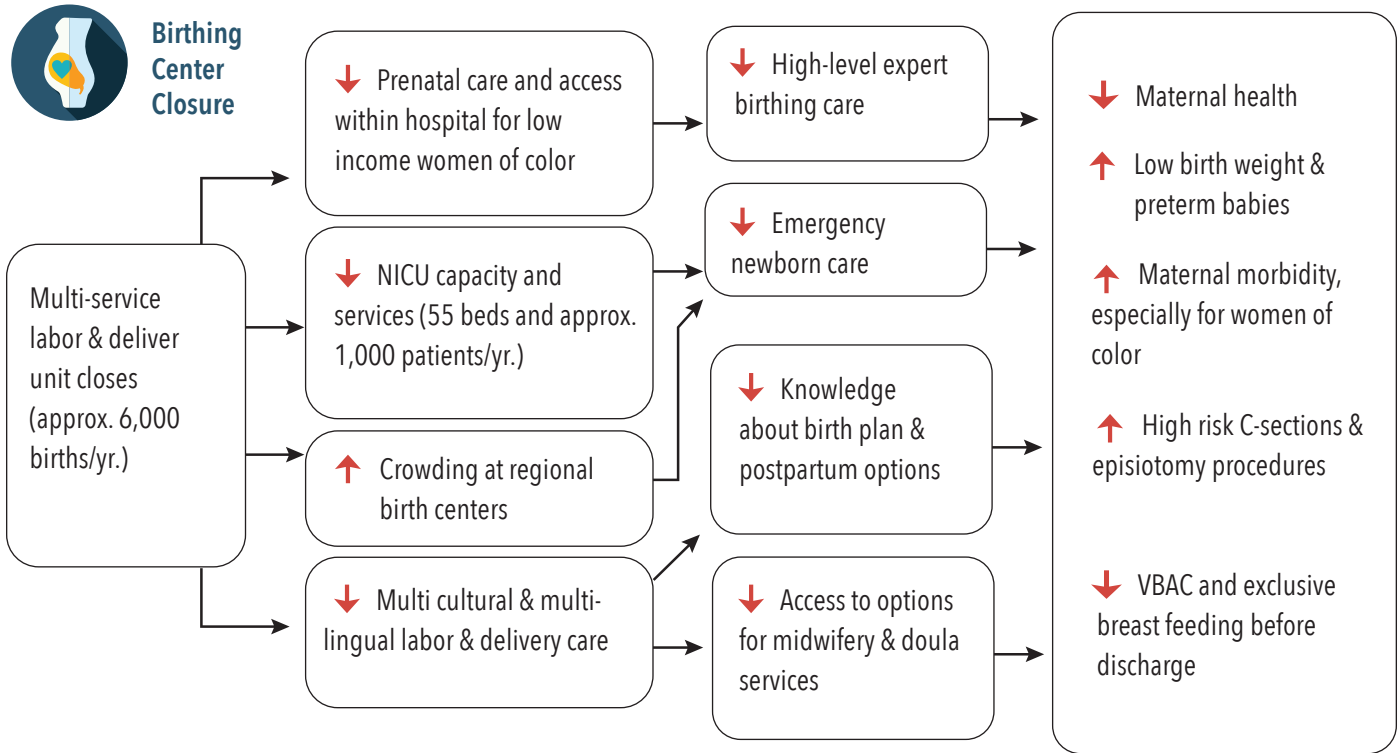


Figure 7. Hypothesized Impacts from Alta Bates Campus Emergency Department (ED) closing

Scenario B:

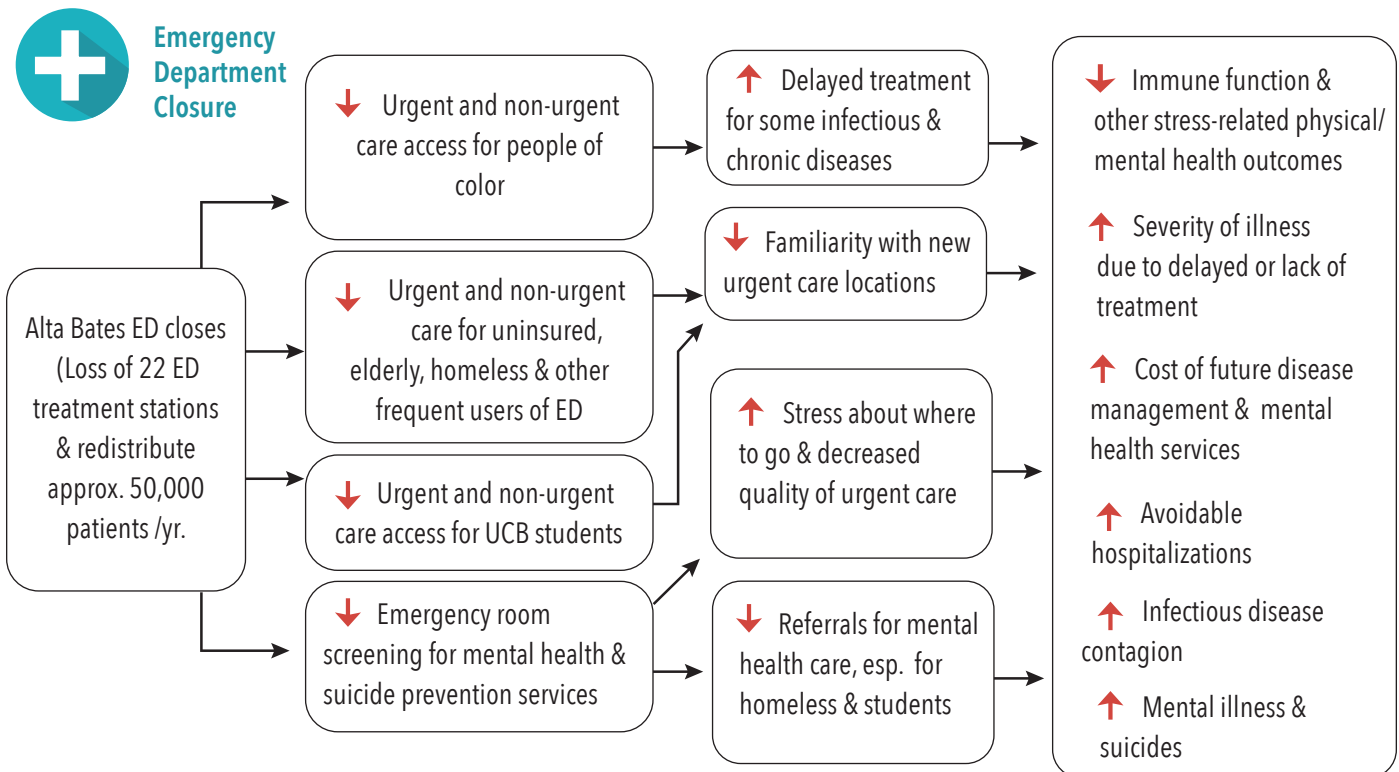


Figure 8. Hypothesized Impacts of Alta Bates Campus ED closing on Emergency Medical Services

Scenario C:

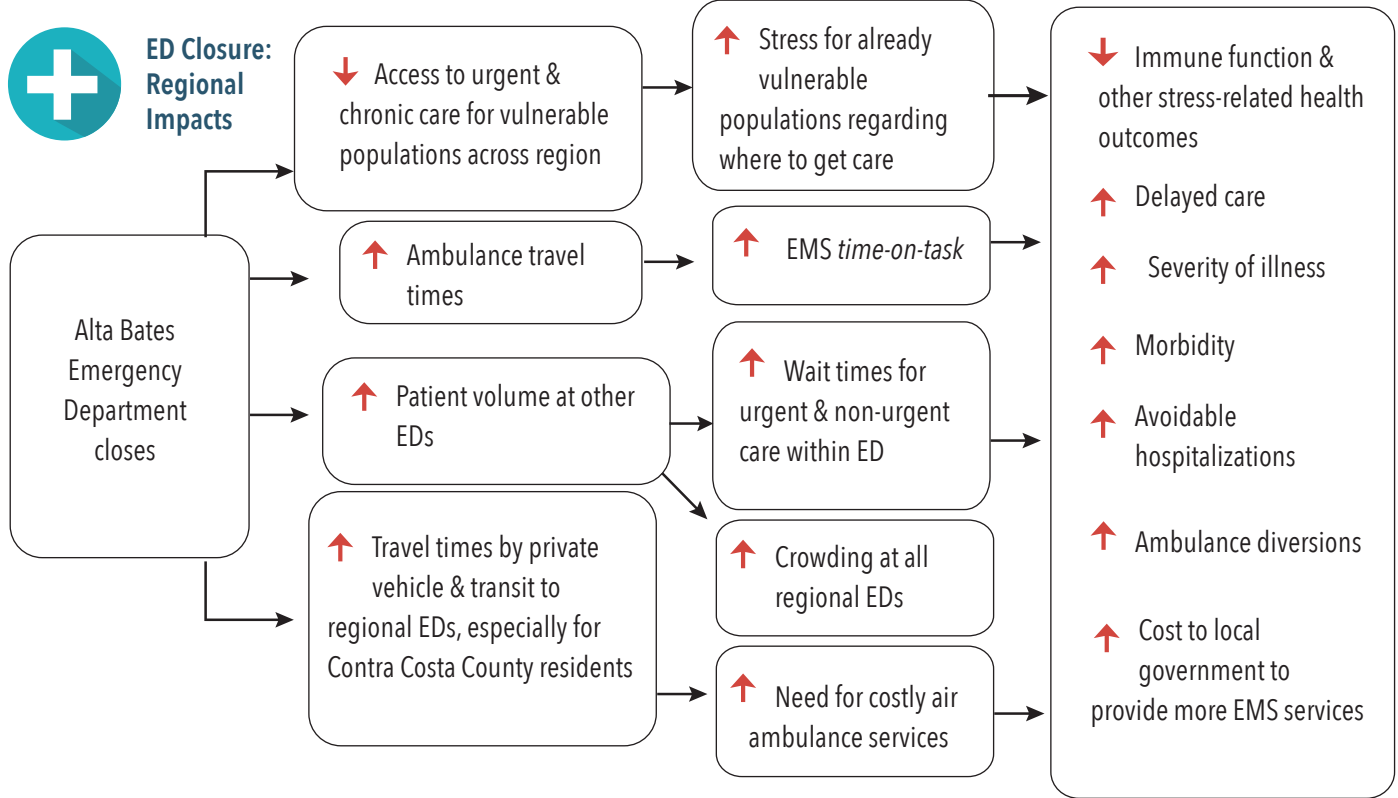


Figure 9. Hypothesized Impacts of a Regional Disaster on ED access without Alta Bates Campus

Scenario D:

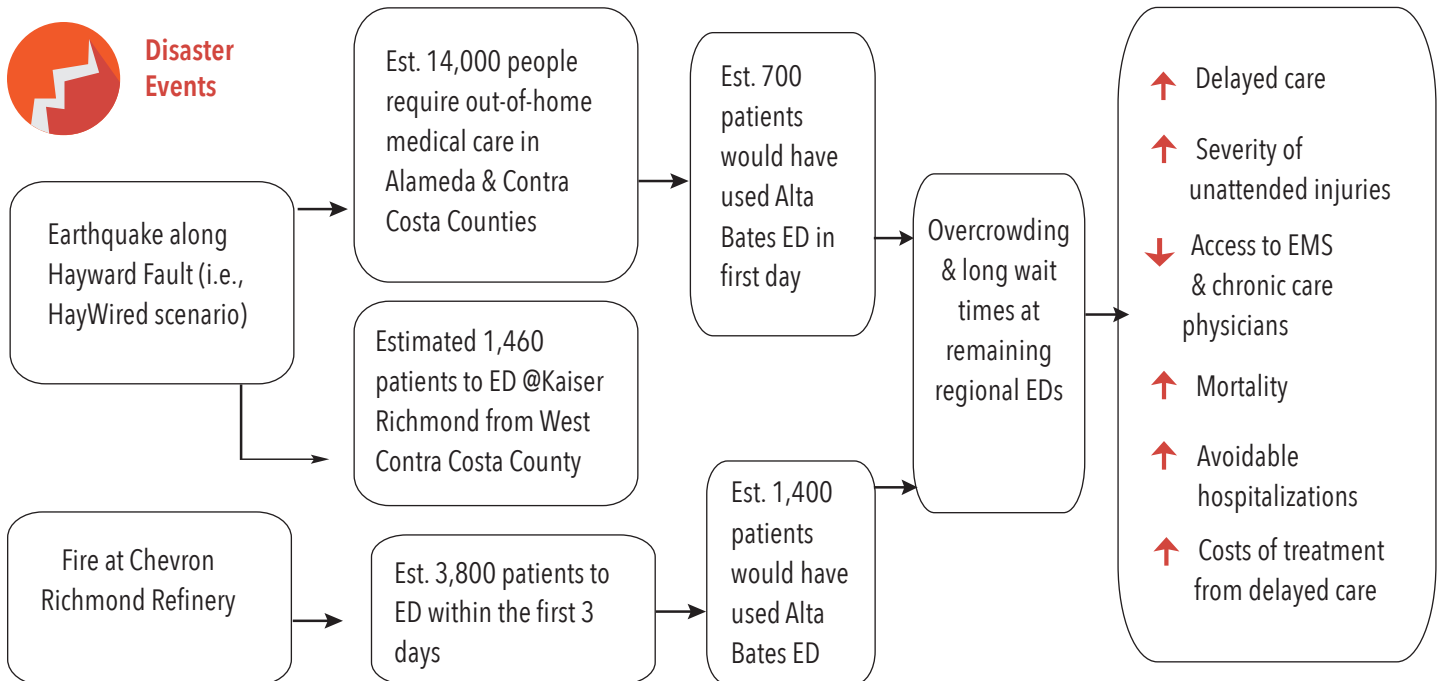
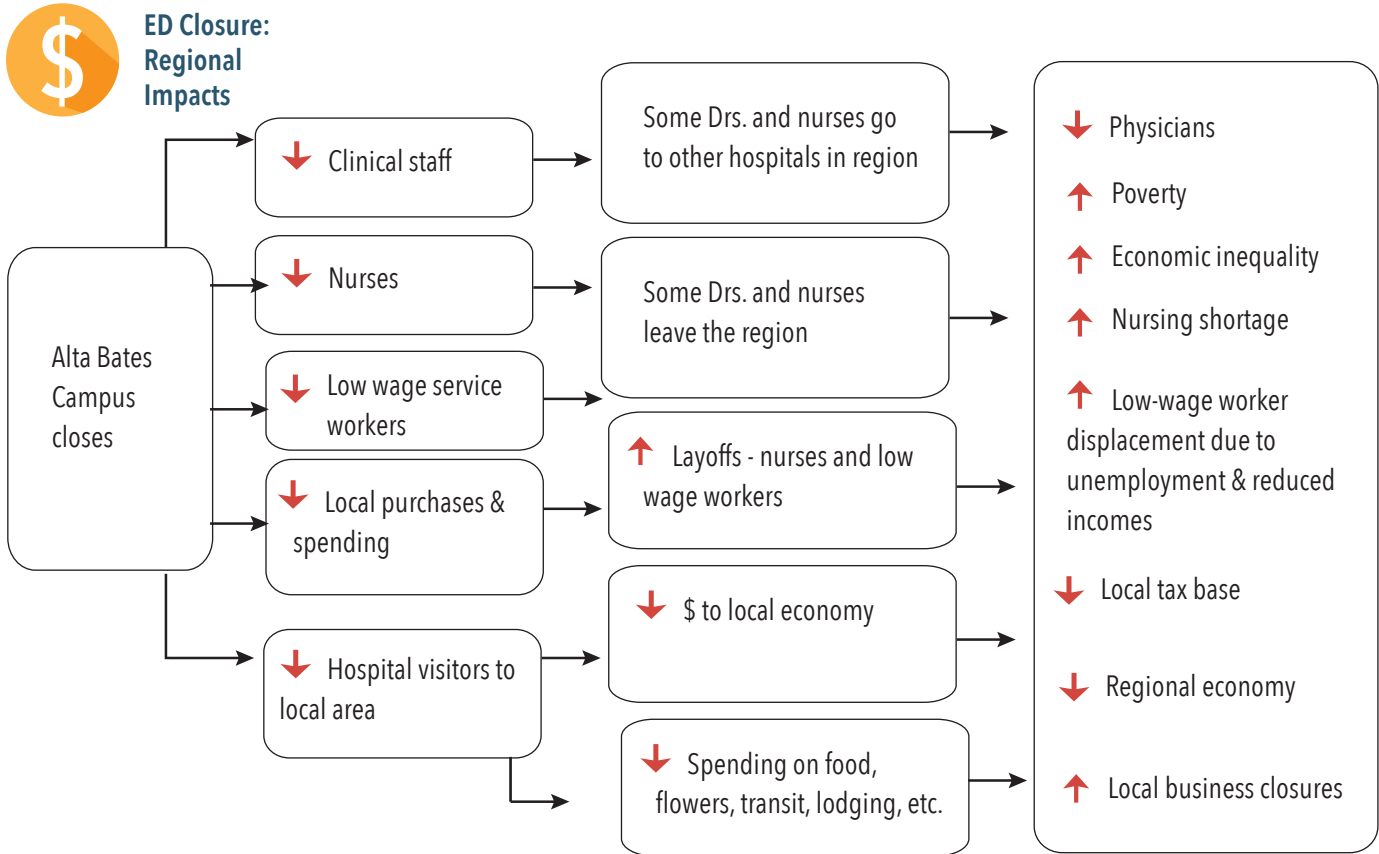


Figure 10. Hypothesized Impacts from Alta Bates Closing on Local & Regional Economy

Scenario E:



Rapid HIA Methodology

A mixed set of methods were used to complete this RHIA. As mentioned above, a detailed review of the scientific literature related to hospital closing was conducted to develop the hypothesized pathway diagrams and support data collection. We analyzed hospital and patient data using the California Office of Statewide Health Planning and Development (OSHPD). The RHIA also includes detailed reviews of reports by local hospital systems, emergency medical providers, and county health departments, which helped us obtain existing utilization information. Key findings from existing reports and analyses were summarized and incorporated into our analyses.

Data for multiple years and for multiple hospitals in the region, including Alta Bates Campus, were obtained from OSHPD. OSHPD conducts an annual, standardized survey required of all hospitals and health services in the state. Each facility is required to report data on patient capacity, inpatient utilization, ED utilization, and expenditures. We generated summary statistics on hospital and patient utilization for Alta Bates and Summit Campuses, as well as select hospitals in the East Bay region. Where possible, we utilized data from 2017, and otherwise reference

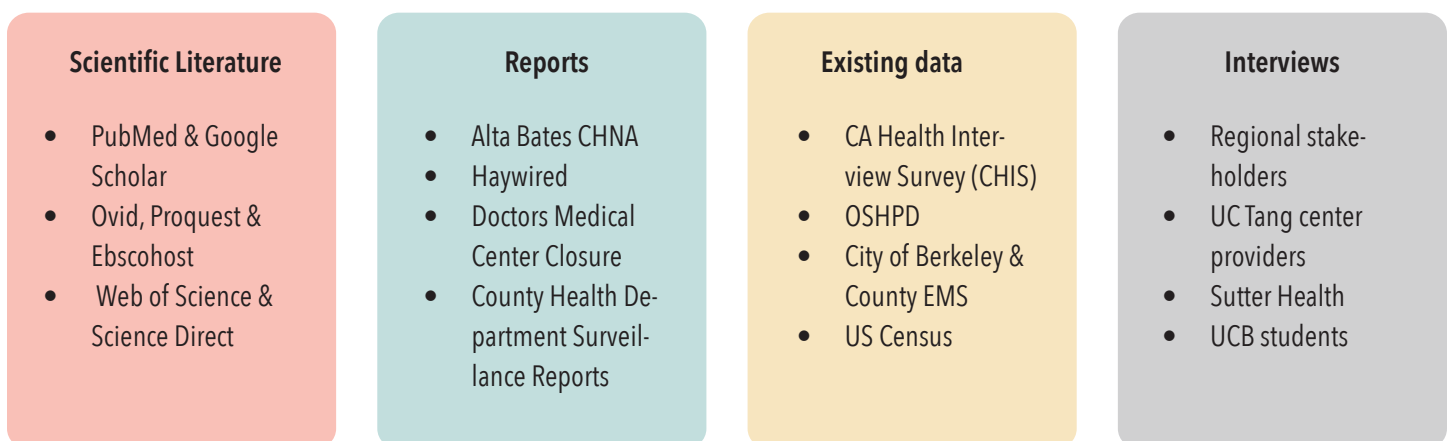
complete OSHPD datasets from 2016. Five year estimates from the 2016 US Census, American Community Survey data were gathered to define ZIP Code populations and other community-scale demographics in the region.

Previously published health outcome data from the Alameda and Contra Costa County Health Departments were summarized by ZIP Code. In addition, ZIP Code level hospitalization data (2011) was accessed through the Sutter Health “Health Needs Maps” website (<http://www.healthneedsmap.com>). All these data are publicly available and as such this assessment was exempt from review by the human subjects’ protection office of the University of California, Berkeley.

Meetings with Sutter Health, City of Berkeley and UC Berkeley’s Tang Health Care providers also informed the analyses and provided qualitative data. A list of interviewees & reviewers of a first draft of this report appears in the appendix.

A summary of the inputs used appear in Figure 11. A full list of references appears at the end of this document.

Figure 11. Examples of inputs to Rapid HIA



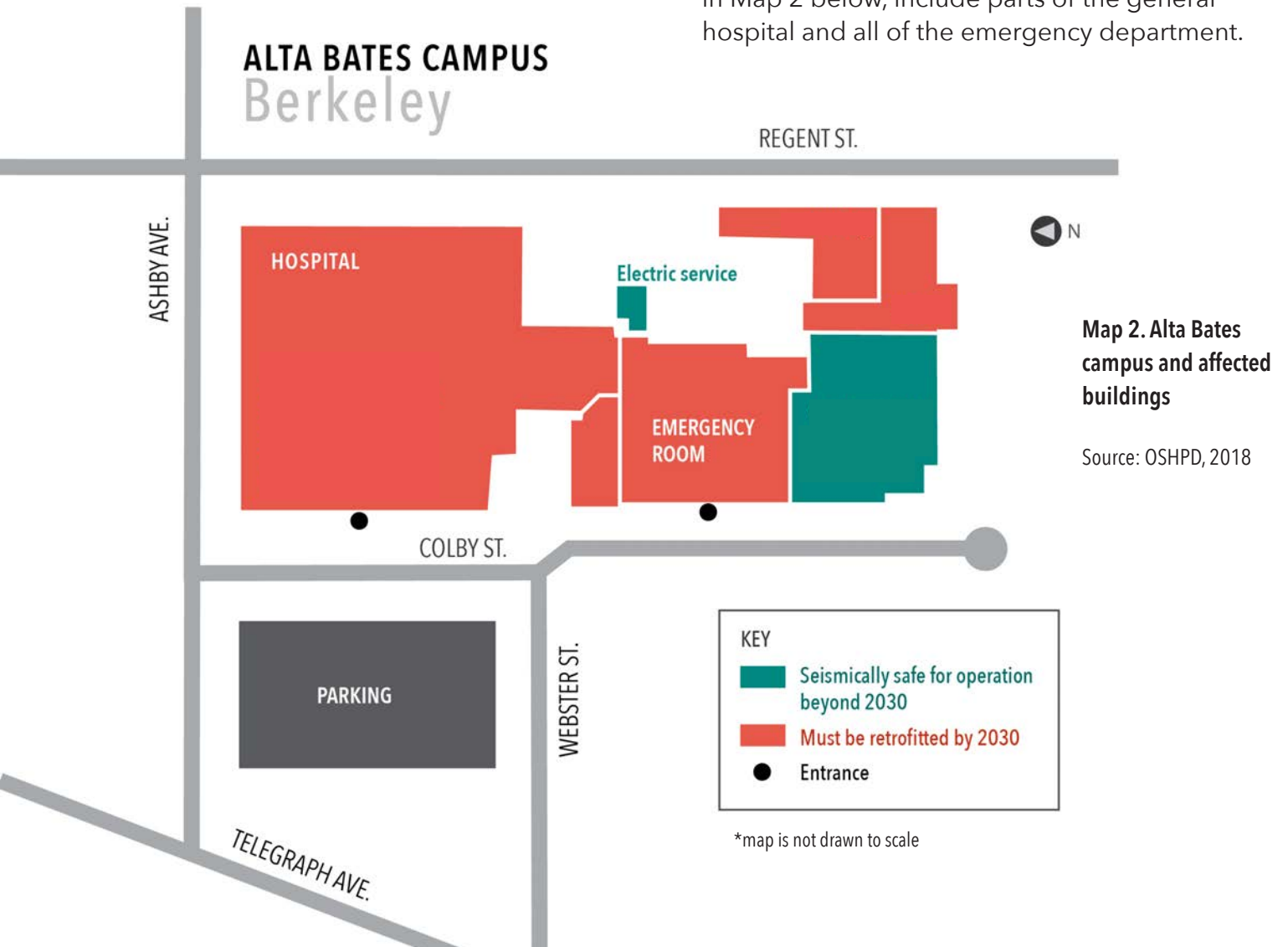
OVERVIEW OF ALTA BATES

■ Alta Bates Campus is one of the most utilized hospitals and birthing centers in Alameda and Contra Costa Counties, with a total of 66,268 patients in 2016. The hospital service area, in which 75% of patients reside, encompasses 9 cities across the East Bay. The hospital has recently seen a large increase in patients from West Contra Costa County after the closure of Doctor’s Medical Center in 2015.

The Alta Bates campus of Alta Bates Summit Medical Center is a 347-bed acute care hospital, located in the city of Berkeley, in North Alameda County, California. Alta Bates was purchased by Sutter Health Corporation and integrated with Summit Medical Center in Oakland and Herrick Hospital in Berkeley to form Alta Bates Medical Center in the year 2000. Aside from providing

emergency, acute and specialty care services, Alta Bates campus is also a major regional birthing center.

The Alta Bates Campus currently has 5 buildings that are out of compliance with the Hospital Seismic Safety Law, and must be retrofitted by 2030 or stop providing all inpatient and emergency services.¹⁰ These buildings, depicted in Map 2 below, include parts of the general hospital and all of the emergency department.



347 beds
3rd largest
general acute
care facility in
the region

66,268 patient
discharges, 2nd highest
of non-Kaiser hospitals
in Alameda County
2016

16,494
discharges from
Contra Costa
County in 2016
- 31% increase
since 2013

45,900
ER visits
in 2016 - 7%
increase since
2013

61% of ER visits
were **Medi-Cal**
and **Medicare** in
2016

7% of ER visits
were **uninsured**
patients in 2016

5,863 live
births in 2016
- highest in the
region



Figure 11. AB utilization overview 2016

We detail Sutter’s response to the seismic upgrade on page 28 below.

Alta Bates Patient Utilization

Alta Bates Campus is one of the most utilized hospitals in Alameda County, and is the 3rd largest general acute facility in the region. Of its 347 beds, the facility currently has 146 general acute beds, 16 in intensive care, 116 perinatal, 55 in intensive newborn nursery, and 14 coronary care beds.⁴

In 2016, Alta Bates Campus discharged 66,268 patients, more than any other non-Kaiser hospital in Alameda County except Highland Hospital at 81,500. Of the 66,268 patients that were seen at Alta Bates Berkeley, 19,887 were hospitalized, including 5,930 patients admitted from the emergency department. **Of the 19,887 hospitalized patients, 30% were admitted for a birth-related diagnosis and 33% were admitted with a pregnancy-related diagnosis, for a total of 63% of all hospitalized patients.** In 2016, Alta Bates Berkeley delivered 5,863 babies, more than any hospital in Contra Costa County or Alameda County, making it the region’s largest birthing center. After birthing and pregnancy patients,

the third highest patient diagnosis was infection-related, which made up only 6% of hospital admissions.⁸

Alta Bates also operates an ambulatory surgery center, which conducted 6,975 surgeries and medical procedures in 2016. The most common principal diagnoses from the ambulatory surgery center were: eye disorders (22%), other reasons

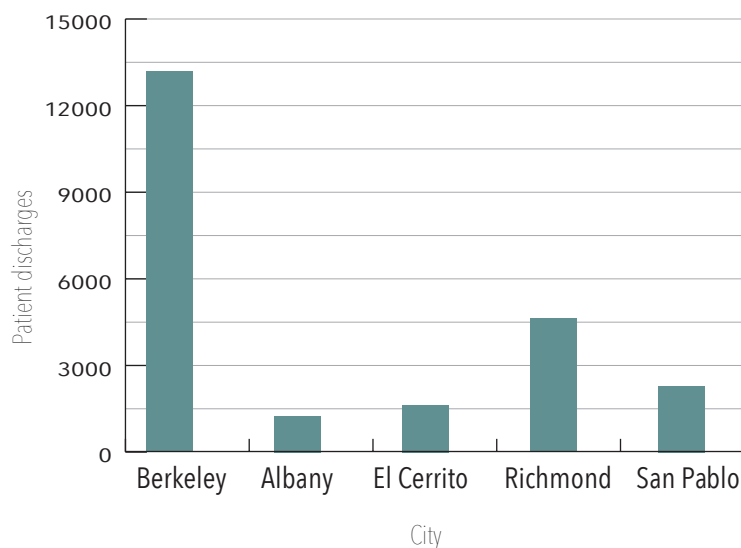


Figure 12. Alta Bates Campus ED patient discharges (2016) from cities impacted by the DMC hospital closure

Source: OSHPD, 2016

(15%), digestive system (14%), cancer (12%), and genitourinary system (11%). Of the 6,699 surgeries that were performed at the ambulatory surgery center in 2016, 60% were related to either eye and ocular surgeries (25%) or digestive surgeries (35%).⁸

Emergency Department

The Alta Bates Campus has one of the largest emergency department (ED) patient volumes in the region, operating over capacity by approximately 6,000 visits per year in 2017. That year the ED had 22 emergency treatment stations, down 3 stations from 2016.^{3,4}

In 2017 Alta Bates Campus documented 50,414 emergency department visits, an additional 4,524 visits than 2016, despite having three less treatment stations. 63% of emergency department visits not resulting in admission were classified as severe, with 27% being life-threateningly severe and 36% being non-life-threateningly severe. Of the remaining visits, 27% classified as moderate, 9% were classified as low/moderate, and 1% were classified as minor.⁴ Based on our review of the literature **it is unlikely that the 'severe' visits - comprising over 60% of total visits - could be treated in an urgent care facility or primary care setting.**

Given the high volume of ED patient traffic, Alta Bates Campus reported 57 hours of ambulance diversion in 2016, and 13 in 2017.^{3,4} During these hours the hospital closed its ED to incoming ambulances, resulting in those ambulances being diverted to other hospitals. High ambulance diversion rates can be an indicator of ED overcrowding, and is associated with poorer health outcomes for patients as well as lost revenue for hospitals. A more detailed discussion on ED access and impact of an Alta Bates Campus closure on the regional emergency medical services network can be found in the section

below on EMS.

Hospital Service Area

For this RHIA, we calculated the Alta Bates Campus hospital service area (HSA) using the latest available OSHPD (2016) patient origin data. This HSA best reflects the geographic area from which patients are coming from to receive care at Alta Bates Campus. As we describe below, the RHIA defined HSA is slightly larger than the area Sutter Health defines as the HSA for Alta Bates Summit Medical Center (which includes Alta Bates, Summit, and Herrick campuses) in their 2016 Community Health Needs Assessment (CHNA) report, since we aimed to capture the recent increase in patients coming from West Contra Costa County.

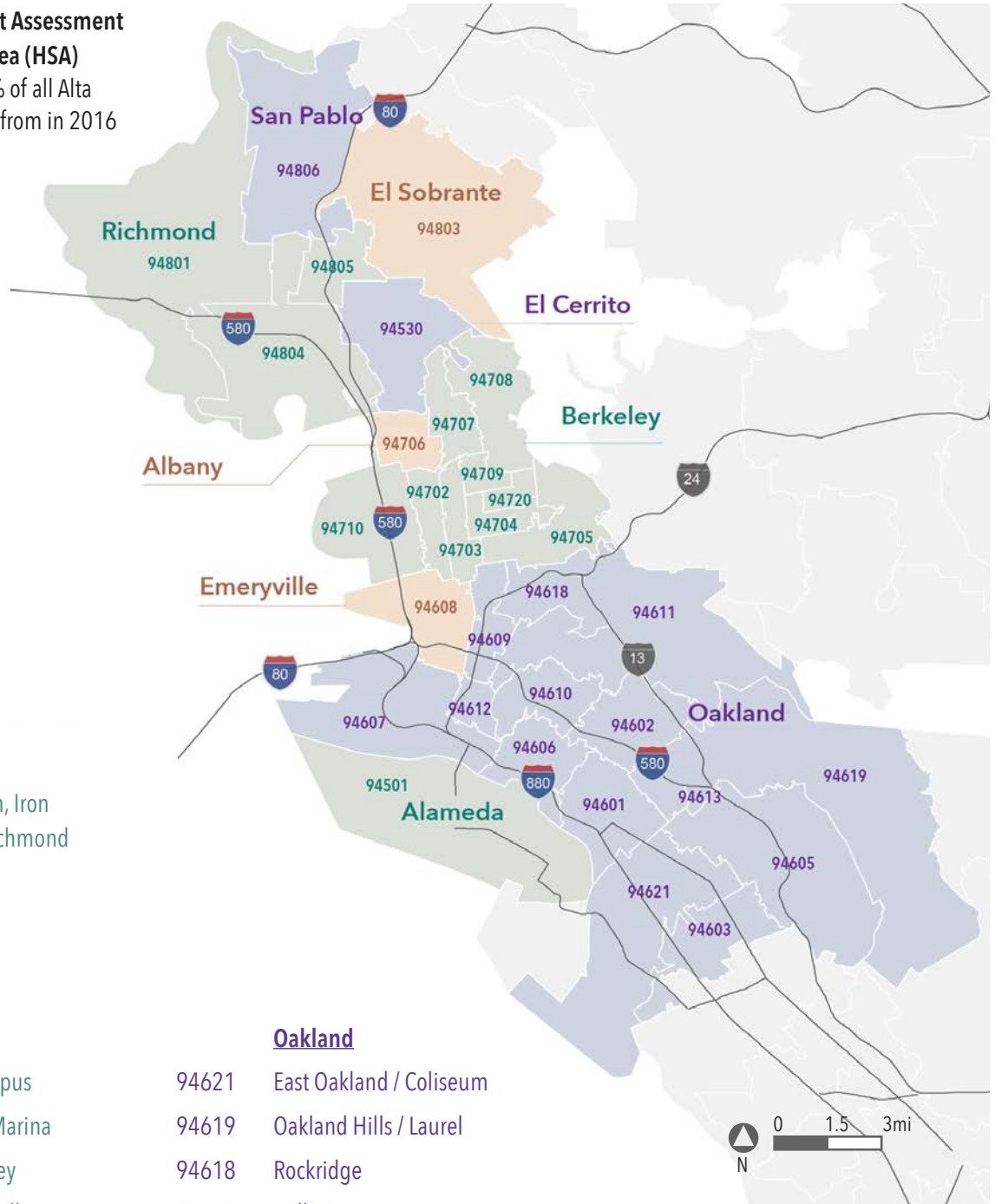
Using all 2016 inpatient and ED origin data, this RHIA defines the Alta Bates campus HSA to include the 32 ZIP Codes in the region where approximately 75% of patients lived. **The HSA spans across 9 cities in Alameda and Contra Costa Counties: Oakland, Alameda, Emeryville, Berkeley, Albany, El Cerrito, Richmond, San Pablo, and El Sobrante (Map 3). While 75% of patients in 2016 came from these 32 ZIP Codes, 66% of all patients that year came from Alameda County, and 25% from Contra Costa County, for a total of 91% of all patients.**⁶

According to the US Census, the RHIA HSA includes 839,299 residents, 44% of which are people of color and 18% of which lived below the poverty line in 2016 (ACS 2012-2016). Roughly 18% of the population in the service area are African American and 25% are Hispanic/Latinx. **In the HSA 25% of the population receives Medicaid coverage and 11% are uninsured.** Since people with Medicaid and the uninsured may utilize a hospital for primary care more than those with other health insurance, there are approximately 301,146 people in the HSA that

Map 3. Rapid Health Impact Assessment defined Hospital Service Area (HSA)

32 ZIP Codes from which 75% of all Alta Bates Campus patients came from in 2016

Source: OSHPD POMS, 2016



ZIP Code Community

94806 **San Pablo**

94803 **El Sobrante**

Richmond

94805 East Richmond

94804 South Richmond

94801 Richmond - North, Iron Triangle, Point Richmond

94530 **El Cerrito**

94706 **Albany**

Berkeley

94720 UC Berkeley Campus

94710 West Berkeley / Marina

94709 Northside Berkeley

94708 Tilden/Berkeley Hills

94707 North Berkeley / Kensington

94705 Claremont / Elmwood

94704 Berkeley Downtown / South of Campus

94703 Northwest Berkeley

94702 Northwest Berkeley

94608 **Emeryville**

Oakland

94621 East Oakland / Coliseum

94619 Oakland Hills / Laurel

94618 Rockridge

94613 Mills Campus

94612 Downtown Oakland

94611 Piedmont / Oakland Montclair

94610 Oakland Grand Lake / Lakeshore

94609 Oakland MLK

94607 West Oakland / Jack London

94606 Oakland / Cleveland Heights

94605 Oakland Hills / Eastmont

94603 East Oakland / Brookfield

94602 Oakland / Glenview

94601 East Oakland / Fruitvale

94501 **Alameda**

RHIA defined
Alta Bates
Campus
hospital
service area

839,299
residents

18% of population below
100% of the federal poverty level

36% of population
below 200% of the
federal poverty level

32 ZIP codes

44% People of Color

may seek non-urgent care at Alta Bates Campus.

Health outcome data also suggests that residents in the Alta Bates Campus HSA experience health inequities and disproportionate rates of illness and injury including asthma, diabetes, assault, unintentional injury, and substance abuse compared to the State of California and both Alameda and Contra Costa Counties (Figure 15) (Sutter Health, 2013).

According to Sutter Health’s 2016 Community Health Needs Assessment (CHNA) report, the HSA defined for all three campuses (Alta Bates, Herrick, and Summit) included 24 ZIP codes in Oakland, Berkeley, and Emeryville, what they call their “core market.” **Approximately 20% of this population lives below the poverty line and about 59% are People of Color.** We highlight the

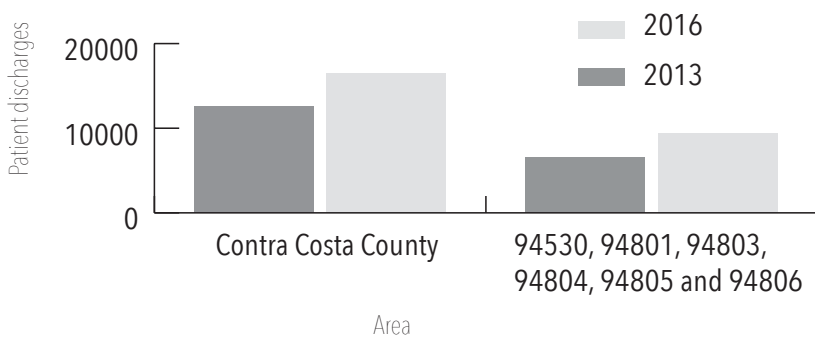
differences in the Sutter CHNA defined service area and the RHIA defined service area in Figure 14 and Map 5. Rather than include patients from all three campuses in the Alta Bates Summit Medical Center, the RHIA defines the HSA solely for the Alta Bates Campus, in order to identify specific needs of the Alta Bates Campus patient population and evaluate impacts of the proposed campus closure.

Figure 14. Alta Bates Hospital Service Areas: RHIA & CHNA defined

Source: ACS 2012-2016 estimates

	RHIA defined service area	CHNA defined service area
Population	839,299	557,296
Number of Cities	9	3
Number of Zip Codes	32	24

Figure 13. Increased Alta Bates discharges from Contra Costa County & regional zip-codes



Source: OSHPD, 2013 & 2016




We determined that the larger number of residents from West Contra Costa County utilizing Alta Bates Campus in recent years demanded that we expand the HSA to include these communities in our analyses (Figure 13). The increase in patients from West Contra Costa County can be partly attributed to the closure of Doctor’s Medical Center (DMC) in the city of San Pablo, California in 2015. **Of the 66,268 patients that visited Alta Bates Campus in 2016, approximately 18% were from 6 zip codes in Richmond, San Pablo, El Cerrito, and El Sobrante**

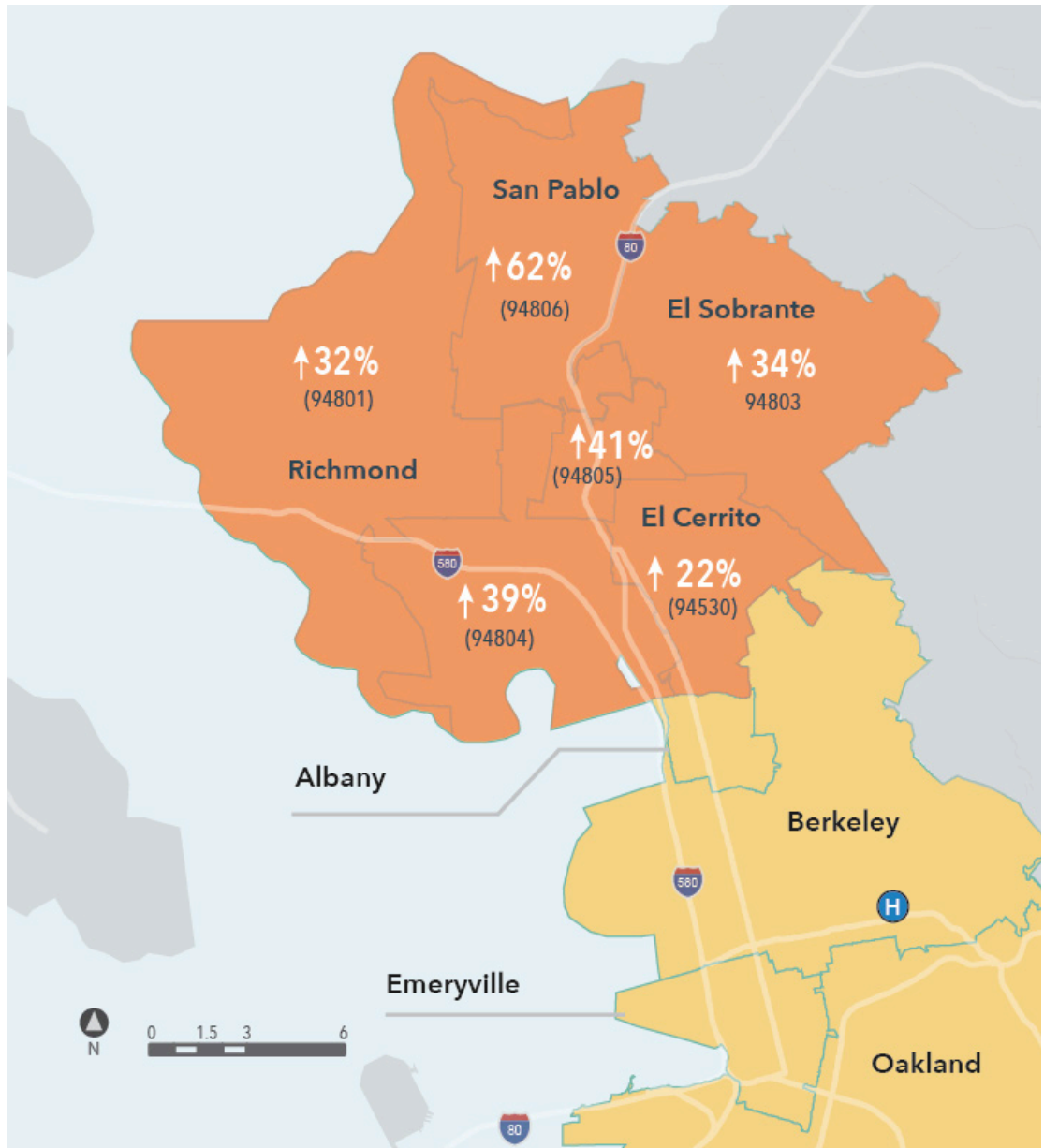
(94530, 94801, 94803, 94804, 94805 and 94806) located in West Contra Costa County (Map 4). From 2013 through 2016, there was a 24% increase in patients visiting Alta Bates Campus from Contra Costa County and a **39% increase in patients visiting Alta Bates Campus from the six zip codes above.**^{5,6}

Since these communities are in close proximity to Kaiser Richmond (which has limited ED capacity and primarily serves Kaiser members) **the closure of Alta Bates Campus is likely to**

Map 4. Large volume increases in Alta Bates ED discharges from West Contra Costa County 2013 - 2016

Source: OSHPD, 2013 & 2016

-  Alta Bates campus
-  West Contra Costa County in the RHIA defined service area
-  Additional Cities in the HSA



have a significant adverse impact on access to ED and hospital care for residents of West Contra Costa County. These same communities are also some of the most vulnerable in terms of having the largest African-American populations, having preexisting health conditions and being uninsured.

For example, according to Contra Costa Health Services 2010 Community Health Indicators Report:

- African Americans in Contra Costa had a shorter life expectancy (73 years) than any other racial/ethnic group in the county.
- African Americans also experienced higher rates of new cases of colorectal, lung and prostate cancer, new cases of HIV and AIDS, hospitalization for non-fatal assault and self-inflicted injuries, low birth weight infants and teen births, and a higher percent overweight and obese fifth-graders.
- The communities of Richmond and San Pablo

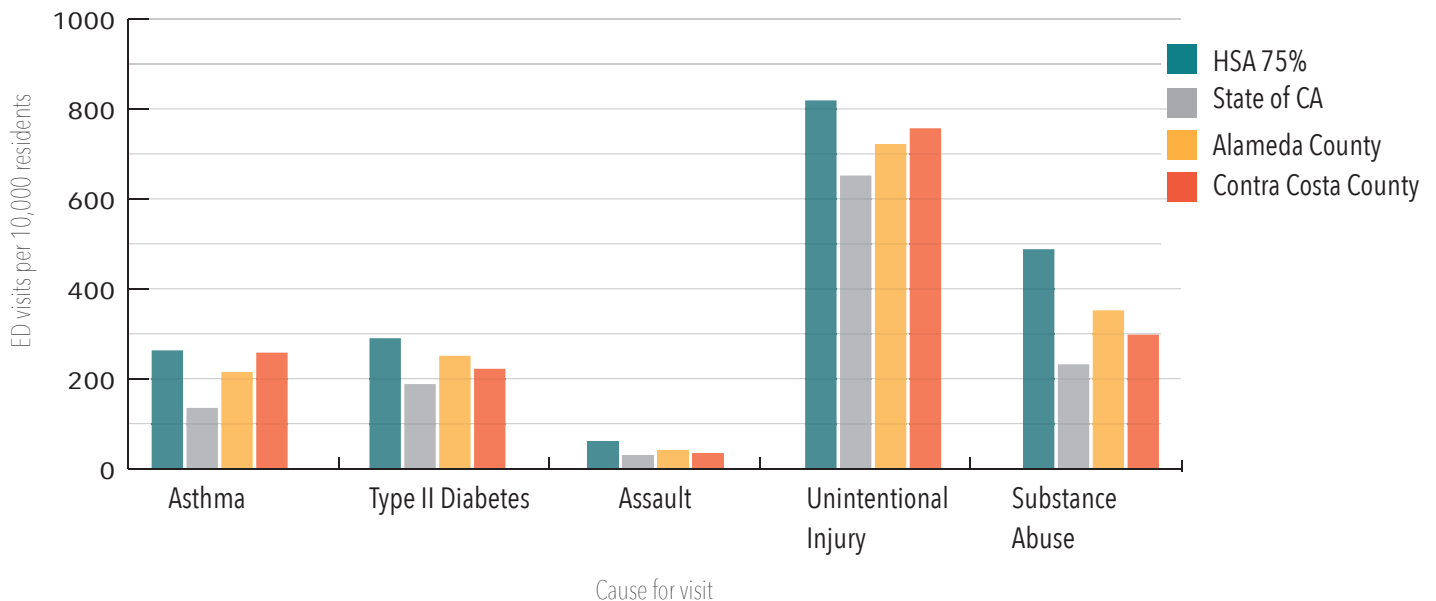
had the highest health risks and death rates (particularly for African American men) from heart disease, all cancers, diabetes, stroke and homicides.

- African Americans in Richmond had 254 asthma hospitalizations and ED visits per 10,000 people, compared to 105 for all racial/ethnic groups.
- The rates of sexually transmitted infections and people living with HIV/AIDS are significantly higher in Richmond than in Contra Costa County.
- A larger percentage of Hispanic students in Richmond high schools reported contemplating suicide than other students, according to the 2011 California Healthy Kids Survey, Grades 9-11.

The RHIA addresses potential impacts of the proposed hospital closure on vulnerable populations served by Alta Bates on page 30 of this report.

Figure 15. ED Visits by Cause: Comparing the RHIA defined Alta Bates Campus HSA to State and County Rates

Source: Sutter Health Needs Maps, 2013





Map 5. Comparing RHIA & CHNA defined Hospital Service Areas

Source: OSHPD POMS, 2016 & Alta Bates Summit Medical Center CHNA, 2016

≡ 2016 CHNA defined Alta Bates Summit Medical Center HSA

■ RHIA defined Alta Bates Campus HSA

Ⓜ Alta Bates Campus

SUMMIT CAMPUS IMPACTS

Campus Utilization & Capacity to Absorb Alta Bates Patients

■ The Summit Campus includes an emergency room and hospital with 403 licensed beds in 2017. Sutter has indicated that all inpatient and emergency care capacity at Alta Bates Campus will be relocated to the Summit Campus by 2030. However key details about the expansion as well as the capacity for the Summit Campus to absorb an additional 40,000 ED patients remains in question.

The Summit Campus hospital on Hawthorne Avenue in Oakland includes an emergency department (ED) and a new patient pavilion that was renovated in 2014. Despite the recent renovation and a current emergency department expansion underway, **9 buildings at the Summit Campus do not currently meet seismic standards, and must be retrofitted or stop all inpatient and ED services by 2030** (Map 6).¹⁰

In 2017, Summit Campus saw a total of 60,038 patients, both hospitalized and from the ED. 47,117 patients were seen in the ED, of which 25% were admitted to the same hospital. In 2017, **Summit had 25 ED treatment stations, down from 32 stations the year prior.**⁴

Of the approximate 47,000 ED patients in 2017 (including those later admitted to the hospital), 35% were classified as severe and life threatening, 33% were classified as severe but not life threatening, 25% were moderate, 6% were low/moderate, and 1% was minor.⁴

Since the closure of the Alta Bates Campus catheterization lab, the Summit campus has become the central heart attack and ST-Elevation Myocardial Infarction (STEMI) patient receiving location. The hospital performed 345 cardiovascular surgery operations in 2016, and saw 2,531 cardiac catheterization patients (1,106 diagnostic 1,425 therapeutic), which resulted in 3,426 catheterization procedures in total.⁸



Summit Campus at a glance in 2017

47,117

Total Emergency Department Patients

25

EMS Treatment Stations

403

Licensed Beds

147,095

Licensed Bed Days per year

60,038

Total patients

29

Diversion Hours

0

Total Live Births

The Summit Campus does not currently have the capacity to serve the volume of patients seen at the Alta Bates Campus, particularly for birthing and emergency care.

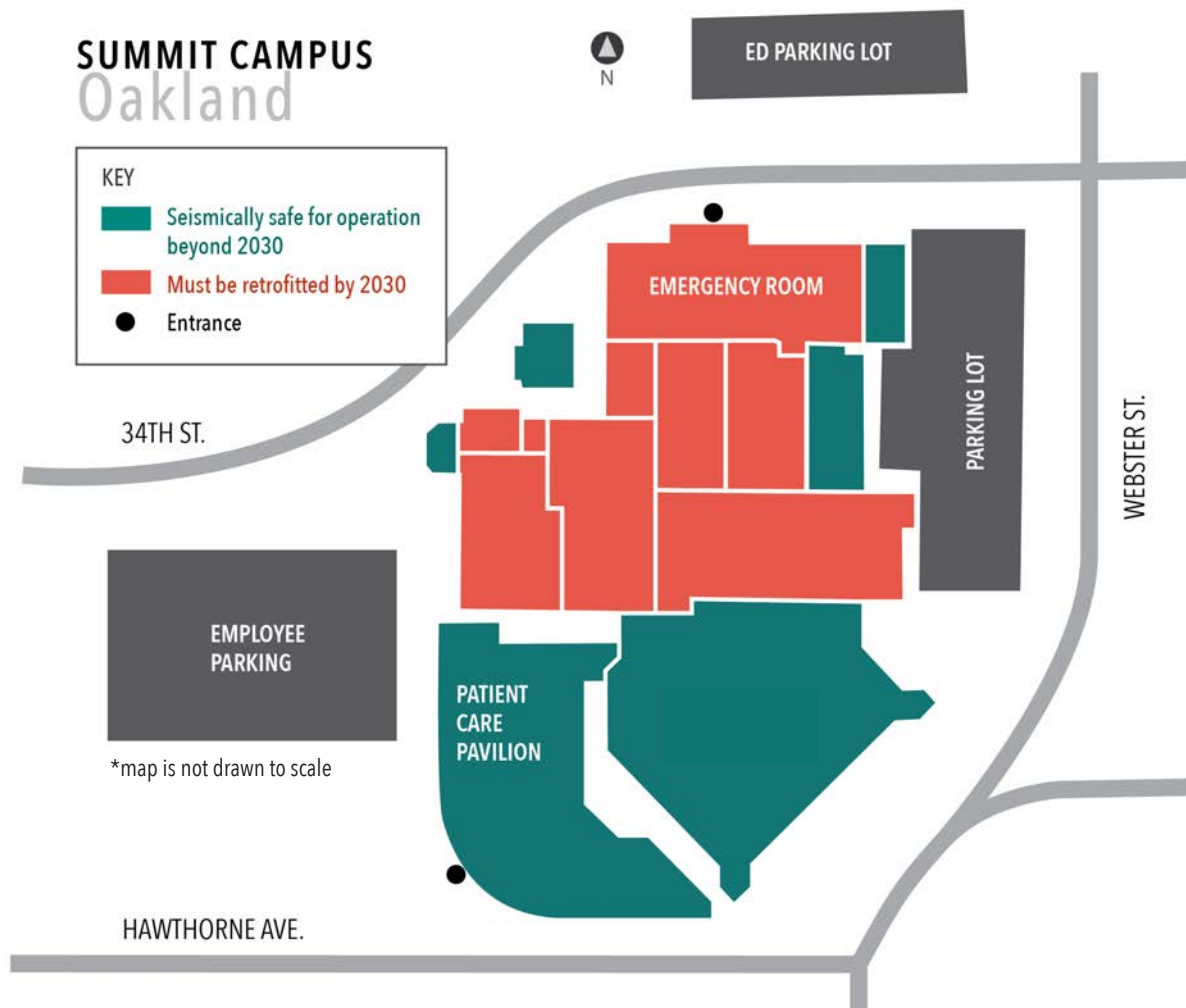
Summit currently does not operate a birthing center, and relocating services to Summit would require that a new birthing facility be built at the Oakland campus, with the capacity to deliver nearly 6,000 babies per year.

To replace Alta Bates Campus emergency department, Summit Campus would need to expand its capacity by an additional 50,000 emergency department visits per year (the number of ED patients seen at Alta Bates campus in 2017), for an approximate total of 100,000 visits annually.

In the case of a relocation of all ED services from Alta Bates Campus to Summit, the total patient volume at Summit Campus would exceed any Emergency Department in the East Bay or San Francisco, including SF General, the highest traffic ED in the broader region which had 72,716 ED encounters in 2016.⁸

Map 6. Summit Campus and affected buildings

Source: OSHPD, 2018



Sutter Health Plans for Summit Campus Expansion

■ Sutter Health is proposing to relocate all East Bay inpatient and emergency services to its Summit Campus in Oakland. The Sutter website dedicated to the proposed closure of Alta Bates Campus (<https://rebuild.altabatesummit.org>), indicates that Sutter plans to build a new acute care medical center and ED at the Summit location by the year 2030.

The following section outlines select Frequently Asked Questions (FAQs) and responses from Sutter regarding the hospital closure, along with the RHIA's relevant key findings.

What services will Sutter Health continue to provide in Berkeley?

Sutter response:

We are committed to making future investments in Berkeley and see it as a primary location to provide outpatient care. Our Herrick Campus on Dwight Way has been identified by the city as a prime location to deliver medical services. We plan to expand Herrick's services, which include our Comprehensive Cancer Center and Behavioral Health program. In addition, we currently have three large care centers, including our newest one near the Herrick Campus on Milvia Street, where people can also visit our urgent care center.

RHIA analysis:

Since we did not have details from Sutter on what services will remain at Alta Bates Campus, we focused on impacts to the birthing center and ED.

Will the new facility in Oakland be able to provide enough emergency care?

Sutter response:

We plan to enlarge, upgrade and strengthen the current Summit Emergency Room so that we have the capacity to handle more than 90,000 ER visits a year. By the year 2030, we plan to completely rebuild our ER within a second critical care tower to be constructed at the Summit Campus.

RHIA analysis:

We detail the ED impacts throughout this report. A key finding is that the new Summit Campus ED will need a capacity of approximately 100,000 visits per year, but plans to serve 90,000.⁴ This exceeds the number of visits seen by any ED in the East Bay or San Francisco.

Oakland is farther away than Berkeley from where I live. What if I'm having a heart attack or a stroke and need to call 9-1-1?

Sutter response:

Any non-Kaiser patient in the Alta Bates Summit service area calling 9-1-1 today for a heart attack or stroke is already transported to our Oakland campus, where we have one of the most advanced heart centers in California. Additionally, the Summit Campus ER is located next to two major freeways (I-580 and I-980) in Oakland. It's actually faster for most patients in the East Bay - including those from West Contra Costa County - to get to our Oakland campus than it is for them to get to our Berkeley campus, especially during an emergency.

RHIA analysis:

We offer a detailed travel time analyses in the Emergency Services section, on page 43. We found that private vehicle and transit travel times will increase for some communities. Where travel time increases exceed 30 minutes, the literature suggest patients will experience adverse health outcomes.

What will happen to the Summit Campus?

Sutter response:

In August 2014, the new 238-bed patient care tower opened at the Summit Campus in Oakland. This new tower meets the state's 2030 seismic regulations and is equipped with the latest technology, ensuring the highest level of medical care and patient safety. We plan to create a modern footprint at this campus that will allow us to build another building - a second pavilion - that will include new operating rooms, intensive care units, a modern, expanded Emergency Room and space for our Women and Infants Birthing Center and Newborn Intensive Care Unit. It is our plan to relocate inpatient and emergency hospital services, including all staff and doctors, from Berkeley to Oakland by 2030.

RHIA analysis:

As noted above, needs at an expanded Summit Campus would include a comprehensive birthing center and significantly increased capacity in the ED. The Summit Campus is located less than 3 blocks away from the Kaiser Oakland ED. Although Kaiser Oakland is not accessible to all patients, its ED has the capacity to see 96,000 visits per year, and was operating 32,313 visits below capacity in 2017. Summit currently has the capacity to see 50,000 ED visits per year, but was operating under capacity by 2,883 visits in 2017.⁴ This suggests that while patients currently have the option to utilize Summit Campus or other EDs

with more capacity, many are choosing to utilize the Alta Bates Campus ED which was operating above capacity by over 6,000 visits in 2017.

What happens next?

Sutter response:

Planning a project of this scale takes years and must be thoroughly vetted and collaboratively developed. We will keep our community informed with accurate and timely information. This transition must be planned far in advance to ensure the community's ongoing health needs are met without interruption. Please visit this site for updates or use the information on the Contact Us page to reach out to us.

RHIA analysis:

Our review of the literature suggests that the timing of events is crucial to prevent adverse impacts to those seeking both chronic and urgent care. A more detailed plan would be necessary, including public awareness and engagement, to ensure treatment options are clearly communicated to current Alta Bates patients and those seeking urgent care in the region.

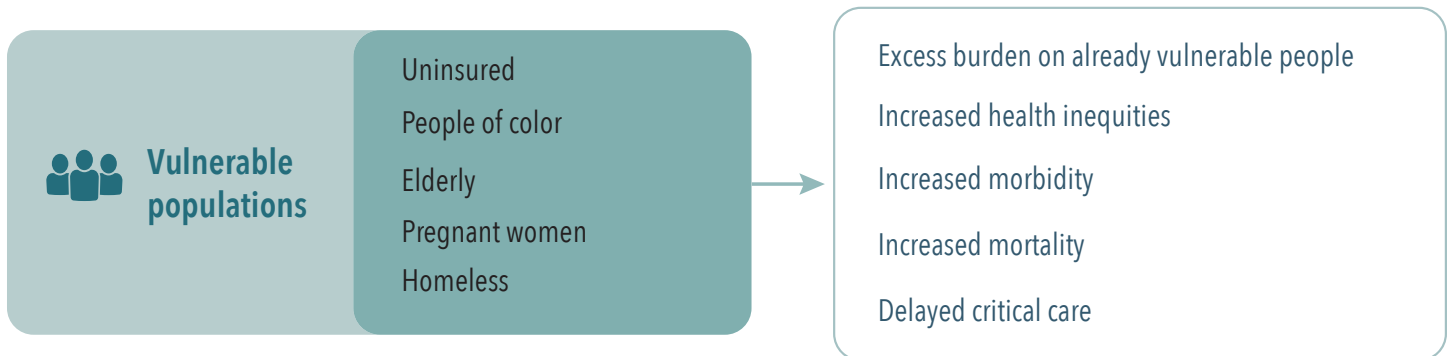
**All Sutter Health website text referenced reflects updates as of June 7th 2018*



IMPACT ON VULNERABLE POPULATIONS



■ Vulnerable populations are more likely to be impacted by the proposed closure of Alta Bates Campus, this includes low-income and people of color, Medi-Cal and Medicare patients, pregnant women, and the homeless.



ALTA BATES PATIENT DEMOGRAPHICS 2016

56% of ED patients and **63%** of hospitalized patients were people of color

41% of patients are uninsured/self pay or are Medi-Cal recipients

23% of hospitalized patients are elderly

68% of inpatient discharges were women

The Alta Bates Campus and ED provide key medical services to a high volume of patients from vulnerable populations in the Bay Area region which include but are not limited to: pregnant women, People of Color, low-income, uninsured and Medi-Cal patients, the elderly, and people living with disabilities. While people of color make up 44% of the Alta Bates campus Hospital Service Area (HSA), they represented 63% of hospitalized patients and 56% of ED patients in 2016. An additional 41% of patients in 2016 were Medi-Cal recipients or self pay/uninsured, and 23% of hospitalized patients were over 60.⁸

A wealth of evidence suggests that vulnerable populations may be more severely impacted by hospital closures, and should be taken into special consideration in the context of Alta Bates and the capacity of the East Bay regional healthcare network. Chen et al (2015) found that vulnerable populations, particularly African American and Medicaid patients, have higher measures of non-urgent ED scores, and are more

frequent users of the ED for both non-urgent and urgent reasons. A 2011 study looking at major medical services such as outpatient care, specialty care, marker conditions, births, and mental health and substance abuse services found that urban hospital closures led to disproportionate disruptions in accessing care, especially for uninsured African-Americans and Latinx populations, and all women on Medicaid hospitalized for births (Hsia & Shen, 2011).

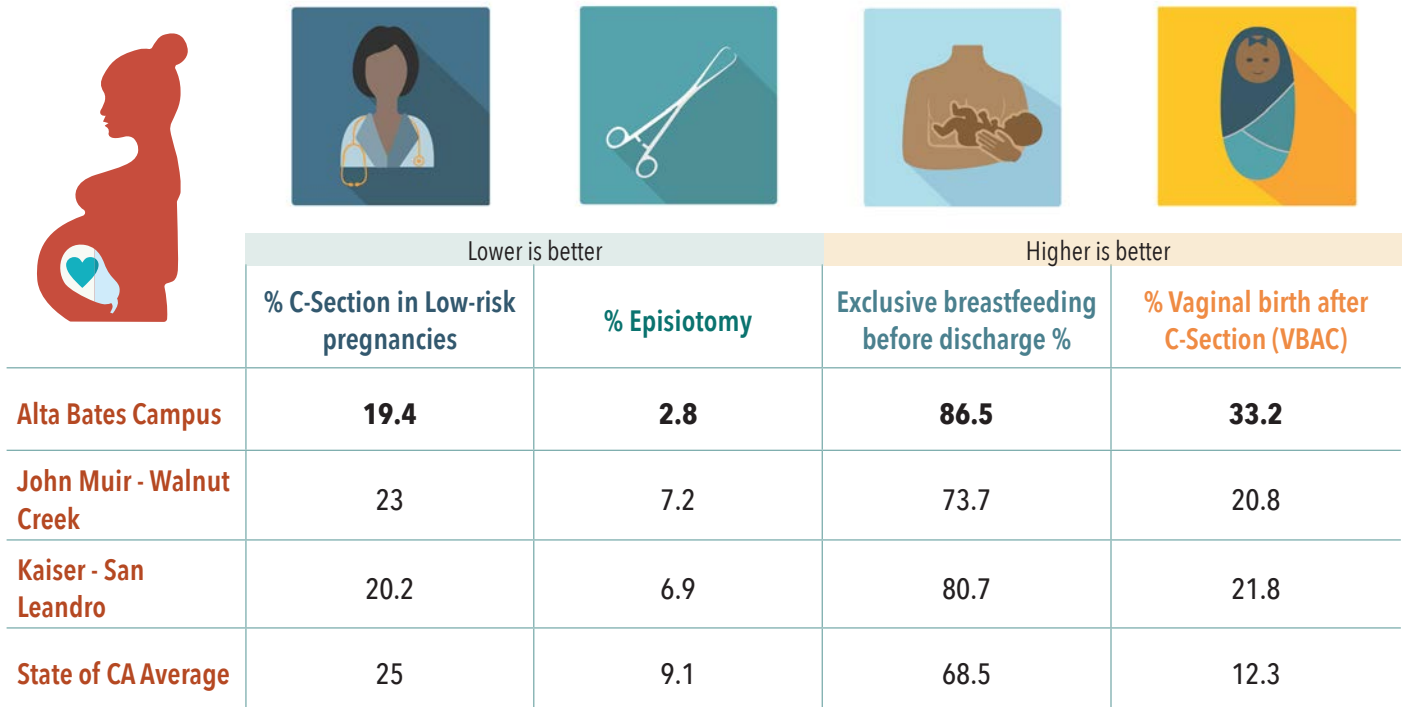
The ED visit rate to Alta Bates Campus for patients living in low-income ZIP Codes (i.e., the lowest quartile), increased 23% from 2006 to 2014. There was no change in ED visits for patients living in higher-median-income ZIP Codes over this same period. This is not a surprise finding, but it does suggest that the Alta Bates Campus ED currently serves an increasingly number of low-income residents in the Bay Area.

Pregnant Women & Newborn Babies

As noted above, Alta Bates Campus is one of the region’s premier birthing centers. The age and gender distribution of hospitalized Alta Bates Campus patients reflects the high utilization of its birthing and pregnancy-related services: **in 2016, 68% (13,564) of inpatient discharges were female**, and 32% (6,322) of inpatient discharges were male. 30% (6,018) of inpatient discharges were for patients under 1 year old, reflecting high utilization of birthing and the NICU.⁸ **In 2016, Alta Bates Campus had 2,145 more births than Kaiser San Leandro, the second largest birthing center in the region that year** (Figure 17).³

While being one of the most highly utilized birthing centers in the region, Alta Bates Campus has some of the **best health outcomes for birthing services when compared to other regional birthing centers and CA state averages** (Cal Hospital Compare, 2018). As depicted in Figure

Figure 16. Outcomes for Largest birthing centers in Alameda & Contra Costa Counties, 2016



*numbers are reported as percentages (Adapted from CA Health Care Foundation & CHART 2014)

16, Alta Bates Campus reports the lowest regional rates for C-Section in low-risk pregnancies and episiotomy procedures, which can put mothers at risk for post surgical complications. Alta Bates Campus also has the highest rates for exclusive breastfeeding before discharge and vaginal birth after C-section (VBAC) which are both positive birth indicators for mothers and newborns.

Alta Bates Campus also has an active 55-bed, level III newborn intensive care unit, operated by a 200-person healthcare team (Sutter Health, 2018). Compared to other birthing centers in the region, the Alta Bates Campus NICU has experienced a consistently high occupancy rate and discharged a high volume of newborns. In 2016, the NICU was at nearly 60% occupancy and discharged 964 patients, 350 more than John Muir Walnut Creek, which had the second highest number of live births for a non-Kaiser hospital. That year, John Muir Walnut Creek had a NICU occupancy rate of 27% with 614 patient discharges.³

Lorch et al (2013) found that when hospital obstetric units in Philadelphia closed, neonatal and fetal mortality increased almost 50% in the first three years after the closure compare to surrounding counties where hospitals did not close. This study also found that low income women tended to receive their prenatal care at the hospital, not a doctor’s office, and this may have also had an impact on birth outcomes.

Given the comprehensive prenatal, labor and delivery, postpartum and specialty newborn care provided at the Alta Bates Campus as well as the high volume of births, **we determined that the hospital closure will likely have an adverse impact on maternal and newborn health in the**

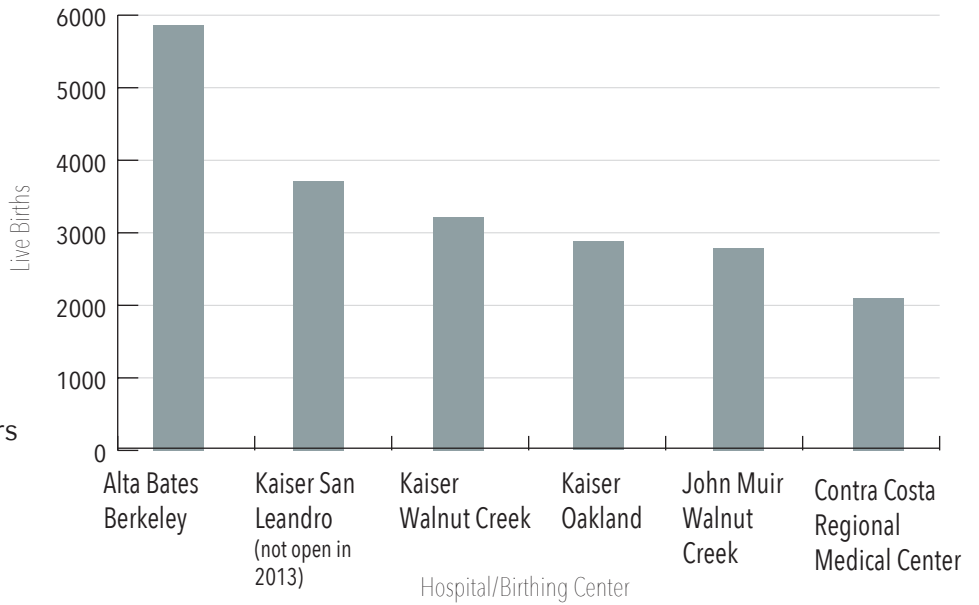


Figure 17. Number of live births across regional birthing centers 2016

Source: OSHPD, 2016

region, particularly in the short term. While Sutter plans to open a new regional birthing center at the Summit campus in Oakland, the timing and specific services that will be offered have not been disclosed.

People of Color

Alta Bates Campus serves diverse communities in terms of race, ethnicity, and socioeconomic status, and hospital and emergency department patients have consistently included a high proportion of low-income and people of color.

In 2016, 63% of inpatient discharges and 56% of emergency department discharges were for people of color (African American, Hispanic/Latino, Asian/Pacific Islander or Native American). Of the 63% of inpatient discharges for people of color, 22% were African American, 25% were Hispanic/Latino, 16% were Asian/Pacific Islander. White patients made up 32% of all 2016 discharges. For the ED, 56% of discharges were people of color, including 38% African American, 14% Hispanic/Latino, and 10% Asian/Pacific Islander. White patients made up 38% of 2016 ED

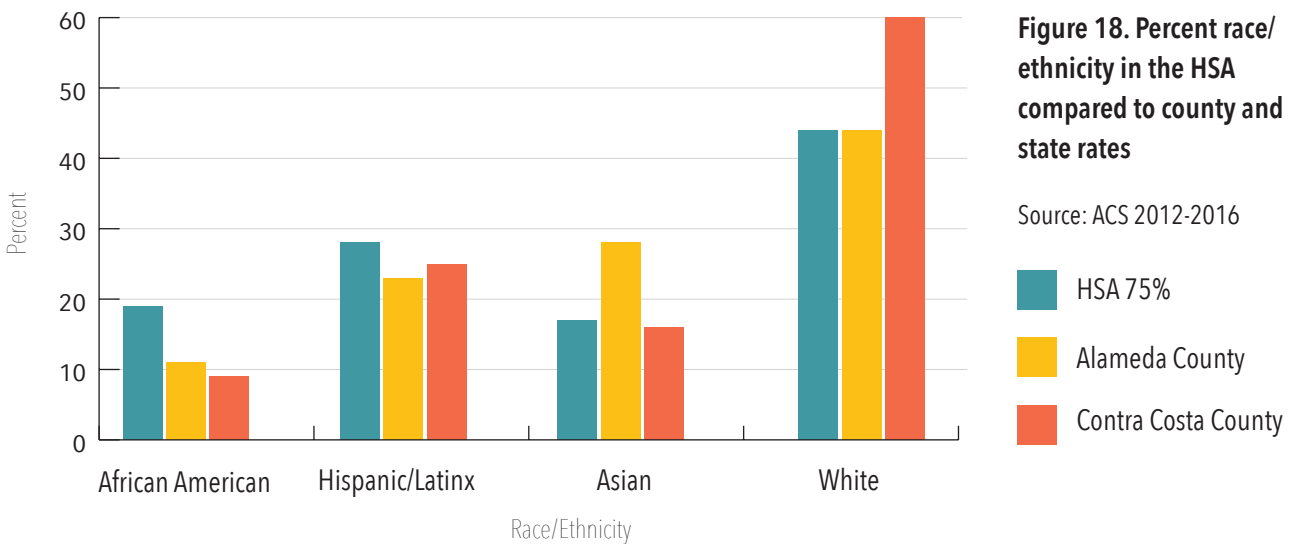
discharges.⁸ African American people in particular were overrepresented in both inpatient and ED discharges from Alta Bates in 2016, making up only 18% of the population in the RHIA defined Alta Bates Hospital Service Area (HSA).

Within the Alta Bates HSA, an estimated 20% of the population has limited English proficiency; this figure is higher than both Alameda (18%) and Contra Costa Counties (14%) (ACS 2012-2016). Limited English proficiency can create language barriers between patients and providers, but can also contribute to decreased healthcare utilization particularly when a patient must access a relocated or unfamiliar facility.

Fishman et al (2018) studied ED and clinic usage in Chicago and found that patients living in medically under-served areas (MUAs) and areas with lower spatial access to primary care clinics had higher odds of preventable ED use. Analyzing data from the National Hospital Ambulatory Care Survey, Johnson et al. (2012) observed higher preventable ED use among those who were female, non-Hispanic black or Hispanic, older, or publicly insured, and that areas with large concentrations of ethnic and racial minority populations have been shown to have high rates of preventable use of EDs. While a significant

portion of preventable ED use can be addressed by improved access to primary care, EDs still serve as an essential care provider for those unable to access care by other means. Chen et al. (2015) found that lower-income vulnerable populations, particularly African Americans and Medicaid patients, more frequently utilized the ED for both non-urgent and urgent reasons, and these same populations tended to utilize the hospital ED for medical conditions that could be addressed in a primary care setting.

With high rates of ED and hospital service utilization, and representing large percentage of the population in the HSA, **people of color will be disproportionately burdened by the closure of Alta Bates Campus. We are especially concerned with access for both urgent and non-urgent conditions, and the continuity of care for people of color that are already relying on Alta Bates' ED for regular care.** Related to the closure of Alta Bates Campus, we would expect short term (first 1-3 years) delays in seeking treatment, increased severity of some diseases, increased hospitalizations due to delays in seeking care, increased costs of treatment (i.e., medications, doctor visits, etc.) and potentially increased morbidity and mortality (especially from conditions already disproportionately burdening

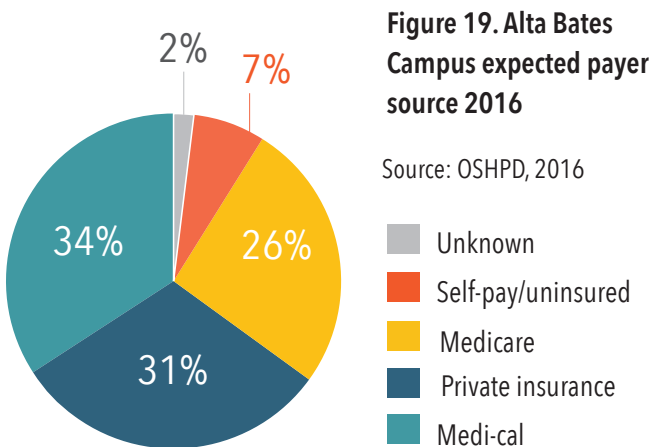


people of color such as diabetes, heart disease and asthma) for people of color in the region. The high utilization of the ED for both urgent and non-urgent conditions raises an opportunity in the Bay Area for increased coordination and communication between primary, urgent, and emergency care providers. While the region has a network of urgent care facilities that may be able to absorb some of the preventable ED patient traffic, urgent care hours of operation and insurance plans accepted may still pose barriers to low-income and people of color.

People with Disabilities

According to the US Census, **95,840 people or 11% of the population in the HSA are living with a disability, of which at least 61% are racial/ethnic minorities.** White people represent 44% of the population in the HSA, however they make up only 9% of people living with disabilities. Conversely, the Native American and Pacific Islander populations, which combined constitute less than 2% of the total HSA population, represent 31% of people living with disabilities in the area.

While this RHIA does not frame disability as a medical condition, we recognize that people living with disabilities may be adversely impacted by the closure of Alta Bates Campus due to transportation barriers and increased distance, unfamiliarity with relocated services, and other accessibility challenges.



Uninsured & Publicly Insured Patients

As discussed above, Alta Bates Campus serves a large number of low-income patients. In the HSA, over 18% of the population lives below the federal poverty level, and 36% of the population live below 200% of the federal poverty level. This has a large impact on children and young people, as 61% of public school students are eligible for free/reduced price lunch, compared to 44% in Alameda County and 40% in Contra Costa County. This is consistent with the high rate of Medi-Cal covered patients (25%) and uninsured patients (11%) in the hospital service area (ACS 2012-2016).

Alta Bates Campus’ 2016 expected payer sources (Figure 19) for emergency department patients highlights that a large percentage of Alta Bates patients are from vulnerable populations, as **68% of Alta Bates ED patients were expected to pay via either Medicare, Medi-Cal or were self-pay/uninsured.**⁸ Medicare serves populations over 65 and also serves people with disabilities. People utilizing Medicare represent vulnerable populations, such as the aging/elderly, socioeconomically vulnerable and people with disabilities. Medi-Cal serves socioeconomically vulnerable populations, by qualifying people/families that are at 138% of the federal poverty level or below (i.e. \$28,677 annually for a family of 3), which is very low-income for California and especially the Bay Area (DHCS, 2018).

Uninsured patients are also extremely vulnerable, as uninsured patients can include patients that are low-income, homeless and/or undocumented immigrants. Hsia et al (2013), found that between 2005-2010 in California, **ED visits by Medicaid beneficiaries increased by 14%, significantly higher than privately insured patients.** According to the 2006 California Health Care Foundation

report, *Overuse of Emergency Departments Among Insured Californians*, even insured patients can be more frequent ED users than uninsured patients, particularly those with Medicaid coverage, which still leaves them with difficulties in accessing primary care.

The Aging & Elderly

Aging people and the elderly (60+ years old) account for a disproportionately high percentage of inpatient discharges and emergency department visits at both Alta Bates and Summit Campuses. Despite representing only 18% of the population in the RHIA defined HSA In 2016, the 60+ year old population accounted for approximately 23% of inpatient discharges and over 30% of emergency department visits at the Alta Bates Campus. That same year, the 60+ year old population accounted for approximately 65% of inpatient visits and 39% of emergency department visits at the Summit Campus.⁸

The aging and elderly population is expected to increase in the coming decades. According to the Public Policy Institute of California, the 65+ year old population is expected to grow 87% from 2012 to 2030, and the California Health Care Foundation has similar findings, noting that California's 65+ year old population is projected to more than double from 2000 to 2030, growing to 8.8 million.

In 2012, the RHIA defined HSA had a 65+ year old population of 93,537, and with an 87% growth projection, will reach 174,914 in 2030 (ACS 2008 - 2012). This growing population is critical to consider because this age group is among the highest users of both emergency

"I know seniors that don't drive and used to regularly use DMC (Doctor's Medical Center, San Pablo) for speciality and emergency situations. Now that DMC is closed, some have to travel 2 hours by public transportation to see speciality doctors. That has a huge impact on whether or not they receive care."

- Local government official, Bay Area

and inpatient care. The California Health Care Foundation noted that due to seniors' high rate of hospitalizations, acute care hospital days are projected to increase by 76% from 2000-2030, and by 2030, the 65+ group is projected to use over half of the state's acute care days, despite representing only 18% of the population.

The CA Health Care Foundation suggests that by 2030 there will be an insufficient number of acute care beds in the SF Bay Area due to the increasing numbers of hospitalized elderly. And, considering the high utilization of the emergency department by the 60+ year old population and the quick growth rate of that demographic, it is unlikely that a new emergency facility designed to meet current capacity would be able to accommodate the combined growth of the elderly and regional population, which could impact timely care for all patients needing to access emergency treatment.

A study that included focus groups with seniors two years after the closing of a Pittsburgh hospital (Countouris et al 2014) found that seniors' health was adversely impacted from a combination of feelings of sadness and loss, fear of finding a new, unfamiliar facility, and powerlessness. Elderly in this study also expressed concerns about having to navigate a new facility/location, uncertainty about transportation that resulted in canceled doctor's appointments, and higher parking costs at the new facility. Bindman et al (1990) found that hospital closures resulted in delayed treatment for the uninsured and elderly because

of inconveniences and difficulties in finding new providers.

Buchmueller et al (2006) revealed that hospital closures in the Los Angeles area increased travel distances to ED and ancillary care and contributed to an increase in heart attack deaths, most notably for the region's elderly population.

This RHIA suggests that the elderly and uninsured will be adversely impacted from the closure of Alta Bates Campus, both due to ED and chronic care needs. The elderly living in the HSA may be most adversely impacted if an adequate number of beds are not provided (such as at the Summit campus), due to their increasing numbers and inpatient needs. The uninsured and publicly insured will be adversely impacted from the lack of access to a familiar ED for both chronic and urgent medical needs. **We expect, especially in the short term, interruptions and delays in seeking care, increased severity of disease, potential greater spread of infections, increased need for costly future care and potentially increased hospitalizations.** We are less confident in the possibility of increased mortality, but this is a possibility especially for the elderly.

Mental health & Suicide Prevention

While the Sutter Herrick Campus in Berkeley is a designated site for mental health care, the Alta Bates Campus ED plays a significant role in treating and identifying mental health patients that may first be seen through emergency care. In 2018, the *Lancet Public Health* journal published, "Suicide in the USA: A Public Health Emergency" noting that the rate of mental health/ substance abuse-related ED visits increased 44% from 2006 to 2014, with suicidal ideation growing 415% over this period.

The Alta Bates Campus ED acts as a first-responder to screen for, intervene and refer for mental health care and suicide prevention. In

2016, **almost 4% of ED patients were transferred to psychiatric care.**⁸ Since the hospital ED is often associated with traumatic events, it is the ideal environment to perform suicide risk assessments. Individuals in a suicidal crisis often seek help at a hospital ED. EDs also frequently provide care for people with other risk factors for suicide, such as serious mental illness, substance use disorders and chronic pain. The ED visit is an important window of opportunity, however brief, to intervene and save lives (Ahmedani et al 2014).

EDs can reduce suicide attempts among high-risk patients by delivering a combination of interventions that includes suicide risk screening, discharge resources, and other interventions (Betz et al 2016; Larkin & Beautrais, 2010). A multi-site study found that when compared to treatment as usual, a combined set of interventions starting in the ED resulted in a 5% decrease in the proportion of patients who attempted suicide in the 52 weeks after their initial ED visit and an overall 30% drop in the total suicide attempts (Miller et al 2017).

The presence of the Herrick Campus, with its comprehensive mental health services, may be able to accommodate any potential delays in care for those currently utilizing Alta Bates Campus. Significant impacts on mental health for the population in the HSA from the closing of Alta Bates Campus may be difficult to quantify.

Homeless People

Homeless people and families, some with mental health care needs, tend to rely on the ED for care (Karaca et al 2013). Nearly three out of four inpatient stays by homeless individuals began in the ED, compared with half of stays for non-homeless patients. Due to multiple barriers in accessing care, including lack of insurance and transportation as well as poor continuity of care, homeless people frequently use EDs as their primary or only source of health care.

A 2002 study by Kushel et al. examined the factors associated with emergency room visits among 2,578 homeless and marginally housed persons. They found that 40.4% of the 2,578 visited an emergency room one time or more during the previous year, and that less-stable housing, chronic illness and victimization were associated with emergency department use among homeless and marginally housed persons. The study also suggests that emergency care is a primary option for homeless and marginally housed persons due to convenience and 24-hour operation, and because they face challenges in addressing medical needs outside of an emergency setting.

In 2017, many Bay Area hospitals reported increases in homeless patients from the prior year. Figure 20 shows the total number of homeless patients that visited the Alta Bates Campus and 5 other major East Bay regional hospitals in 2017, and the volume increase in patients from 2016. Kaiser Richmond and Kaiser Oakland combine hospital data, and are represented as one site in the analysis. The figure highlights that all six hospitals saw a significant increase in the number of patients from 2016 to 2017, with the **Alta Bates Campus seeing nearly a 600% increase in homeless patients**, rising from 60 to 409. Highland Hospital had the smallest percentage increase in homeless patients but served 1,118 homeless patients in 2017. Importantly, aside from Highland and the Herrick Campus, at least 89% of homeless patients seen were either emergency department patients or inpatient from the emergency department, underscoring how essential emergency room care is for the homeless and marginally housed. ⁶

While the cause behind the increases in annual reported homeless patients across Bay Area hospitals is unclear, a

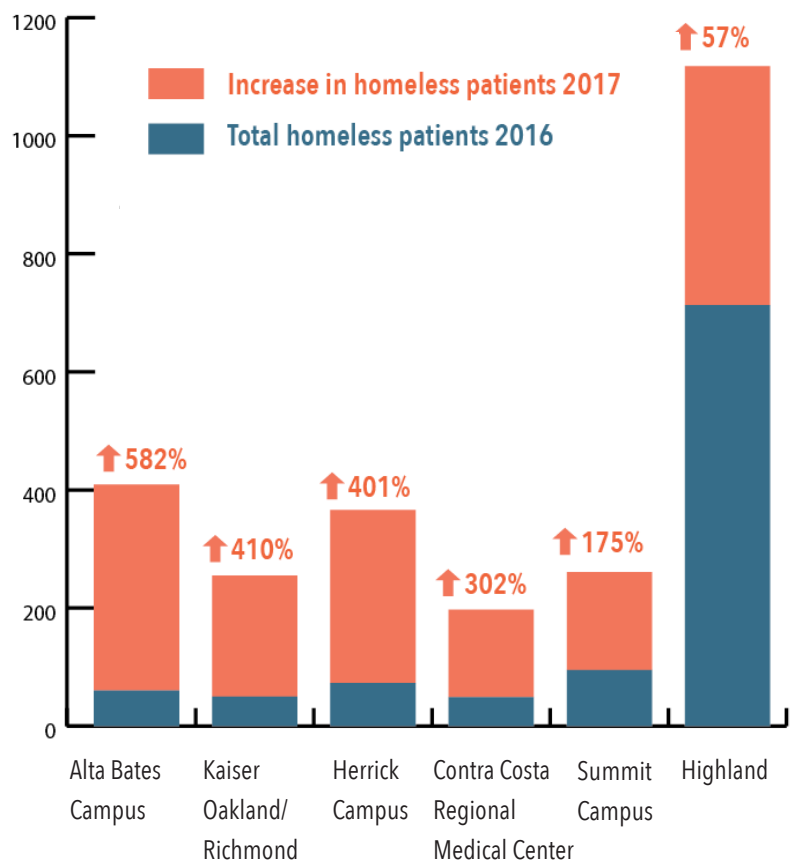
recent quicknotes memo published by OSHPD suggests that the number of homeless patients has been historically underreported (OSHPD, 2018).

We find that the loss of Alta Bates Campus and its critical emergency and mental health care services may have an impact on the surrounding area’s homeless population, particularly if the increasing trends in homeless patients seeking emergency care continue.

Adverse Impacts on Vulnerable Communities in the Alta Bates Hospital Service Area

Alta Bates Campus currently serves some of the most vulnerable communities in the Bay Area, such as those mentioned above in West Contra Costa County as well as many communities in

Figure 20. Total Homeless patients at select East Bay hospitals 2016 - 2017⁶



Oakland and other parts of Alameda County. Community vulnerability includes not just current-day utilization of hospital care, but the likelihood of future needs based on health-influencing risks, such as poverty, low education, housing displacement, exposure to pollution and violence. These same communities are also vulnerable since a large percentage of the populations living there have preexisting health conditions that require chronic care.

The 2016 Alta Bates Summit Medical Center Community Health Needs Assessment (CHNA) recognized these vulnerable communities as the medical center’s “communities of concern.” **The 2016 CHNA identified 13 ‘vulnerable community’ ZIP Codes that represented 65% of the population served by all three campuses in the Alta Bates Summit Medical Center.**

Figure 21. Alta Bates Summit Medical Center CHNA Communities of Concern

Source: Alta Bates Summit Medical Center CHNA, 2016

ZIP Code	Community
94601	East Oakland/Fruitvale
94602	Oakland/Glenview
94603	East Oakland/Brookefield
94605	East Hills/Oakland Zoo
94606	Oakland/Cleveland Heights
94607	West Oakland/Jack London
94608	Emeryville
94609	Oakland/MLK
94612	Downtown Oakland
94621	East Oakland
94702	Northwest Berkeley
94703	Northwest Berkeley
94710	West Berkeley/Marina

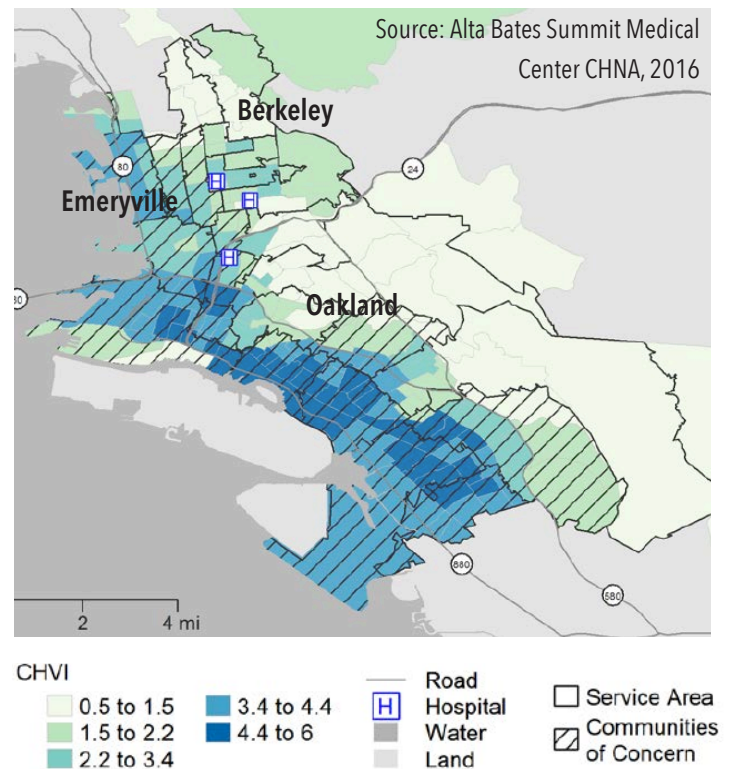
To identify communities of concern in the 2016 CHNA defined hospital service area, the CHNA authors identified significant health needs and

developed what the report calls the ‘Community Health Vulnerability Index’ (CHVI), which combines the following indicators of community vulnerability into one CHVI index value (Map 7):

- Percent Minority
- Population 5 Years or Older Who Speak Limited English
- Percent 25 or Older Without a High School Diploma
- Percent Unemployed
- Percent Families with Children in Poverty
- Percent Households 65 years or Older in Poverty
- Percent Single Female-Headed Households in Poverty
- Percent Renter-Occupied Households
- Percent Uninsured

For this report we were not able to calculate CHVI scores for the additional ZIP Codes included in the RHIA defined HSA using the 2016 CHNA

Map 7: 2016 CHNA defined service area CHVI scores



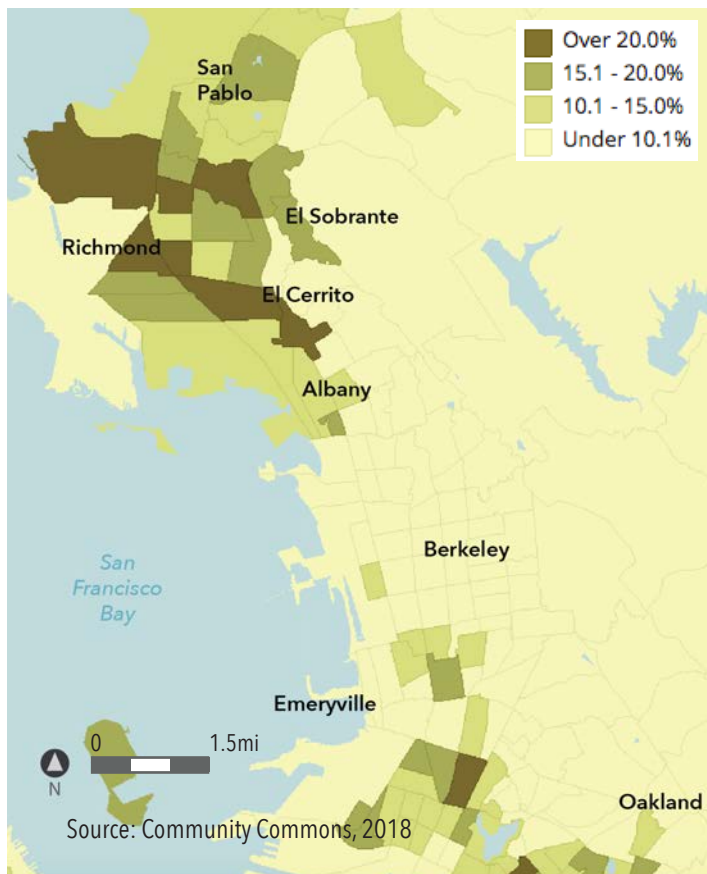
methodology. However, we reviewed each of the CHVI indicators to assess the vulnerability of the additional ZIP Codes (primarily communities in West Contra Costa County) using ACS 2012-2016 estimates. This review indicated that many communities in West Contra County likely meet the same standard of vulnerability as the 13 communities of concern in the 2016 CHNA, which did not include any ZIP Codes outside of Alameda County. **The vulnerable communities from West Contra Costa County include ZIP Codes within Richmond, San Pablo, El Cerrito, and El Sobrante; cities for which Alta Bates Campus saw a 39% increase in discharges between 2014-2016.**

Maps 8 & 9 highlight select CHVI indicators for communities in the RHIA defined HSA. As both maps indicate, communities in West Contra Costa show high levels of vulnerability at comparable

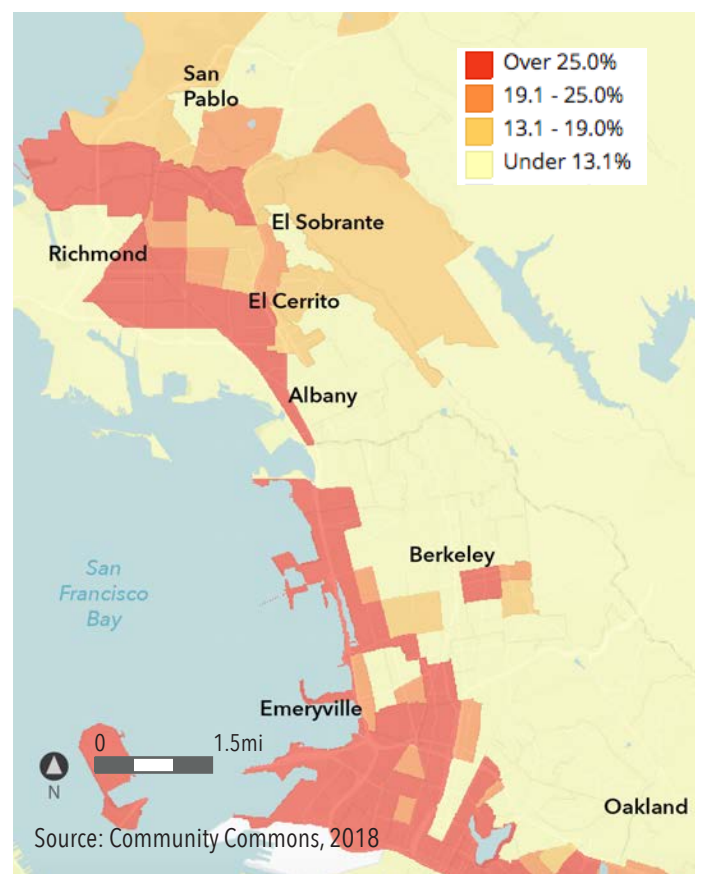
rates to those in Oakland, Emeryville, and parts of Berkeley, in Alameda County. In addition to the review of CHVI indicators, we reviewed data compiled by Sutter Health on their interactive Health Needs Maps website. The website provides 2011 data on hospitalization and ED visit rates by condition, reported per 10,000 residents and aggregated by ZIP Code. We compared the following 11 available reported causes (conditions) for ED visits and hospitalizations across all ZIP Codes in the RHIA defined hospital service area (HSA):

1. Asthma
2. COPD
3. Diabetes
4. Heart disease
5. Hypertension
6. Mental health

Map 8: Percent Uninsured across Census Tracts in the RHIA defined Service Area



Map 9: Percent of Families (with Children) in Poverty across Census Tracts in the RHIA defined Service Area



- 7. Assault
- 8. Self-inflicted injury
- 9. Unintentional injury
- 10. Stroke
- 11. Substance abuse

From this data, we identified high need ZIP Codes that fell within the top quartile relative to all zip codes in the HSA for each condition. We then ranked the top 10 ZIP Codes in order of highest need (those that fell within the top quartile most often for the 11 conditions).

Figure 22. High Health Care Need Communities in the RHIA defined HSA

ZIP Code	Community
94801	Richmond/Iron Triangle
94804	South Richmond
94806	San Pablo
94621	East Oakland
94612	Downtown Oakland
94609	Oakland/MLK
94608	Emeryville
94607	West Oakland/Jack London
94605	East Hills/Oakland Zoo
94603	East Oakland/Brookefield

Figure 22 lists the top 10 high health care need ZIP Codes in the RHIA defined HSA from highest to lowest need. ZIP Codes that overlap with the 2016 CHNA communities of concern (listed in Figure 20) are highlighted in yellow.

Consistent with our review of CHVI indicators in the RHIA defined HSA, we found that West Contra Costa County ZIP Codes are particularly vulnerable. Zip Code 94801 in Richmond, which includes unincorporated North Richmond, the Iron Triangle neighborhood, and relatively wealthy Point Richmond, ranks first out of all zip codes in the HSA for ED visits for all 11 conditions,

and is 1st for stroke, 2nd for diabetes and heart disease, 3rd for asthma and 4th for injury-assault.

The 94804 South Richmond ZIP Code ranked 1st in heart disease-related ED visits, and the 94806 San Pablo and 94804 Richmond Iron Triangle ZIP Codes were ranked 3rd and 4th for highest incidence of diabetes-related inpatient hospitalization. As highlighted in Figures 23 and 24, many of the high health care need ZIP Codes experienced ED visit rates greatly exceeding those of both Alameda and Contra Costa Counties as well as the state of California in 2011.

While there are many vulnerable communities in the RHIA defined HSA that fall outside of West Contra Costa County (primarily in Oakland and Emeryville), these communities are currently served by existing services at the Summit Campus, as well as Highland Hospital and Kaiser Oakland, and are likely to be less adversely impacted by a closure of Alta Bates Campus.

As noted above, **we predict a disproportionate adverse impact on access to chronic and urgent care for the communities of West Contra Costa County, particularly Central and North Richmond, from a closure of Alta Bates Campus.** Access to care in these communities has already been adversely impacted by the closure of Doctors Medical Center and the limited capacity of Kaiser Richmond.

Figure 23. Heart Disease ED visits per 10,000 residents for all ZIP Codes in the RHIA defined Alta Bates HSA

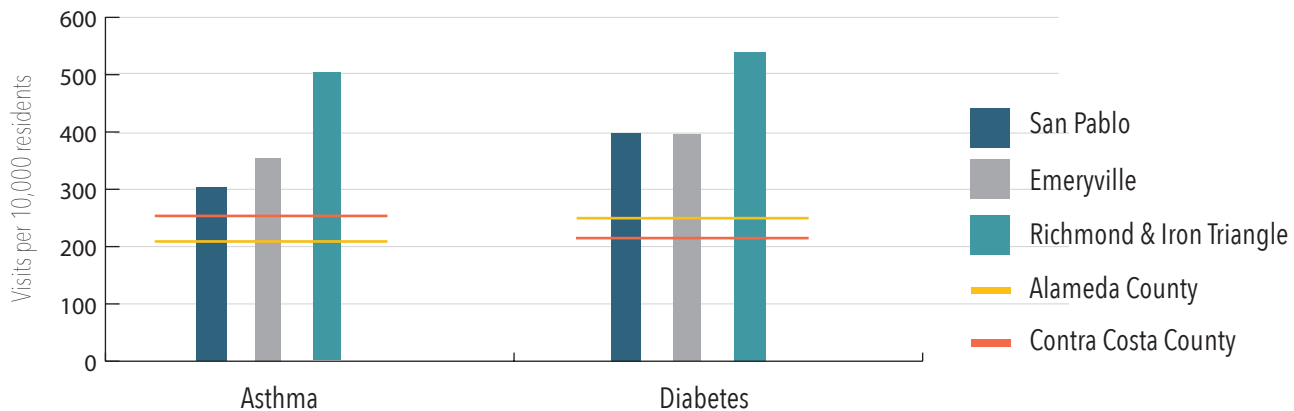
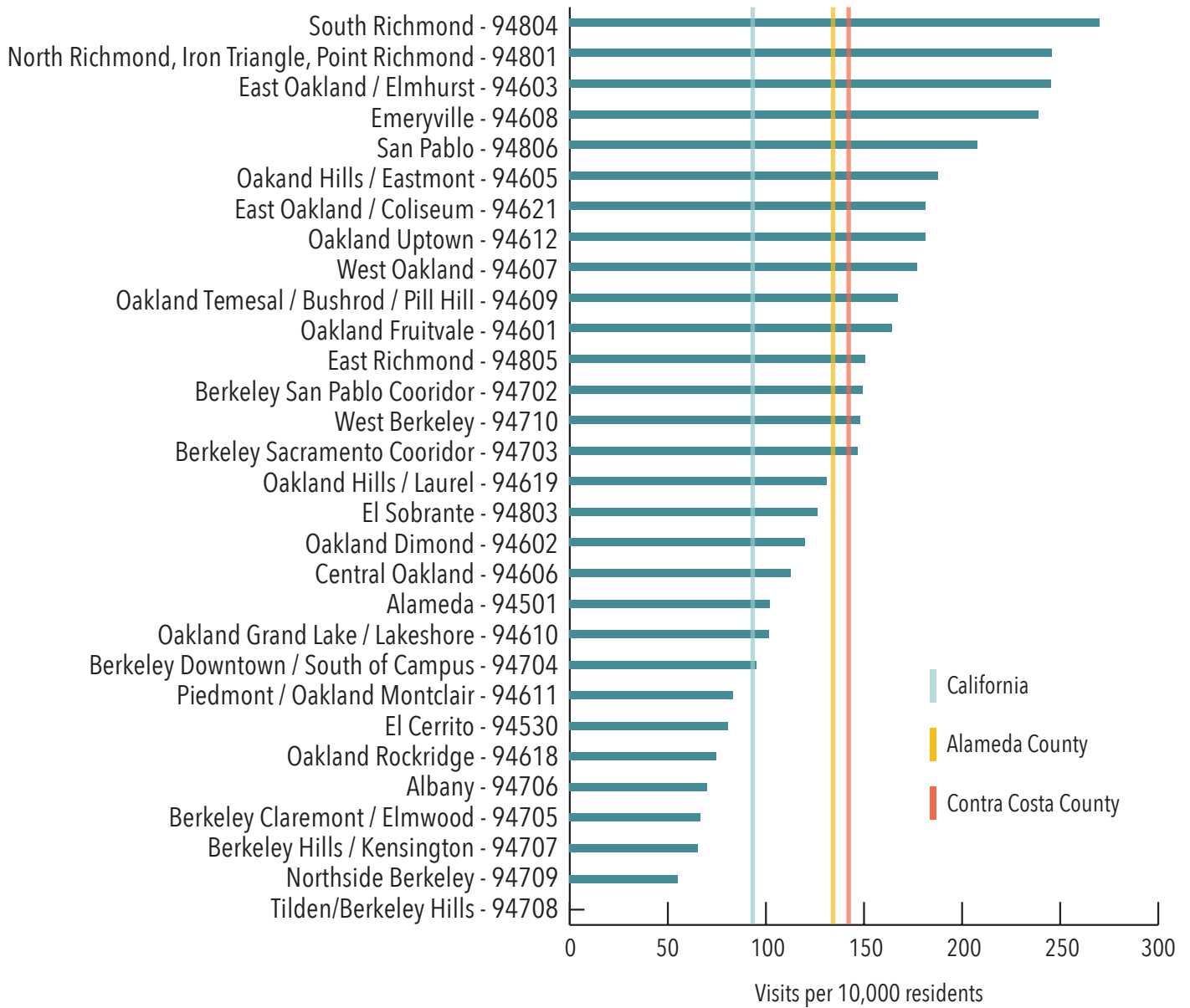


Figure 24. Select ZIP Codes - Asthma and Diabetes ED visits per 10,000 residents

Source: Sutter Health, Health Needs Maps, 2011

IMPACTS ON UC BERKELEY STUDENT HEALTH CARE

■ The UC Berkeley student population may be adversely impacted by increased travel times to the Summit campus. The campus can generate about 4,000 student ED visits per academic year, and the UC Tang Center alone estimates about 1,500 student ED referrals per year. While the Tang Center can meet the majority of urgent care student needs, it is not open 24 hours and does not perform imaging, surgery, and some emergency services make the UC Berkeley student population particularly reliant on Alta Bates Campus.

In the 2017-18 academic year, the University of California Berkeley had 30,574 undergraduate students, 11,336 graduate students, and approximately 12,000 staff (UC Berkeley Office of the Vice Chancellor of Finance, 2017). Since we did not have complete information on staff health insurance, this RHIA focuses on the potential impacts of the closing of Alta Bates Campus on student health care access. Roughly half of UCB students are enrolled in the Student Health Insurance Plan (SHIP), with the remainder enrolled either in alternative private insurance plans or through Medi-Cal. SHIP covers medical, counseling, prescription, vision and dental services. In interviews with Tang Center staff including Executive Director of University Health Services, Claudia Covello, and Medical Director Dr. Anna Harte, we learned that a larger proportion of graduate students are likely enrolled in SHIP. This is due in part to undergraduates being able to remain on their parents' insurance plans until age 26. Regardless of insurance enrollment, all students have access to the on-campus Tang Health Care Center.



The University Health Service Tang Center is a fully-accredited outpatient center designed

to address most medical, mental health and health education issues. The Tang Center employs about 300 physicians, registered nurses, nurse practitioners, medical assistants, physical therapists, pharmacists, nutritionists, lab/radiology/pharmacy technicians, social workers, licensed psychologists and psychiatrists, and health educators. An urgent care facility is open seven days a week but limited to working hours, with reduced hours on weekends.

While the Tang Center is a student health asset, it is not a licensed hospital and therefore relies heavily on Alta Bates Campus for timely referrals of acutely ill patients for **conditions including appendicitis, ectopic pregnancies, blood clots, and head injuries requiring scans.** According to the Tang Center, they refer approximately **2,500-3,000 students per year to the ED, 21% for surgery and 41% for emergency care alone (not all, but most, go to ABMC). Approximately 1-2 students per day require ambulance transport to the hospital.** An additional 2 students per week may require hospitalization for psychiatric care from Tang.

There can be daily communication between Tang practitioners and Alta Bates and this close relationship enables students to receive referrals for potentially serious illnesses. In addition

to urgent care referrals, the Tang Center also refers students to Alta Bates Campus for some outpatient diagnostic procedures, maternity care, and specialty care.

We reviewed SHIP billing data to estimate the student utilization of Alta Bates Campus and Sutter health care facilities more generally. As noted, this is not the universe of all student health care issues and students on other insurance or without insurance are likely also accessing the hospital. In addition, our review of studies from the Journal of American College Health suggested that across US universities, there were approximately 100 ED visits per 1,000 enrolled students (McKillip et al, 1990).

With approximately 40,000 students in 2017, **we estimated that UC Berkeley generates as many as 4,000 student ED visits to Alta Bates Campus per academic year.** (We note here, but did not analyze, that the East Bay has a number of students at other institutions that will likely be similarly impacted by the closure of Alta Bates Campus. For example, there are an estimated 7,000 students at Berkeley City College, and 7,900 at Contra Costa College, but many of these are commuter students and we were unable to obtain data on these students' health insurance status or residence).

Student mental health is a critical issue on the UC Berkeley campus. Severe episodes of stress, depression, thoughts of suicide and other mental health issues are prevalent in both undergraduate and graduate settings. Receiving timely treatment for these mental health issues is critical to the health of students and the general UC Berkeley population.

Our analyses of SHIP claimant data by diagnosis code from August 2016 through May 2017 revealed that of the 8,111 SHIP diagnoses, **15% were for some type of mental health-related diagnosis**, including, but not limited to: suicide attempts, thoughts of suicide, psychosis, bipolar disorder, depression, schizophrenia, eating disorders and substance abuse. While a majority of these were likely treated at the Tang Center, we do note that 7% of the Alta Bates Campus ED diagnoses in 2016 were for mental disorders/episodes. Figure 25 compares SHIP utilization for mental health related issues and those presenting at the Alta Bates Campus ED.

While we cannot determine the exact number of students visiting Alta Bates Campus for mental health care, our conversations with Tang and Alta Bates staff suggest that a high percentage of the mental health and suicide/self-harm visits to Alta Bates Campus are from UC Berkeley students. Similarly, a significant proportion of UC Berkeley

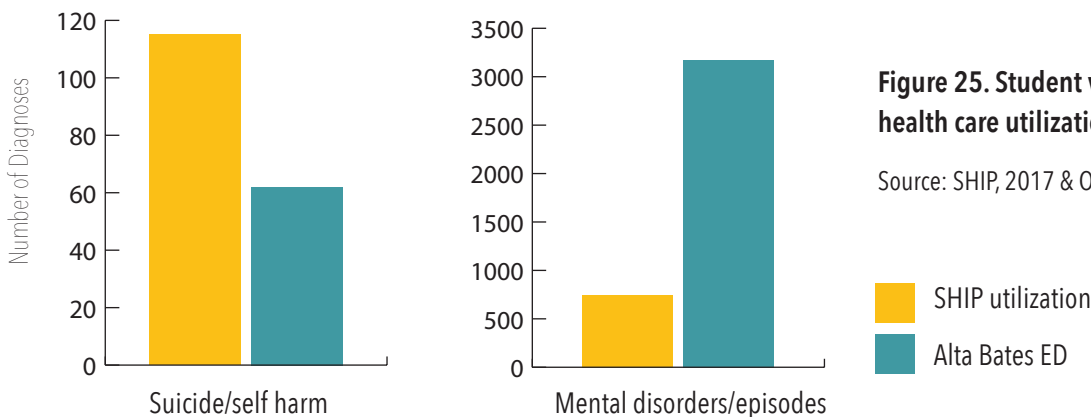
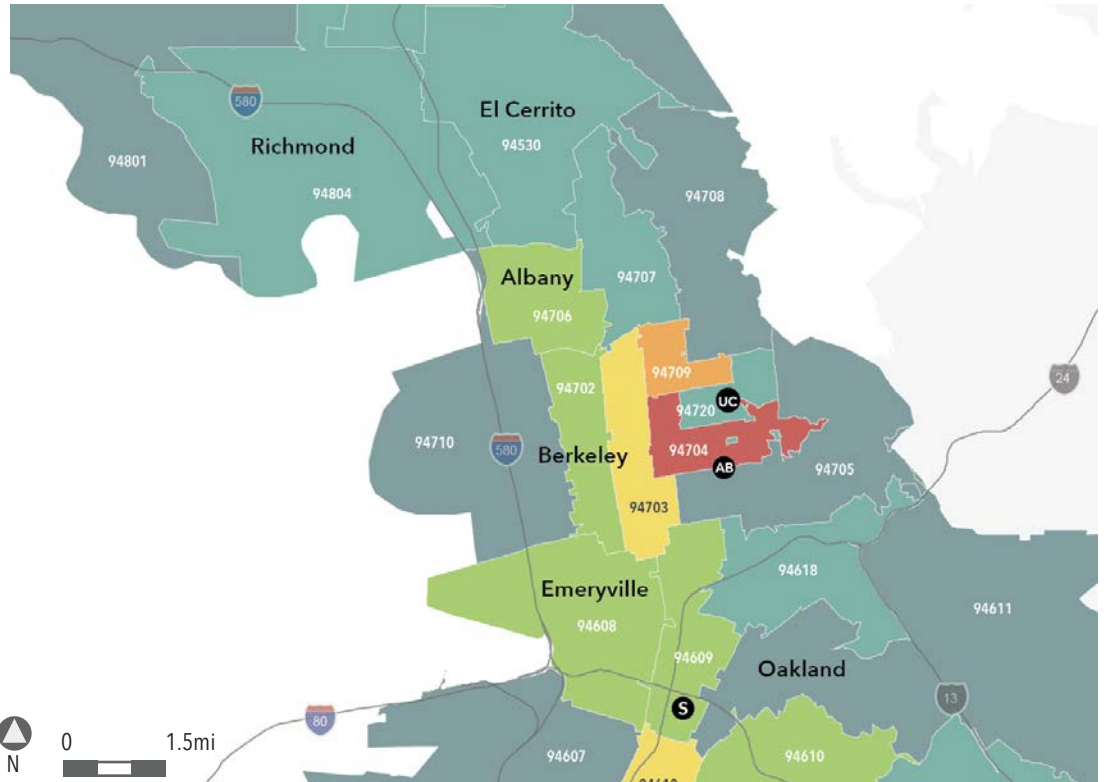
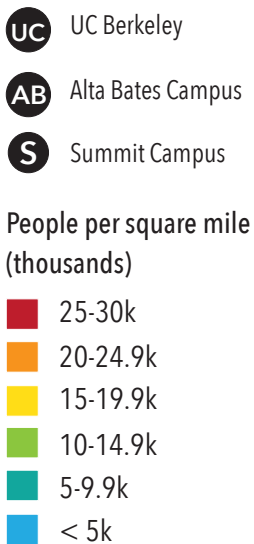


Figure 25. Student vs Alta Bates mental health care utilization

Source: SHIP, 2017 & OSHPD, 2016

■ SHIP utilization
■ Alta Bates ED

Map 10. Population density in ZIP Codes surrounding UC Berkeley, Alta Bates Campus, and Summit Campus



students that utilize mental health services seem to have received a referral after being seen at Alta Bates Campus, sometimes through the ED for issues such as anxiety and depression. The fact that Sutter's Herrick campus will not be affected by a potential closure is significant and will likely off-set any potential care that is now provided at Alta Bates.

However, since Herrick does not have an ED, a limited number of students that require emergency psychiatric services will be impacted by the closure. Runyan et al (2017) noted that when young people are unfamiliar with where to access care and support, this can adversely impact suicide-related episodes. In addition, the ED can provide important discharge counseling protocols for patients with potential suicide risks (Runyan, et al. 2017).

For accessing emergency care, travel by

ambulance or private vehicle from the Tang Center to Summit or another ED besides Alta Bates will likely increase time to receive care.

In addition, a number of students with chronic disease rely on Alta Bates Campus for routine specialty care for diagnosis and follow up. In the event of a closure, these students may have to travel farther, requiring more time to access care and money to get there, and potentially resulting in delays. The perception of this distance by students could also change the way they access care.

These impacts will be further compounded by students' time constraints, inexperience in navigating the healthcare system, and financial limitations. We predict that adding these barriers will further complicate health care access for students and may delay student utilization of care.

As depicted in Map 10, the 94704 (southside) and

94709 (northside) ZIP Codes surrounding the UC Berkeley campus and Alta Bates Campus are the most densely populated in the RHIA defined Hospital Service Area (HSA), with 25,297 and 20,165 persons per square mile respectively. This greatly exceeds the density of most other ZIP Codes in the HSA, with the next highest being 17,766 persons per square mile in Downtown Oakland (94612) and an overall average of 5,989 persons per square mile in the HSA (ACS 2012-2016).

Thus the **student population may be most adversely impacted during a campus or regional emergency, in which a large volume of students and residents in areas surrounding the UC Berkeley campus require access to timely care.** We discuss the impacts of a disaster scenario on emergency services in more detail on page 56.

We interviewed students and met with student organizations already concerned with the potential impacts of the closure of Alta Bates Campus. We heard from students that had direct experience at Alta Bates Campus and received treatment for appendicitis, hand lacerations, allergic reactions and other injuries. A common theme among the students was that Alta Bates Campus and its ED was close-by, familiar and served them when the Tang Center was closed.

In general, students we heard from were not familiar with other hospitals in the region and would need more information on what alternatives were available if Alta Bates Campus were to close. We also heard from both UCB health professionals and students that they viewed Alta Bates as an 'extension' of the UC Berkeley health care network. The likely short-term impacts to student health on Alta Bates closing are difficult to estimate, but may include a disruption of familiar care options and longer travel times to a 24hr ED.



UC BERKELEY STUDENT VIEWS ON ALTA BATES CLOSING

Student 1:

"It was around 9pm so we could not go to Tang first. I knew a friend of mine had gone to Alta Bates previously for a night time emergency, since it was the closest emergency care available, so that is why we chose it."

Student 2:

"I don't know of another urgent care facility nearby that I trust, and had the situation been worse, it may have been too far to go."

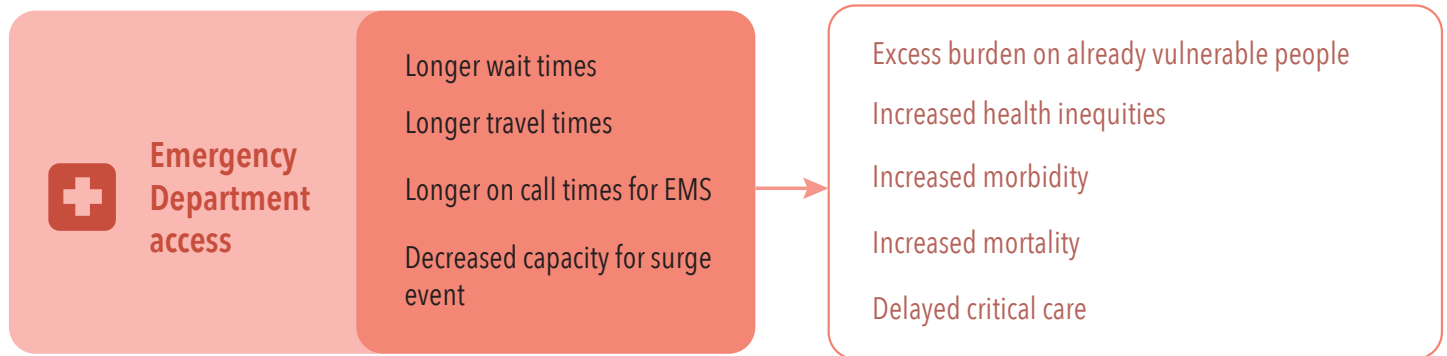
Student 3:

"[Alta Bates closing] would be extremely detrimental as students would no longer have a location that was close for emergencies. Particularly for more emergent situations, [when] there is a need to go see a doctor immediately. If not then it could cause more harm than good to go somewhere farther away."

IMPACT ON EMERGENCY SERVICES



■ In 2017, the Alta Bates Campus ED received 6,424 visits over the recommended number by the American College of Emergency Physicians (ACEP). Modeled travel times to Summit hospital surpass 40 minutes for the evening rush hour period for 10 ZIP Codes north of Alta Bates. For the Summit Campus, the average City of Berkeley EMS time on task is about 10-12 minutes longer than for transports to Alta Bates Campus. The additional travel time to Summit can result in about 2 hours of time an ambulance is away from service compared to ED transports to Alta Bates.



Whenever an urban hospital closes there are concerns over travel times for ambulances to reach the next closest ED and potential adverse health outcomes from delayed access to care. Liu et al. (2014) reviewed California emergency department closures between 1999 and 2010 and found that **patients who lived near a closed emergency department and were later admitted had a 5% higher chance of dying in the hospital than those who did not live near a closure.** They concluded that ED closures do have significant effects on patient outcomes.

Crandall et al. (2016) studied outcomes in EDs for serious trauma after the closing of a large medical center in Los Angeles. They did not find any significant impact on trauma-related health outcomes, but did find that one hospital ED surrounding the closure had a tripling of uninsured patients visiting their ED in a ten year period. Lee et al. (2015), found that in NY State, urban hospital ED use increased in areas where

hospitals have closed and that ED visits have risen by 23% in the United States over the last decade.

Shen and Hsia (2016) studied changes in acute myocardial infarction (AMI) among Medicare patients whose communities experienced increased driving time to an ED due to the closing of an ED in their community. They found that **patients whose driving time related to local ED closure increased by ≥ 30 minutes had a statistically significant increase in 90-day mortality** by 6.58 percentage points (CI 2.49, 10.68) and 1-year mortality by 6.52 percentage points. Patients whose driving time increased by 10 - <30 minutes also had a significant but less pronounced increase in 90-day and 1-year mortality, by 1.60 percentage points (CI 0.53, 2.67) and 2.05 percentage points (CI 0.96, 3.14), respectively. Patients whose driving time increased by less than 10 minutes did not experience worse mortality rates after an ED closed in their community.

Hsia et al. (2012) used California data from 1999-2009, and found that patients with an increase in distance to the nearest ED (0.8 miles average distance increase) did not have significantly higher mortality in general or for specific conditions, including those with acute myocardial infarction, stroke, asthma or chronic obstructive pulmonary disease, and sepsis. However, Nichol et al. (2007) found that increased journey distance to the hospital appeared to be associated with an increased risk of mortality. Berlin et al. (2016) studied acute myocardial infarction (AMI) mortality in Switzerland and found a 19% increase and a 10% increase for men and women respectively, all over 65 years, for those with the longest driving time to a university hospital compared to the same population group with the shortest driving times to the same hospital.

Alta Bates ED Utilization

Alta Bates Campus had a total of 50,414 ED visits in 2017, a 21% increase since 2010. The campus treated an average of 126 patients per day in 2016 and 138 patients per day in 2017. Alta Bates Campus currently has 22 emergency treatment stations in their ED.⁴ **The American College of Emergency Physicians (ACEP) recommends a standard of 2,000 visits annually per emergency treatment station. In 2016, Alta Bates Campus had approximately 1,836 visits per emergency treatment station, but this rate increased to 2,292 visits per emergency treatment station in 2017.³ This increase resulted in 6,414 ED visits over the ACEP standard in 2017.**

Our analyses of OSHPD data and review of the literature suggests that ED visits are increasing nationwide and in the Bay Area. Further, there may already be an inadequate supply of ED treatment stations to keep up with this increasing demand. The closing of Alta Bates Campus will remove at least 22 ED treatment stations and, as noted above, require a doubling of ED capacity

at Summit to accommodate the patients from the Berkeley facility.

Analyses of Travel Times to Alta Bates vs Summit Campus Emergency Departments

Sutter has indicated that it plans to relocate all in-patient and emergency department services to the Summit campus in Oakland by 2030, though little details have been provided to date about the extent and time line of the proposed expansion. A concern is whether the move to Summit will increase the travel time to the ED for some people in the region.

Using Google Maps GPS navigation software, the RHIA modeled travel times via private vehicle to Alta Bates and Summit campuses during the morning and evening peak traffic periods (8:30am and 5:30pm). We compared these periods to travel time at 12am as the non-traffic period. We estimated travel times for all ZIP Codes in the RHIA defined Alta Bates Hospital Service Area. The analysis routed travel to Summit and Alta Bates campuses from the center point of each ZIP Code in the HSA, and recorded an estimated range in minutes to each destination.

Figure 22 provides detailed findings of travel times from all of the ZIP Codes north of Alta Bates Campus, using the high end of each travel time range. Findings revealed that travel times to both Alta Bates and Summit Campuses from ZIP Codes in north Alameda County and West Contra Costa County are longest at the 5:30pm peak traffic time. **For the PM rush hour, all ZIP Codes in West Contra Costa County (in Richmond, San Pablo, El Sobrante, and El Cerrito) as well as Albany and Berkeley, have increased travel times to Summit Campus when compared to Alta Bates Campus.** These findings also overlap with ZIP Codes identified in the vulnerable communities section, indicating that there is a potential negative impact of increased travel times on already vulnerable populations that are served by Alta Bates.

Overall travel times at 5:30pm are longest from ZIP Codes in West Contra Costa County, four of which have a total travel time between 50-60 minutes to the Summit Campus. An additional six ZIP Codes near the West Contra Costa and Alameda County border fall within a 40 - 50 minute range of travel time to the Summit campus.

Timely transport to care is critical for a range of health emergencies, but can mean the difference between life and death for ST-segment elevation myocardial infarction (STEMI) patients (i.e., a heart attack in which an artery is blocked). Mathews et al. found that up to 40% of STEMI patients use private vehicle or non-EMS transportation to reach the hospital. While ambulance transport time is also critical, ambulances have life-saving

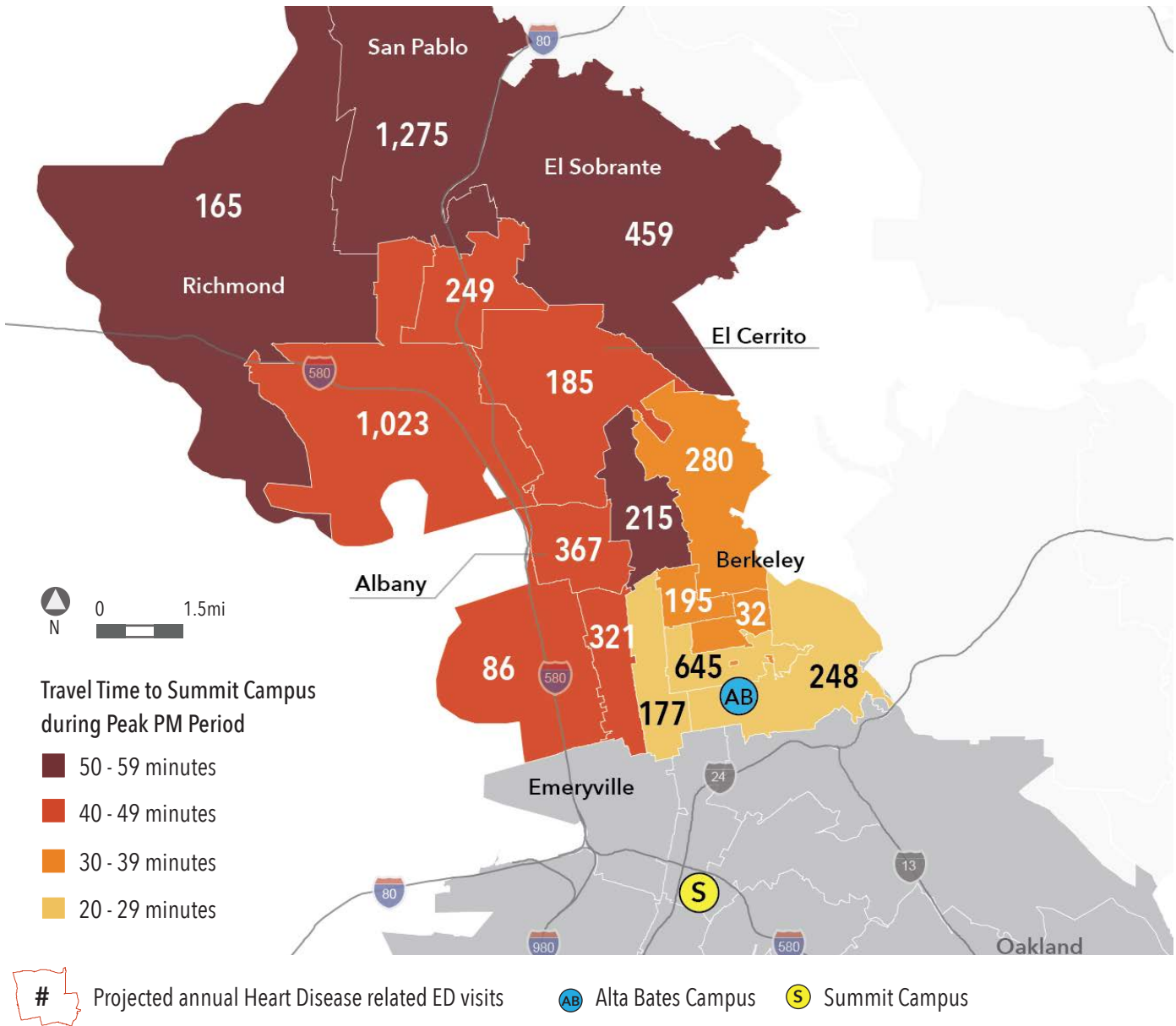
equipment to treat a time-critical patient.

Map 11 depicts travel times via private vehicle to the Summit Campus during peak evening traffic within 10 minute increments, and projected annual emergency department visits related to heart disease. We calculated the number of estimated heart disease patients for each ZIP code by multiplying the population by the actual percent of ED visits for heart disease (from 2011). Richmond, San Pablo and El Sobrante have both the longest travel times to Summit and the largest estimated heart disease related ED visits. 13 ZIP Codes have estimated travel times greater than 30 minutes to Summit Campus, which is currently the closest STEMI receiving center in the region.

Figure 26. Travel times to Alta Bates & Summit Campuses from ZIP Codes in the HSA

		No Traffic (12am)			Traffic (8:30am)			Traffic (5:30pm)			Estimated annual Heart Disease related ED visits
City	ZIP Code	Time to AB	Time to S	Diff (S - AB)	Time to AB	Time to S	Diff (S - AB)	Time to AB	Time to S *	Diff (S - AB)	Population x % heart disease ED visit per ZIP Code (2011)
Berkeley	94702	10	12	2	18	22	4	20	40	20	321
	94703	5	10	5	10	16	6	12	22	10	177
	94704	6	12	6	9	22	13	12	26	14	645
	94705	6	14	8	8	20	12	9	24	15	248
	94706	16	10	-6	35	26	-9	28	45	17	367
	94707	16	16	0	30	35	5	30	50	20	215
	94708	20	22	2	22	28	6	22	35	13	280
	94709	12	16	4	18	30	12	18	35	17	195
	94710	10	8	-2	20	16	-4	24	40	16	86
	94720	9	20	11	10	26	16	12	30	18	32
El Cerrito	94530	20	14	-6	45	35	-10	40	45	5	185
Richmond	94801	26	22	-4	55	45	-10	45	50	5	165
	94804	18	12	-6	45	35	-10	35	45	10	1,023
	94805	18	12	-6	50	40	-10	35	45	10	249
El Sobrante	94803	26	22	-4	40	40	0	35	55	20	459
San Pablo	94806	26	22	-4	60	50	-10	45	50	5	1,275

Map 11. Estimated Number of Heart Disease ED visits & Private Vehicle Travel Time for Peak Period to Summit Campus for select ZIP Codes

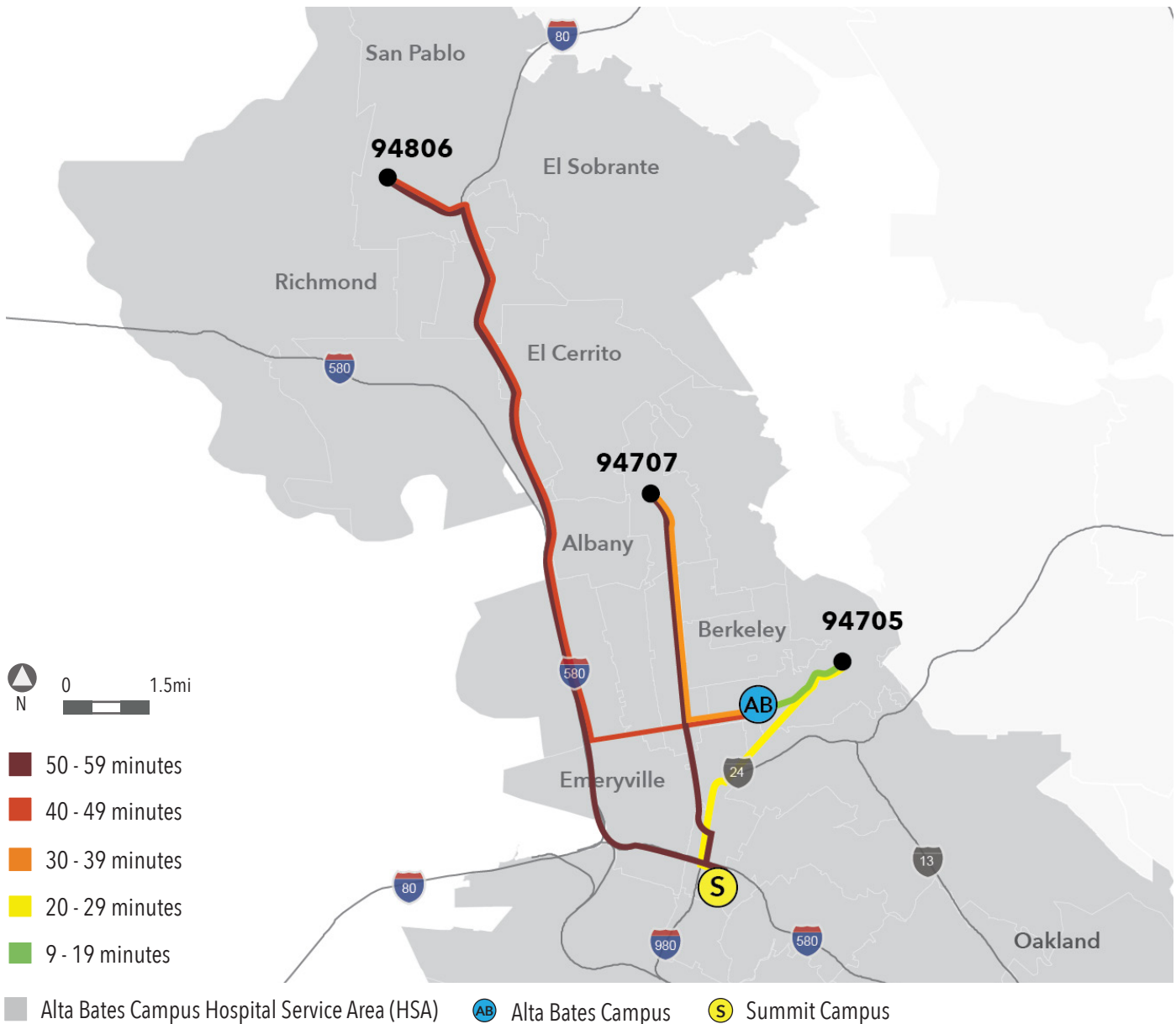


Map 12 depicts travel times to Summit Campus and Alta Bates Campus via private vehicle at 5:30pm for three ZIP Codes in the RHIA defined HSA. Each of these ZIP Codes experience shorter travel times to Alta Bates Campus than Summit Campus during peak evening traffic time, and one relies on heavily congested freeways including 580 and 80.

also tested travels times via public transportation (bus and BART). We did not find significant differences in travel time to Alta Bates Campus vs. Summit Campus for ZIP Codes north of Alta Bates in the HSA for public transit. Travel times via public transit averaged approximately 1 hour from West Contra Costa County to both Alta Bates and Summit campuses.

Given that **15% of households in the HSA report having no vehicle** (ACS 2012-2016), the analysis

Map 12. Travel times to Alta Bates vs. Summit Campus at PM Peak Period from select ZIP Codes in the Alta Bates HSA



Impacts on Ambulance Travel Time

Though this RHIA does not include an analysis of projected ambulance travel times, we assume that emergency vehicles are likely to travel faster than private vehicles in both traffic and non-traffic conditions.

When an ED closes it can cause ambulances to travel to further, and may also result in ED crowding. **Overcrowding can cause increased**

ambulance time on task - the total EMS time from receiving a 9-1-1 call to arriving on scene, then arriving at the hospital, and returning to service. That window represents time that the ambulance and associated staff cannot respond to new incoming calls, and cannot be at the Fire Department garage maintaining the vehicles or completing trainings and other tasks.

The Alameda County Emergency Medical Service (EMS) system responds to about 160,000

emergency calls annually. Under normal protocol a fire department unit and Paramedics Plus ambulance respond to emergency medical calls, however the Berkeley Fire Department EMS division owns and operates four of its own ambulances and therefore generally provides the emergency transport services in the Berkeley area. In 2014, the Berkeley Fire Department transported 5,049 patients to Alta Bates Campus, while Paramedics Plus transported less than 500 from the Berkeley area to the same campus.

Given this large volume of Berkeley EMS transports to Alta Bates Campus and findings from the general travel time analysis (Figures 22 & 23) which indicate that 5 ZIP Codes in Berkeley have increased travel times by vehicle to Summit Campus compared to Alta Bates Campus during no traffic hours, we focus the ambulance travel time analysis on the experiences of the Berkeley Fire Department, referencing data and insight provided by the Fire Captain for the City of Berkeley.

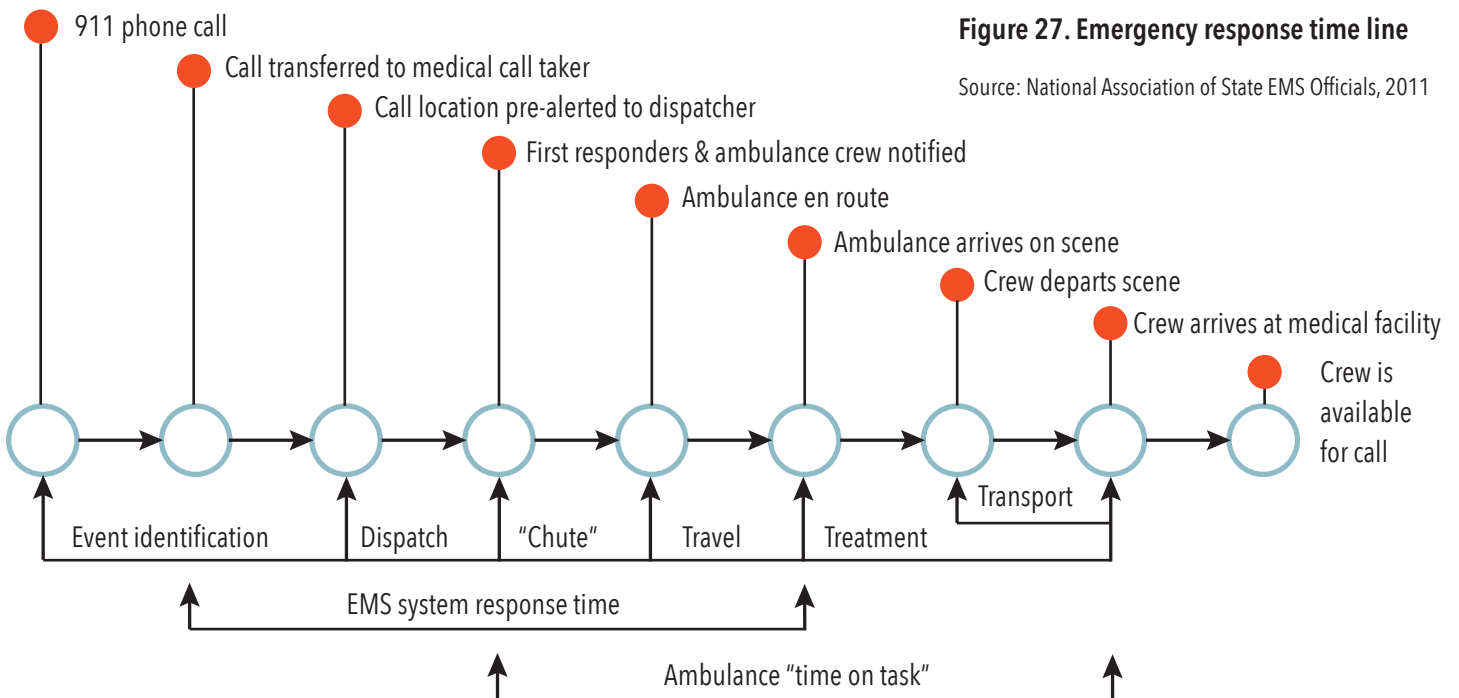
The Berkeley Fire Department transports about 7,000 patients annually to local hospitals, of which there are 14 receiving facilities throughout the county. Receiving centers are determined by matching the closest hospital with the equipment that the patient needs. For instance, if someone standing on the corner of Telegraph and Ashby has a major heart attack and is being transported by ambulance, they may be transported to Summit rather than Alta Bates Campus, since Summit is the closest ST- elevation myocardial infarction (STEMI) receiving center and can adequately address the needs of a major heart attack patient. The vast majority of all-cause City of Berkeley EMS transports are taken to Alta Bates Campus, followed by Kaiser Permanente in Richmond, and the Summit Campus in Oakland (4,576, 1,093, and 578 transports in 2016, respectively).

We assume that most of these transports were not for major heart attacks, since Alta Bates Campus

is not a STEMI receiving center. Despite this, **closing the Alta Bates Campus ED may result in extra time spent transporting patients to care and decreased regional EMS capacity for ambulance transports**, which is particularly concerning for patients with conditions for which quicker transport time is related to measurable differences in health outcomes.

If Alta Bates Campus closes, the Berkeley Fire Department expects that most of the emergency transports would instead be taken to the Summit Campus in Oakland. **For the Summit Campus, the average City of Berkeley EMS time on task averages about 10-12 minutes longer than transports to Alta Bates Campus.** According to the data from Berkeley EMS, there are an average of 12.5 emergency trips made to Alta Bates Campus daily. If Alta Bates Campus were to close, the **extra time needed to transport these patients to the Summit campus instead would add up to about two hours extra of time on task in total per day.**

Without additional resources, response times to incoming emergency calls for all causes would likely increase due to the additional time on task required to transport patients to Summit and to get back to Berkeley, where they can receive another call. Assuming there are no additional ambulances in rotation to offset additional time on task for transport to Summit, patients with intermediary or high risk of mortality, including those requiring **time-sensitive interventions - such as coronary revascularization in acute myocardial infarction, fibrinolytic therapy for acute ischemic stroke, early goal directed therapy in sepsis, and trauma center care for injuries may not receive the timely response associated with a survival benefit**, and subsequently mortality rates for life threatening conditions may increase. While Alta Bates is not a critical stroke or STEMI receiving center, stroke and major heart attack patients in Berkeley will still be disproportionately impacted by the proposed closure due to the added time on task and decreased capacity of Berkeley EMS



to respond to all 9-1-1 calls. This impact may be worsened by an increase in diversion hours at Summit Campus after the proposed closure of Alta Bates Campus, which we discuss in the following section.

We find similar impacts on ambulance transports in West Contra Costa County, where the closest ED is at Kaiser-Richmond hospital, with the next closest being Alta Bates Campus, followed by Summit Campus. According to Patricia Frost, Director of Emergency Medical Services for Contra Costa County, prior to the DMC closure the Kaiser Richmond ED received about 31% of all ambulance transports, but after the closing this increased to 52%. From January 1 to March 31, 2016, 11% of the 4,692 EMS ambulance destinations in West Contra Costa County, 516 in total, went to Alta Bates Campus. **From 2014 to 2016, the Alta Bates Campus experienced a 123% increase in transports from Contra Costa County EMS, going from 2.5 trips to Alta Bates per day to nearly 5.7 trips to Alta Bates per day.**

If Alta Bates Campus closes, we would expect these patients to go to Alta Bates Summit in

Oakland, which is further away from West Contra Costa County than the Alta Bates Campus.

The additional distance is likely to increase emergency service travel times and time-on-task, which would keep ambulances out of rotation longer and increase emergency response wait times for others in Contra Costa County. In addition to increased distance to Alta Bates Summit, there could be time on task added if Alta Bates Summit is on diversion status or is not on diversion status, but is overwhelmed with a high volume of patients. Closing Alta Bates Campus will likely increase time on task for Contra Costa EMS, forcing the county to either contract out for additional ambulances or try to absorb the additional time on task, which could put lives at risk.

The 2014 Contra County Health Services report analyzing the potential impacts from the closing of the ED at Doctors Medical Center in San Pablo, noted the following impacts which are worth repeating here as they likely apply to the closing of Alta Bates' ED:

1. *American Medical Response ambulance crews will experience longer time-on-task for all*

transports going to more distant hospitals as a result of the DMC closure.

2. *In addition to possible delays in fire and ambulance response resulting from increased time on task, the West County community has raised a concern that there may be an increase in the number emergency calls. Increased 9-1-1 usage may result when patients choose to access 9-1-1 rather than private transport due to the longer driving distance and lack of familiarity with routes to other facilities.*
3. *9-1-1 ambulance traffic from the region would overwhelm Kaiser-Richmond's ED or require transporting patients to other EDs that would be further away, impacting ambulance availability within the county.*
4. *Kaiser-Richmond will experience 80 - 100 new ED patients per day on top of the 78 it already sees daily. That is an increase of at least 102 percent. While there are 12 other EDs in the region, Kaiser-Richmond will be disproportionately impacted. The reason for this is that patients typically choose the next closest ED for their ED needs, barring significant new healthcare resources in the community or an extensive public education campaign.*

Ambulance Diversion

Crowded EDs can also result in ambulance diversion, which is when ambulances are redirected to bring patients to a different ED than they would under normal conditions for timely treatment. Beyond indicating overcrowding, diversion is harmful in itself, as it increases time to definitive care and can be associated with poor outcomes for patients with certain conditions, particularly stroke and acute myocardial infarction. According to OSHPD, Alta Bates Campus had 182 hours of ambulance diversion in 2014 but only 57 hours of ambulance diversion in 2016. Sun et al. (2006) assessed the effects of nearby

hospital closures on ED ambulance diversion in Los Angeles County from 1998 to 2004. They documented ambulance diversion hours due to ED saturation and found that hospital closures increased ambulance monthly diversion hours by an average of 56 hours for the first 4 months at the nearest EDs.

In 2016, both Alta Bates and Summit campuses practiced ambulance diversion for about 60 hours during the year.³ However in 2017, Alta Bates' diversion hours decreased to 13, and Summit decreased to 29. Comparatively, Highland Hospital in Oakland had 161 hours of ambulance diversion in 2017.⁴ Since Summit is already practicing diversion, there is a high likelihood that additional diversion hours would be added to the Summit ED after a closure of Alta Bates Campus.

Regional Emergency Department impacts

The San Francisco Bay Area is home to more than 80 acute care hospitals, serving a region of more than 7 million people, situated within 9 counties and 110 cities (ACS 2012-2016).¹¹ In Alameda and Contra Costa Counties, there is a large hospital network in place to serve the counties' more than 2.7 million residents. However, the hospitals within this network are not evenly distributed throughout the region, and this may impact where patients go for care if Alta Bates Campus is to close.

As we discuss throughout the report, the regional hospital network was recently impacted by the closure of Doctor's Medical Center (DMC) in 2015. The closure of DMC resulted in a regional gap in ED care, making Kaiser Richmond (which has limited capacity for non-Kaiser patients) the only ED besides Alta Bates Campus along the corridor from San Pablo to Berkeley. **This RHIA has found that Kaiser-Richmond experienced an increase in ED utilization since DMC closed, going from 40,065 ED visits in 2013 to 64,680 in 2017.**^{4,7} According the 2016 Contra Costa EMS System Performance Report there was an approximate

12% increase in EMS responses from 2014-2016 in the county, with an average of 271 EMS responses per day (in 2016). Since 2014, there has not only been a large increase in total ambulance usage, but, as a result of the DMC closure and distance to the next closest hospitals, there has also been a large increase in ambulances originating from Richmond, San Pablo and nearby areas that travel high traffic roads and freeways to Kaiser-Richmond, Alta Bates Campus, Contra Costa Regional Medical Center in Martinez and John Muir Medical Center in Walnut Creek.

Within Alameda and Contra Costa County, only 6 hospital other than Alta Bates Campus (Summit Campus, Kaiser Richmond, Kaiser Oakland, Highland Hospital, Alameda Hospital and Children’s Hospital Oakland) receive a significant (25% or more) number of patients from the RHIA defined Alta Bates Hospital Service Area (HSA), and in 2016 Alta Bates Campus was overwhelmingly the most utilized non-Kaiser hospital by residents of Berkeley, Albany, El Cerrito, Richmond and San Pablo. Given the increasing reliance on Alta Bates Campus ED by patients from West Contra Costa County and the high utilization by Berkeley residents, it is unclear where people in the HSA

will seek emergency care, both independently and by ambulance transport.

To assess the capacity of regional hospitals to absorb additional ED patients, we used the American College of Emergency Physicians (ACEP) standard of 2,000 ED visits annually per ED treatment station. Figure 24 shows the additional number of ED visits (using 2017 data) that could be absorbed by regional hospitals per year should Alta Bates Campus ED close, before exceeding the ACEP standard. If Alta Bates Campus were to close and all of the 50,414 ED patients in 2017 utilized the remaining open EDs, particularly Highland Hospital and Kaiser-Oakland, there would be capacity in the region even without an expansion of Summit Campus in Oakland. In 2017, Highland could have absorbed 48,003 visits before exceeding the ACEP standard, and Kaiser-Oakland could have absorbed 32,313 visits before exceeding the ACEP standard. However, whether or not the 50,414 patients that went to the Alta Bates Campus ED in 2017 will utilize Kaiser and/or Highland in the event of an Alta Bates Campus closure is unclear, given the disproportionate utilization of the campus (in 2017 Alta Bates Campus ED surpassed the ACEP standard by over 6,000 visits).

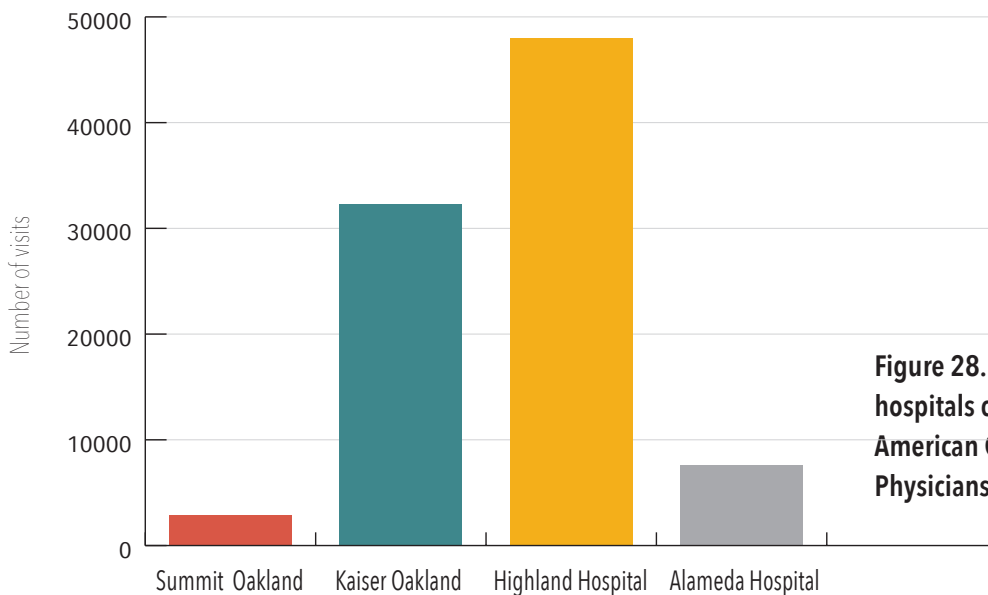


Figure 28. Additional ED visits/year hospitals can absorb before exceeding American College of Emergency Physicians (ACEP) standard, 2017.

Highland Hospital receives the majority of its patients from central and east Oakland, and in 2016 the hospital received 62% of its ED patients from 10 ZIP Codes. 8 of the 10 ZIP Codes fall within the Alta Bates Campus HSA, however just 14% of Alta Bates Campus ED patients came from those same 8 ZIP Codes.⁶ Since there is currently relatively low utilization of Highland by the population primarily served by Alta Bates Campus, it is not likely that Highland will become the primary receiving center for Alta Bates Campus ED patients. It is more likely that the majority of Alta Bates Campus' current patients would choose to utilize Summit, which is already near capacity and would need to double its capacity to accommodate all of the patients that utilize Alta Bates Campus ED annually.

Figure 25 shows the relationship between the number of ED stations, total ED visits and the

ACEP standard for the Alta Bates and Summit campuses. To calculate the emergency department capacity, based on the ACEP standard, the number of emergency department stations is multiplied by 2,000, which is the ACEP standard for yearly visits per emergency treatment station. In 2017, Alta Bates Campus had an ACEP defined capacity of 44,000 (22 ETS*2,000) and was over capacity by 6,424 visits. Meanwhile, Alta Bates Summit had an ACEP defined capacity of 50,000 (25 ETS*2,000) and was under capacity by 2,883 visits. **Summit Campus would need to expand their emergency treatment stations by at least 24 to accommodate the increase in patients from Alta Bates Campus.** Sutter Health has stated on their Vision 2030 website that they would increase the Alta Bates Summit Campus emergency department capacity to accommodate **90,000 visits per year. However, this would be insufficient to accommodate all Alta Bates Campus emergency department patients, should the campus close.**

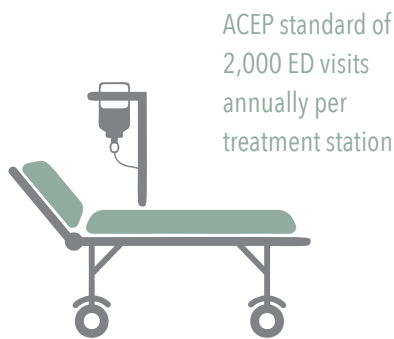


Figure 29. Alta Bates & Summit ED utilization & American College of Emergency Physicians' recommended capacity

	# ED Stations (2017)	ACEP standard (yearly visits per station)	ACEP Defined Capacity	2017 Total ED Visits	Visits that exceed capacity (+ exceeds, - under capacity)
Alta Bates campus	22	2000	44000	50414	+6414
Summit campus	25	2000	50000	47117	-2883
Total	47		94000	97531	+3531

DISASTER EVENT IMPACTS

In this section, we estimate the potential impact of the closing of Alta Bates on emergency department capacity during two disasters, an earthquake and large fire. We base these analyses on the *HayWired Reports Volume I & II* which detail likely impacts from an earthquake on the Hayward fault line, and data from the aftermath of a 2012 fire at the Chevron refinery in Richmond, CA.

The entire Alta Bates HSA runs along the Hayward fault line, and the Working Group on California Earthquake Probabilities calculates that there is a 33-percent likelihood of a large (6.7 magnitude or greater) earthquake occurring along this fault line in the next few decades (USGS, 2018). In order to fully examine the potential impacts of a major earthquake along the Hayward fault line, the USGS, along with a number of stakeholders, created the *HayWired* scenario and resulting reports.

The HayWired scenario is one of many plausible scenarios for the region's next major earthquake. It

investigates the likely impacts of a 7.0 magnitude earthquake along the Hayward fault, with an epicenter under the city of Oakland. In this scenario, the 7.0 magnitude earthquake strikes on April 18, 2018 at 4:18pm, just around the start of the week-day rush hour (USGS, 2018).

According to FEMA data, there are an estimated 837 people mortally injured, 461 life-threatening injuries, 3,007 injuries requiring a high degree of medical care, and 12,263 injuries that require medical attention and cannot be treated at home after the initial quake. In total, there are 16,568 casualties from the earthquake, 837 fatalities and 15,731 people that require medical attention. **The HayWired scenario rounds FEMA's estimates to 800 fatalities and 16,000 injured and needing medical attention.** FEMA estimates that 84% of displaced households will come from Alameda County (68%) and Contra Costa County (16%) (USGS, 2018). Using these same percentages, we estimate that those injured and needing medical attention would total to **13,440** in Alameda County and Contra Costa Counties, with **10,880 needing medical attention in Alameda County and 2,560 in Contra Costa County.**

Access and time to treatment will be critical for many of the injured, and considering that the majority of the impact will be felt in Alameda County and Contra Costa County, there will be increased pressure on the existing hospital network and emergency services to respond to and treat the surge of patients in the ED. If all of the injuries that occur in Alameda County seek treatment at hospitals in Alameda County in an even manner (all hospitals are evenly impacted by the event), there would be an estimated **837 additional patients seeking treatment at each emergency department as a result of the quake.** For instance, in the event of the HayWired

Haywired Earthquake Scenario:

84% of households are displaced in Alameda and Contra Costa Counties

14,000 estimated injuries requiring medical attention from Alameda and Contra Costa Counties

\$57 billion in total direct economic loss



Map 13. Earthquake along the Hayward Fault & Hospital Locations

— Hayward Fault Line

● Earthquake epicenter

Source: HayWired Report Volume I

scenario, Kaiser San Leandro, which addresses the highest # of ED cases/day in Alameda County, would need to serve an estimated 1,028 patients. This is a 438% increase from their daily average number of visits. If Alta Bates Campus were to close, the number of surge patients requiring ED treatment in Alameda County would increase by an additional **64 visits for each hospital in the county.**

In Contra Costa County, we estimate 2,560 injuries needing medical attention. We estimate that roughly 280 people from Contra Costa County would access emergency treatment at Alta Bates

Campus. Since the Kaiser Richmond emergency department is the primary receiving center for West Contra Costa County residents, we would expect at least half of the remaining 2,280 to go to Kaiser Richmond. The Kaiser Richmond Emergency Department could be overwhelmed with an estimated 1,316 people needing treatment the day of the earthquake. If Alta Bates were to close, we estimate that Kaiser Richmond would experience an additional 282 ED patients immediately following the earthquake.

In the 1994 Northridge earthquake, a magnitude 6.7 earthquake in Los Angeles, there were over

9,000 people injured and 57 fatalities. Research conducted around the Northridge Earthquake showed that injuries increased significantly with age. 60-79 year olds were 10.9 times more likely to be injured, and people 80 and older were 34.6 times more likely than 0-19 year olds to sustain earthquake related injuries (Peek-Asa, 1998). The Northridge Earthquake highlighted that those most impacted by injuries are likely to be the aging/elderly (60+), and aging/elderly populations already experience issues of mobility, from issues related to driving restrictions, physical limitations or other cognitive/familiarity issues that inhibit their ability to access far away or unfamiliar hospitals.

Approximately 13% of the population in the Alta Bates Campus HSA are over the age of 65, with an additional 12% between 55-64. Compared to other cities in the HSA, Berkeley has a high concentration of elderly, as people over 65 make up between 20-30% of the population in three of its ZIP Codes (94705, 94707 and 94708). The ZIP Codes with the highest total number of elderly (65+) in the HSA are located in Richmond (94806), Alameda (94501) and Oakland (95611), each with over 6,500 residents over 65. These six zip codes would be particularly vulnerable to the impacts of

Chevron Fire Example:

Estimated **15,000** related emergency department visits over 2 ½ weeks

2,876 visits to emergency departments on peak day (4 days after fire occurred)

200 ED visits within the first 2 hours after the fire

an earthquake without Alta Bates Campus.

Though our earthquake analysis does not account for potential post-earthquake barriers to local hospitals, it is critical to note that the Summit Campus is bounded by freeways, including 580, 980 and 880. Under the Haywired scenario there is a high possibility that local freeways will be compromised and hospitals, including Summit, may not be accessible by all that need care. Concentrating ED care in fewer locations in the East Bay may compromise access to emergency medical treatment after an earthquake.

Potential Impact from Chevron Refinery Fire

On August 6, 2012, a major fire erupted at the Chevron Refinery in Richmond, CA. A Level 3 community warning and shelter in place order were immediately issued. There were no injuries or fatalities at the scene, but the emergency departments at Kaiser-Richmond and Doctors Medical Center began to receive patients that complained of respiratory problems. Emergency departments were overwhelmed and placed on diversion status. American Medical Response (AMR), a subcontractor for emergency services, requested mutual aid resources, and an ambulance staging area with one ambulance from San Ramon Valley Fire and two Paramedics Plus Units from Alameda County was established at San Pablo Town Hall. Tents were set up at both Kaiser and DMC, establishing separate areas for patients to be seen. Within the first two hours after the fire, 200 patients sought emergency treatment at DMC. On the peak day four days after the fire, regional EDs (mostly in Contra Costa County), saw 2,876 visits related to the fire, and an approximate 4,500 visited the ED over the next 3 days. **In total, the fire sent over 15,000 patients to the emergency department for 18 days following the event (CCHS, 2012).**

Figure 26 shows the regional emergency department surge pattern for ED visits related to

the Chevron fire in the two weeks following the incident. At the time of the fire, both DMC and Kaiser-Richmond EDs were in full operation. Before its closure, DMC had 25 emergency treatment stations, and Kaiser Richmond had 15 emergency treatment stations. Even with two hospitals receiving the surge of patients, both emergency departments were quickly overwhelmed and both hospitals did not return to normal operations until August 23rd (CCHS, 2012).

“The magnitude of the earthquake that’s going to happen here is so significant that we really do need to have every critical facility in the best possible earthquake shape possible.”

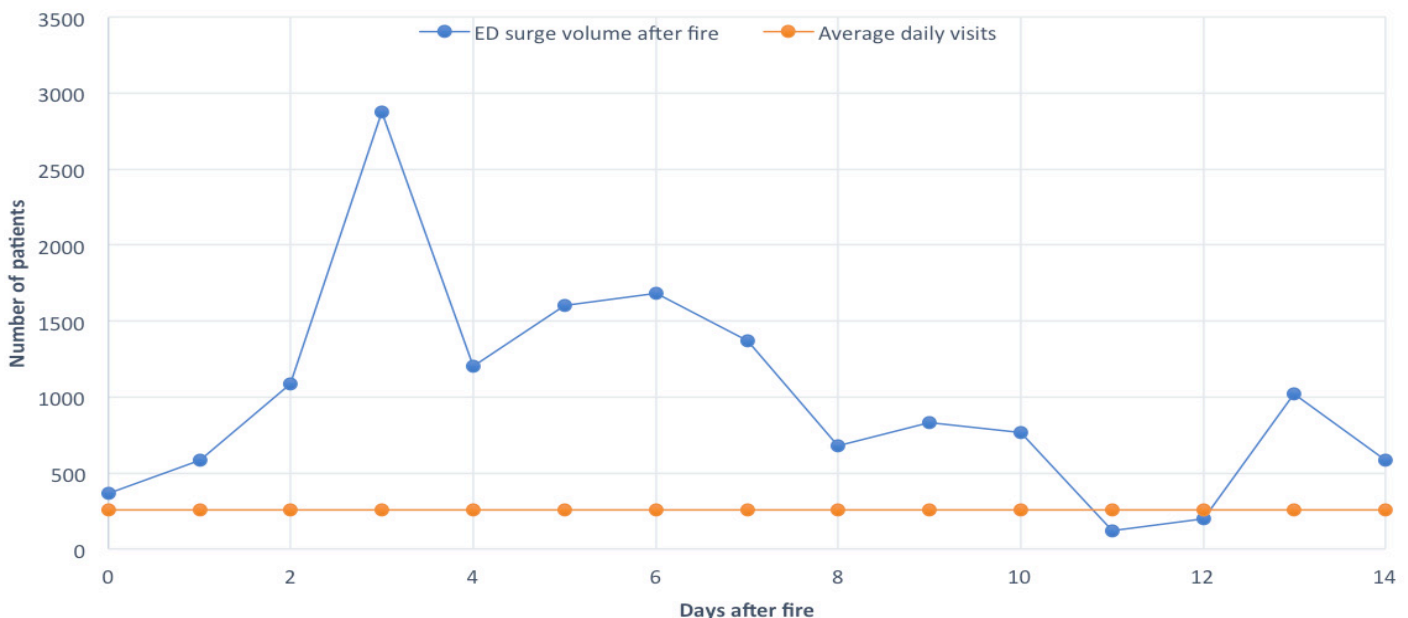
- Nancy Skinner (NY Times Article)

As highlighted in the Alta Bates Campus Utilization and Hospital Service Area sections above, Alta Bates Campus has seen an increase in patients from West Contra Costa County since the closure of DMC in 2015. If this scenario were to happen without the ED of Alta Bates Campus, we estimate that between 1000- 1,200 people would seek treatment at regional EDs in the first three days of the event. Kaiser Richmond would be most impacted, but it is unclear where patients from Contra Costa County and northern Alameda

would seek treatment without Alta Bates Campus. We estimate that Summit and Highland Hospital, as well as urgent care facilities in Contra Costa County would need to absorb the increased ED patient load.

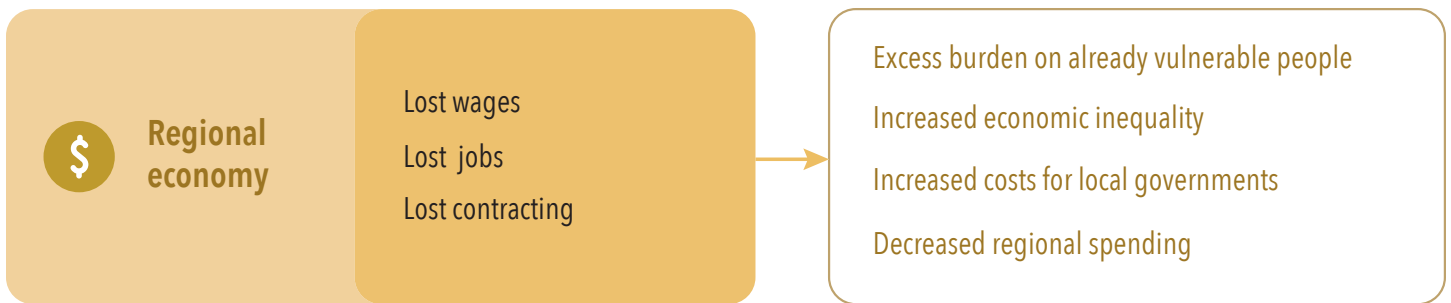
Without Alta Bates Campus, the emergency response plan to provide residents from Contra Costa County with timely care in the case of a major fire would need to be addressed. As noted above, a fire or earthquake disaster may overwhelm ED capacity and services at hospitals throughout the region, and these impacts may be critical if the Alta Bates Campus closes.

Figure 30. Emergency Department patient surge volume after Chevron refinery fire, Richmond, CA, 2012



ECONOMIC IMPACTS

■ Alta Bates generated over \$1.9 billion in patient revenue and spent \$604 million on operations and employee compensation in 2016. According to their filing with the State of CA, Alta Bates has reduced their overall spending by over \$81 million since 2012. The closing of Alta Bates will adversely impact the local economy but the extent of the impact will depend on the nature of replacement services, hiring and contracting at the Summit campus.



Hospitals such as Alta Bates Campus are major generators of economic activity. As a result, closure of a hospital can not only impact those employed there but the local and regional economy. In 2016, Alta Bates Campus reported earning almost \$1.9 billion in revenue for providing care to patients, with billing including Medicare (35% of total revenue), Medi-Cal (26%), and private insurance providers (38%).² Though Alta Bates Campus earned almost \$1.9 billion in revenue, with spending, adjustments and other deductions, their net income was approximately \$19 million in 2016.

Much Alta Bates Campus' revenue is subsequently spent on hospital clinical and nonclinical operations. In 2016, Alta Bates Campus reported spending a total of \$604 million on operations. Of this, \$284 million was spent on direct expenses, which includes purchases of supplies and equipment, leases and rents, and purchased services such as parking and security.²

Of the \$604 million spent on operations, the other \$320 million was spent on employee compensation. Aside from high-skilled and high-

paying staff such as physicians, surgeons, and nurses, Alta Bates Campus is also a major source of low-skilled jobs. According to SEIU-UHW, the hospital directly employed 280 people in low-skilled, lower-paid jobs in 2015 (Rauber, 2014). These positions include clerks, patient aides, food service and custodial staff, nursing assistants, and technical support staff. With average hourly wages between \$20 and \$24 per hour, these lower paid positions nonetheless offer generally higher wages when compared with similar jobs in different settings.

In line with their announced plan to systematically shut down service lines and transfer them to Summit campus, Alta Bates Campus has already reported significant decreases in spending for certain service lines. Cardiac Services saw a 68% reduction, with spending going from almost \$4.4 million in 2012 to less than \$1.4 million in 2016. Radiology Services - for both diagnostic and therapeutic purposes - had a decrease of 57% or over \$19 million over the same time period. Adolescents service lines showed no spending by 2016.^{1,2}

According to their financial disclosures, Alta Bates has even started to reduce spending in their birthing center. Between 2012 to 2016, Labor and Delivery Services saw an almost 23%, or \$7 million reduction in spending, while spending on Neonatal Intensive Care fell almost 35% over this same time period.¹

Impact	Magnitude
Low wage workers	165 workers already laid off since 2012
Community benefits	Potential reduction of \$91 million in charity care
Local economic activity	Potential loss of \$1.5B annually in local economic activity

Alta Bates as an Economic Base Multiplier

Alta Bates Campus, like all hospitals, has a large impact on the regional economy. Hospitals draw in billions of dollars in revenue from medical reimbursements. These reimbursements come overwhelmingly from outside the region: Medicare brings in federal dollars; Medi-Cal brings in a combinations of federal and state dollars; and private insurance brings in money from corporations based across the country. With this continuous source of revenue, hospitals like Alta Bates Campus typically spend overwhelmingly within the metropolitan area or its surrounding region. In fact, economists estimate that an average urban hospital spends at least 80% of its patient revenue within the metropolitan area (Erickson et al., 1986).

The nature of hospital operations necessitates that Alta Bates Campus contracts with local companies for everything from medical supplies and equipment to food for its patients, staff, and visitors. They must also contract with local companies for purchased services such as laundry, parking, and security. Alta Bates

Campus also contributes to the regional economy by employing hundreds of staff. If not through direct employment, Alta Bates supports dozens of jobs through its purchasing of services.

As a nonprofit hospital, Alta Bates Campus is required by law to reinvest any surplus revenue back into the community in the form of community benefit programs. **According to its Community Benefit Plan, Alta Bates spent over \$97 million in 2016 for community benefit programs, activities, and initiatives. The vast majority of this community benefit--over \$91 million--comes in the form of charity care, providing free medical services for those without coverage and unable to afford the cost of their care (Sutter Health, 2016). The rest is spent funding various public health programs such as asthma and diabetes resource centers, neighborhood revitalization programs, and youth outreach and career development services.**

As a result, Alta Bates Campus acts as what economists call an *economic base multiplier*. That is, the hospital generates significantly higher

\$1.9 billion in patient revenue generated in 2016

23% reduction in spending on Labor & Delivery Services from 2012-16

35% reduction in spending on Neonatal Intensive Care from 2012-16

165 lower wage workers already laid off by Alta Bates since 2012

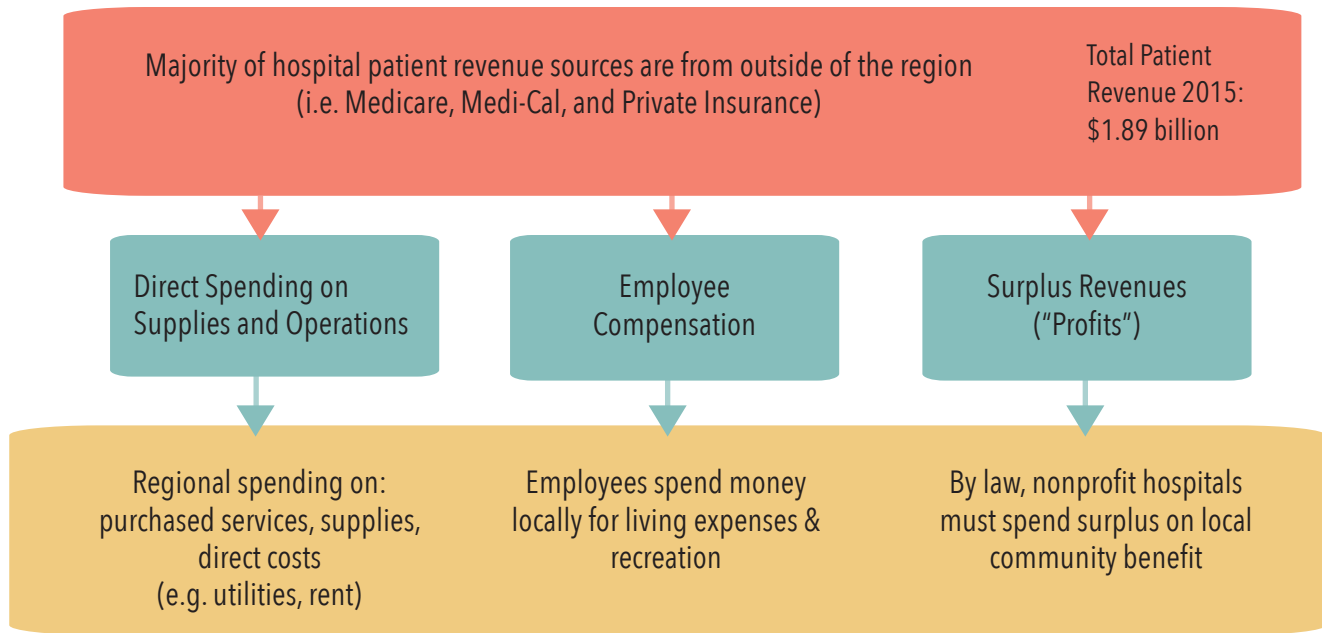


Figure 31. How hospitals contribute to regional Economies

downstream economic output in proportion to its revenue. A number of studies highlighted this economic base multiplier effect on urban hospitals in Pittsburgh, PA, Syracuse, NY, and Minneapolis, MN. These studies found that the multiplier ranged from 2.63 to 2.69, meaning that **every dollar that a hospital earns in patient revenue generates between \$2.63 and \$2.69 in economic activity for the surrounding region** (Moore, 1974 & Doeksen et al., 1997).

We used the economic-multiplier idea and conservative assumptions to estimate the hospital's likely contributions to the local economy. **Given that in 2016 Alta Bates Campus spent \$604 million, we estimate that the hospital is likely responsible for generating approximately \$1.5 billion in economic activity for the Bay Area.**

The economic impacts from the closing of Alta Bates Campus will likely also include loss of low wage jobs. These workers may lose income and experience other hardships. Skilled workers, such as physicians and nurses will either be relocated to Summit, find work elsewhere, lose their

jobs, or leave the region to find work elsewhere. If skilled nurses leave, the region's health care facilities may experience an increase in the nursing shortage.

There is little doubt that Alta Bates Campus provides economic benefits to the local and regional economy. The exact adverse impacts from the closing are difficult to estimate, but our review of OSHPD data suggests that close to \$1.5 billion in local economic activity could be lost.

APPENDICES

A. Acknowledgments, Reviewers & Interviewees

Alta Bates Regional Task Force, Members

Andy Katz, Alta Bates Regional Task Force Member

Anna Harte MD, Medical Director, UC Berkeley University Health Services

Mary Kay Lacey, Bateman Neighborhood Association

Bahar Navab, Associate Director, University Health Services

Carolyn Bowden, Community Organizer, California Nurses Association

Claudia Covello, Assistant Vice Chancellor, University of California, Berkeley Student Affairs & Executive Director, University Health Services

Community Health Commission, City of Berkeley

Cynthia Frankel, EMS Coordinator, Alameda County Emergency Medical Services

Daniel Caraco, Alta Bates Regional Task Force

David McPartland, EMS Captain, Berkeley Fire Department

Declan Walsh, Research Analyst, SEIU-UHW West

Dominic Chan, California Nurses Association

Gabriel Quinto, Mayor, City of El Cerrito

Jacquelyn McCormick, Senior Advisor to the Mayor, City of Berkeley

Jesse Arreguin, Mayor, City of Berkeley

Patrick Richards, Associate Director, Business and Finance at University of California, Berkeley

Rochelle Pardue-Okimoto, Mayor Pro Tem, El Cerrito

Scott Donahue, Council member, City of Emeryville

B. HSA Calculation & Discharges by ZIP Code

Calculation Description	Calculation	Notes
AB HSA	AB CHNA zip codes + non-CHNA zip codes sending highest numbers of patients to AB = approximately 75% of AB patients	See Table 1 below for more information
Surge Event Injuries Alameda County Estimate	(16,000 Haywired estimated injured)*(estimate of 68% of displaced households coming from Alameda County)= 10,880 estimated injuries in Alameda County	Assumes that the percentage of displaced households is equivalent to the percentage of injuries occurring in Alameda County
Economic Loss Estimate	\$2.5 (economic base multiplier)*(\$1.9 billion in patient revenue in 2016)= \$4,750,000,000	Economic base multiplier = \$2.5 per every dollar in patient revenue

Zip Code	2016 # Patient Discharges from Alta Bates Campus
94613	10
94720	276
94612	866
94619	875
94618	972
94610	992
94602	1,106
94709	1,130
94708	1,186
94603	1,194
94606	1,215
94707	1,230
94710	1,295
94607	1,297
94621	1,579
94611	1,629
94605	1,751
94609	1,855
94705	1,992
94601	2,241
94704	2,394
94608	2,754
94702	2,922
94703	3,035
Total CHNA patient discharges	35796

94805	822
94803	1,145
94501	1,431
94801	1,557
94706	1,737
94530	2,156
94804	2,764
94806	3,134
Total non-CHNA zip code patient discharges (approximately 75% of all ABC patient discharges)	14746

C. Acute Care Hospitals in Alameda County and Contra Costa County with Basic or Comprehensive EDs

Hospital	County	2016 ED Visits/Beds (AMA benchmark is 2000 visits/Emergency Treatment Station (ETS))	2017 ED Visits/Beds (AMA benchmark is 2000 visits/Emergency Treatment Station (ETS))
Alta Bates Berkeley	Alameda County	1836 visits/ETS (25 ETS)	2292 visits/ETS (22 ETS)
Alta Bates Summit	Alameda County	1481 visits/ETS (32 ETS)	1885 visits/ETS (25 ETS)
Highland Hospital	Alameda County	1211 visits/ETS (57 ETS)	1158 visits/ETS (57 ETS)
Kaiser Oakland	Alameda County	1289 visits/ETS (48 ETS)	1327 visits/ETS (48 ETS)
Kaiser Fremont	Alameda County	2347 visits/ETS (16 ETS)	2452 visits/ETS (16 ETS)
Kaiser San Leandro	Alameda County	1645 visits/ETS (40 ETS)	1739 visits/ETS (40 ETS)
Alameda Hospital	Alameda County	1404 visits/ETS (12 ETS)	1369 visits/ETS (12 ETS)
St. Rose Hospital	Alameda County	2037 visits/ETS (17 ETS)	2134 visits/ETS (17 ETS)
CHORI	Alameda County	1289 visits/ETS (37 ETS)	1261 visits/ETS (37 ETS)
San Leandro Hospital	Alameda County	2739 visits/ETS (12 ETS)	2,851 visits/ETS (12 ETS)
Washington Hospital Fremont	Alameda County	2236 visits/ETS (23 ETS)	2168 visits/ETS (23 ETS)
Eden Medical Center	Alameda County	2097 visits/ETS (22 ETS)	1943 visits/ETS (22 ETS)
Stanford ValleyCare	Alameda County	1768 visits/ETS (18 ETS)	1886 visits/ETS (18 ETS)
Contra Costa Regional Medical Center (CCRMC)	Contra Costa County	2122 visits/ETS (20 ETS)	1499 visits/ETS (26 ETS)
Kaiser Richmond	Contra Costa County	2256 visits/ETS (28 ETS)	2310 visits/ETS (28 ETS)
Kaiser Antioch	Contra Costa County	1588 visits/ETS (36 ETS)	1699 visits/ETS (36 ETS)
Kaiser Walnut Creek	Contra Costa County	1183 visits/ETS (52 ETS)	1224 visits/ETS (52 ETS)
John Muir Concord	Contra Costa County	1876 visits/ETS (32 ETS)	1858 visits/ETS (32 ETS)
John Muir Walnut Creek	Contra Costa County	1206 visits/ETS (44 ETS)	1262 visits/ETS (44 ETS)
Sutter Delta Antioch	Contra Costa County	1906 visits/ETS (32 ETS)	1835 visits/ETS (32 ETS)
San Ramon Regional Medical Center	Contra Costa County	1526 visits/ETS (12 ETS)	1578 visits/ETS (12 ETS)

REFERENCES

OSHPD Data Sets

RHIA Reference #	Report or Data Set Source	Data Set Description	URL	Data Used in HIA	Data Location
1	Annual Financial Disclosures Report 2012	Hospitals and long-term care (LTC) facilities report detailed annual facility-level data on services capacity, inpatient/outpatient utilization, patients, revenues and expenses by type and payer, balance sheet and income statement.	https://siera.oshpd.ca.gov/FinancialDisclosure.aspx	Total Patient Revenue	Page 12
				Clinical Operations	Page 17
				Nonclinical Operations	Page 18
2	Annual Financial Disclosures Report 2016	See above	https://siera.oshpd.ca.gov/FinancialDisclosure.aspx	Total Patient Revenue	Page 12
				Clinical Operations	Page 17
				Nonclinical Operations	Page 18
3	Hospital Annual Utilization Data 2016 (including ALIRTS)	Contains basic licensing information including bed classifications; patient demographics including occupancy rates, the number of discharges and patient days by bed classification, and the number of live births; as well as information on the type of services provided.	https://www.oshpd.ca.gov/HID/Hospital-Utilization.html#Pivot	Overview of capacity and services offered	Pivot Table
4	Hospital Annual Utilization Data 2017 (including ALIRTS)	See above	https://www.oshpd.ca.gov/HID/Hospital-Utilization.html#Pivot	Overview of capacity and services offered	Pivot Table
5	Patient Origin and Market Share Reports 2012-2013	ZIP Code of residence for all ED visits and hospitalizations	https://www.oshpd.ca.gov/HID/POMS-Report.html#Pivot		Pivot Table

6	Patient Origin and Market Share Reports 2016 - 2017	See above	https://www.oshpd.ca.gov/HID/POMS-Report.html#Pivot		Pivot Table
7	Facility Summary Reports 2013	Patient level data are reported through the Medical Information Reporting for California (MIRCal) system. These reports display a numerical and percentage breakdown of patient level data. These Summary Reports combine report periods into an annual view of a facility's Hospital Inpatient (IP), Emergency Department (ED), or Ambulatory Surgery (AS) patient level data.	https://www.oshpd.ca.gov/HID/Facility-Summary-Reports.html	Patient Payer Mix Emergency Department Ambulatory Services Inpatient services	Downloadable Report
8	Facility Summary Reports 2016	See above	https://www.oshpd.ca.gov/HID/Facility-Summary-Reports.html	Patient Payer Mix Emergency Department Ambulatory Services Inpatient services	Downloadable Report
9	Seismic Compliance Unit: Seismic Performance Ratings	Description of the seismic performance (SPC) rating criteria	https://www.oshpd.ca.gov/FDD/seismic_compliance/SB1953/SeisPerfRatings.html	Definitions of SPC + MPC ratings	Web page
10	California Hospital and Skilled Nursing Facility Data 2018	This page presents information for California hospitals and skilled nursing facilities such as site plans (also called "keyplans"), building numbers, SPC/NPC ratings and various links associated with the facility. Links to the OSHPD Report Center for open, closed, and old projects are included.	https://www.oshpd.ca.gov/FDD/Forms/Keyplans/index.html	Building Site Plans + SPC Ratings of Buildings Open Projects	Web page
11	General Facility Listing 2017	All California hospital facilities in 2017	https://www.oshpd.ca.gov/HID/Facility-Listing.html	Acute care hospitals in region	

General References

Ahmedani, B. K., Simon, G. E., Stewart, C., Beck, A., Waitzfelder, B. E., Rossom, R., ... & Operskalski, B. H. (2014). Health care contacts in the year before suicide death. *Journal of general internal medicine*, 29(6), 870-877.

Alameda County Data Sharing Initiative. (2014). Paramedics Plus Response Time. <https://data.acgov.org/Public-Safety/Paramedic-Plus-Response-Time/9yek-274s/about>. Accessed November 2017.

Associates in Process Improvement. Alameda County Emergency Medical Services Quality Improvement Program Plan 2017. <http://www.acphd.org/media/476290/2016%20alameda%20county%20ems%20system%20quality%20improvement%20plan.pdf>. Published September 21, 2017.

Betz, M. E., Wintersteen, M., Boudreaux, E. D., Brown, G., Capoccia, L., Currier, G., ... & Moutier, C. (2016). Reducing suicide risk: challenges and opportunities in the emergency department. *Annals of emergency medicine*, 68(6), 758-765.

Berlin, C., Panczak, R., Hasler, R., Zwahlen, M. Do acute myocardial infarction and stroke mortality vary by distance to hospitals in Switzerland? Results from the Swiss National Cohort Study. (2016) *BMJ Open*, 6 (11), art. no. e013090.

Berkeley City College. (2018). About BCC Home. Retrieved from Berkeley City College website: <http://www.berkeleycitycollege.edu/wp/about-bcc/>

Bindman, A. B., Keane, D., & Lurie, N. (1990). A public hospital closes: impact on patients' access to care and health status. *Jama*, 264(22), 2899-2904.

Buchmueller, T. C., Jacobson, M., & Wold, C. (2006). How far to the hospital?: The effect of hospital closures on access to care. *Journal of health economics*, 25(4), 740-761.

Cal Hospital Compare. (2018). Compare Hospitals. Retrieved from Cal Hospital Compare website: <http://calhospitalcompare.org/find-hospitals/?q=alta+bates+>

California Department of Health Care Services. (2018). Do You Qualify? | Medi-Cal Eligibility. Retrieved from <http://www.dhcs.ca.gov/services/medi-cal/Pages/DoYouQualifyForMedi-Cal.aspx>

California Health Care Foundation. (2006). Overuse of Emergency Departments Among Insured Californians. Retrieved from California Health Care Foundation website: <https://www.chcf.org/wp-content/uploads/2017/12/PDF-EDOveruse.pdf>

California Health Care Foundation. (2008). Beds for Boomers: Will Hospitals Have Enough? Report. Retrieved from the California Healthcare Foundation website: <https://www.chcf.org/wp-content/uploads/2017/12/PDF-SnapshotBedsBoomers.pdf>

California Health Care Foundation. (2014). A Tale of Two Births. Adapted from: <https://www.chcf.org/publication/a-tale-of-two-births-high-and-low-performing-hospitals-on-maternity-measures-in-california/>.

California Office of Statewide Health Planning and Development (OSHPD). (2018). Data and Reports. Retrieved from: <https://www.oshpd.ca.gov/HID/>.

City of Berkeley, Department of Health, Housing

- and Community Service, Public Health Division. (2013). Health Status Report 2013. Report. Retrieved from City of Berkeley website: https://www.cityofberkeley.info/Health_Human_Services/Public_Health/2013_Health_Status_Report.aspx
- City of Berkeley Health Commission. (2017). Report to the Berkeley City Council: Health Impact Assessment of the Proposed Closure of Alta Bates. Retrieved from City of Berkeley website: https://www.cityofberkeley.info/Clerk/City_Council/2017/10_Oct/Documents/2017-10-03_Item_11_Health_Impact_Assessment_of_the_Proposed_Closure_of_Alta_Bates.aspx. Published July 25, 2017.
- Community Commons. (2018). Accessed from: <https://www.communitycommons.org/>
- Contra Costa College. (2018). About Contra Costa College. Retrieved from Contra Costa College website: <https://www.contracosta.edu/about/>
- Chen, B. K., Cheng, X., Bennett, K., & Hibbert, J. (2015). Travel distances, socioeconomic characteristics, and health disparities in nonurgent and frequent use of hospital emergency departments in South Carolina: a population-based observational study. *BMC health services research*, 15(1), 203.
- Contra Costa Emergency Medical Services Agency. (2014). Impact Evaluation Report: Doctors Medical Center San Pablo Potential Closure of Emergency Services. Retrieved from: <https://cchealth.org/dmc/>
- Contra Costa Health Services. (2012). Chevron Richmond Refinery Fire of August 6, 2012: After Action Report Based on Medical/Health Debriefing Conducted September 10, 2012. Retrieved from: <https://cchealth.org/special/richmond-refinery-response.php>
- Contra Costa Health Services. (2010). Community Health Indicators for Contra Costa County. Retrieved from Contra Costa Health Services website: <https://cchealth.org/health-data/hospital-council/>
- Contra Costa Health Services. (2017). 2016 Contra Costa EMS System Performance Report. Retrieved from Contra Costa Health Services website: <https://cchealth.org/ems/pdf/annual-report-2016.pdf>
- Countouris, M., Gilmore, S., & Yonas, M. (2014). Exploring the impact of a community hospital closure on older adults: A focus group study. *Health & place*, 26, 143-148.
- Crandall, M., Sharp, D., Wei, X., Nathens, A., & Hsia, R. Y. (2016). Effects of closure of an urban level I trauma centre on adjacent hospitals and local injury mortality: a retrospective, observational study. *BMJ open*, 6(5), e011700.
- Diaz, H., Ainsworth, D., & Schmidlein, M. (2016). Community Health Needs Assessment of the Alta Bates Summit Medical Center Service Area: Three Campuses. Retrieved from Sutter Health Alta Bates Medical Center website: <http://www.altabatessummit.org/about/communitybenefit/community-assessment.html>
- Doeksen, G. A., Johnson, T. G., & Willoughby, C. (1997). Measuring the economic importance of the health sector on a local economy: A brief literature review and procedures to measure local impacts. Starkville, MS: Southern Rural Development Center.
- Erickson, R. A., Gavin, N. I., & Cordes, S. M. (1986). The economic impacts of the hospital sector. *Growth and Change*, 17(1), 17-27.
- Fishman, J., McLafferty, S., & Galanter, W. (2018). Does Spatial Access to Primary Care

Affect Emergency Department Utilization for Nonemergent Conditions?. *Health services research*, 53(1), 489-508.

Healthy Policy Alternatives. (2015). Review of the Evidence on the Use of the Emergency Department by Medicaid Patients and the Evolving Role of Emergency Medicine Physicians. White Paper. Retrieved from American College of Emergency Physicians website: newsroom.acep.org/download/HPA+Medicaid+White+Paper_March+18+2015.pdf

Hsia, R. Y. J., & Shen, Y. C. (2011). Rising closures of hospital trauma centers disproportionately burden vulnerable populations. *Health affairs*, 30(10), 1912-1920.

Hsia, R. Y., Kanzaria, H. K., Srebotnjak, T., Maselli, J., McCulloch, C., & Auerbach, A. D. (2012). Is emergency department closure resulting in increased distance to the nearest emergency department associated with increased inpatient mortality?. *Annals of emergency medicine*, 60(6), 707-715.

Hsia, R. Y., Brownell, J., Wilson, S., Gordon, N., & Baker, L. C. (2013). Trends in adult emergency department visits in California by insurance status, 2005-2010. *Jama*, 310(11), 1181-1183.

Hsia, R. Y., Srebotnjak, T., Maselli, J., Crandall, M., McCulloch, C., & Kellermann, A. L. (2014). The association of trauma center closures with increased inpatient mortality for injured patients. *The journal of trauma and acute care surgery*, 76(4), 1048.

Horwitz, L. I., Green, J., & Bradley, E. H. (2010). US emergency department performance on wait time and length of visit. *Annals of emergency medicine*, 55(2), 133-141.

Johnson, P. J., Ghildayal, N., Ward, A. C., Westgard,

B. C., Boland, L. L., & Hokanson, J. S. (2012). Disparities in potentially avoidable emergency department (ED) care: ED visits for ambulatory care sensitive conditions. *Medical care*, 1020-1028.

Joynt, K. E., Chatterjee, P., Orav, E. J., & Jha, A. K. (2015). Hospital closures had no measurable impact on local hospitalization rates or mortality rates, 2003-11. *Health Affairs*, 34(5), 765-772.

Karaca, Z., Wong, H., & Mutter, R. (2013). Characteristics of homeless and non-homeless individuals using inpatient and emergency department services, 2008. *Health cost Util Proj*, 158, 1-14.

Kaiser Foundation Hospital. 2013 Community Health Needs Assessment. Report. Retrieved from Kaiser Permanente website: <https://share.kaiserpermanente.org/article/community-health-needs-assessments-2013/>

Kaiser Foundation Hospital. 2016 Community Health Needs Assessment. Report. Retrieved from Kaiser Permanente website: <https://share.kaiserpermanente.org/wp-content/uploads/2016/12/KFH-LA-CHNA-Final-5.23.16.pdf>

Ko, M., Needleman, J., Derosé, K. P., Laugesen, M. J., & Ponce, N. A. (2014). Residential segregation and the survival of US urban public hospitals. *Medical Care Research and Review*, 71(3), 243-260.

Kushel, M. B., Perry, S., Bangsberg, D., Clark, R., & Moss, A. R. (2002). Emergency department use among the homeless and marginally housed: results from a community-based study. *American journal of public health*, 92(5), 778-784.

Larkin, G.L. and Beautrais, A.L. Emergency departments are underutilized sites for suicide

- prevention. *Crisis*. 2010; 31: 1-6. DOI: <https://doi.org/10.1027/0227-5910/a000001>.
- Lee, D. C., Carr, B. G., Smith, T. E., Tran, V. C., Polsky, D., & Branas, C. C. (2015). The impact of hospital closures and hospital and population characteristics on increasing emergency department volume: A geographic analysis. *Population health management*, 18(6), 459-466.
- Liu, C., Srebotnjak, T., Hsia, R.Y. California emergency department closures are associated with increased inpatient mortality at nearby hospitals (2014) *Health Affairs*, 33 (8), pp. 1323-1329. Cited 7 times.
- Lorch, S. A., Srinivas, S. K., Ahlberg, C., & Small, D. S. (2013). The impact of obstetric unit closures on maternal and infant pregnancy outcomes. *Health services research*, 48(2pt1), 455-475.
- Mathews, R., Peterson, E. D., Li, S., Roe, M. T., Glickman, S. W., Wiviott, S. D., ... & Wang, T. Y. (2011). Use of emergency medical service transport among patients with st-segment-elevation myocardial infarction: findings from the national cardiovascular data registry acute coronary treatment intervention outcomes network registry-get with the guidelines. *Circulation*, CIRCULATIONAHA-110.
- McKillip, J., Courtney, C. L., Locasso, R., Eckert, P., & Holly, F. (1990). College students' use of emergency medical services. *Journal of American College Health*, 38(6), 289-292. <http://dx.doi.org/10.1080/07448481.1990.9936202>
- Miller, I. W., Camargo, C. A., Arias, S. A., Sullivan, A. F., Allen, M. H., Goldstein, A. B., . . . Boudreaux, E. D. (2017). Suicide prevention in an emergency department population: The ED Safe study. *JAMA Psychiatry*, 74(6), 563-570.
- Moore, B. J., Stocks, C., & Owens, P. L. (2017). Trends in emergency department visits, 2006-2014. Rockville, MD: Agency for Healthcare Research and Quality.
- Moore, C. L. (1974). The impact of public institutions on regional income; upstate medical center as a case in point. *Economic Geography*, 50(2), 124-129.
- National Association of State EMS Officials. (2011). 2011 National EMS Assessment https://www.nasemso.org/documents/National_EMS_Assessment_Final_Draft_12202011.pdf
- Nicholl, J., West, J., Goodacre, S., & Turner, J. (2007). The relationship between distance to hospital and patient mortality in emergencies: an observational study. *Emergency Medicine Journal*, 24(9), 665-668.
- OSHPD. (2018). Quick Notes: New Approved Regulations - 2019. Memo. Retrieved from the OSHPD website: https://oshpd.ca.gov/wp-content/uploads/2018/06/MIRCal_QuickNotesV49.pdf
- Peek-Asa, C. "Fatal and Hospitalized Injuries Resulting from the 1994 Northridge Earthquake." *International Journal of Epidemiology* 27, no. 3 (June 1, 1998): 459-65. <https://doi.org/10.1093/ije/27.3.459>.
- Pines, J. M., Pollack Jr, C. V., Diercks, D. B., Chang, A. M., Shofer, F. S., & Hollander, J. E. (2009). The association between emergency department crowding and adverse cardiovascular outcomes in patients with chest pain. *Academic Emergency Medicine*, 16(7), 617-625.
- Public Policy Institute of California. (2015). Planning for California's Growing Senior Population? Report. Retrieved from the Public Policy Institute of California website: <http://www.ppic.org/publication/planning-for-californias-growing-senior-population/>

Rauber C. Alta Bates Summit to slash 358 positions. San Francisco Business Times. January 7, 2014. Accessed March 30, 2018.

Runyan, C. W., Brooks-Russell, A., Tung, G., Brandspigel, S., Betz, M. E., Novins, D. K., & Agans, R. (2017). Hospital emergency department lethal means counseling for suicidal patients. *American Journal of Preventive Medicine*. Advance online publication.

Sager, A. (2013). Presentation. Causes and Consequences of Urban Hospital Closings and Reconfigurations, 1936-2010. Retrieved from the Boston University website: <http://www.bu.edu/sph/files/2015/05/Sager-Causes-and-Consequences-of-Urban-Hospital-Closings-1936-2010-revised-final-version-21.pdf>

Shen, Y.-C., Hsia, R.Y. Association between Emergency Department Closure and Treatment, Access, and Health Outcomes among Patients with Acute Myocardial Infarction (2016) *Circulation*, 134 (20), pp. 1595-1597.

Shen, Y. C., & Hsia, R. Y. (2016). Geographical Distribution of Emergency Department Closures and Consequences on Heart Attack Patients (No. w22861). National Bureau of Economic Research.

Sun, B. C., Mohanty, S. A., Weiss, R., Tadeo, R., Hasbrouck, M., Koenig, W., ... & Asch, S. (2006). Effects of hospital closures and hospital characteristics on emergency department ambulance diversion, Los Angeles County, 1998 to 2004. *Annals of emergency medicine*, 47(4), 309-316.

Sutter Health. (2013). Health Needs Map. Retrieved from: <http://www.healthneedsmap.com/index1.php>

Sutter Health. (2016). Alta Bates Summit Medical Center 2016-2018 Community Benefit Plan.

Retrieved from OSHPD website: [https://www.oshpd.ca.gov/documents/HID/Community-Benefit-Plans/2016/Sutter-Health-Alta-Bates-Summit-Medical-Centers-\(4-Campuses\)-CBP-2016.pdf](https://www.oshpd.ca.gov/documents/HID/Community-Benefit-Plans/2016/Sutter-Health-Alta-Bates-Summit-Medical-Centers-(4-Campuses)-CBP-2016.pdf)

Sutter Health. (2018). Alta Bates Summit Medical Center: Newborn Intensive Care Unit. Retrieved from <http://www.altabatessummit.org/>

Sutter Health. (2018). Alta Bates Summit Medical Center: Our History and Our Work. Retrieved from <http://www.altabatessummit.org/about/history.html>

Sutter Health. (2018). Vision 2030: Rebuild Alta Bates Summit Frequently Asked Questions. (2018). Retrieved from <https://rebuild.altabatessummit.org/vision-2030/>

The Abaris Group. (2011). Study of West County Emergency Medical Services, Emergency Department, and Critical Care Access Final Report. Walnut Creek, CA: The Abaris Group.

The Lancet. Public Health. (2018). Suicide in the USA: a public health emergency. *The Lancet. Public Health*, 3(7), e304.

Thomas, L. (2014). Hospitals, doctors moving out of cities to more affluent areas. Retrieved from <http://archive.jsonline.com/news/health/hospitals-doctors-moving-out-of-poor-city-neighborhoods-to-more-affluent-areas-b99284882z1-262899701.html/>

U.S. Census Bureau (2013). ACS Demographic and Housing Estimates, 2008-2012 American Community Survey 5-year estimates. Retrieved from <https://factfinder.census.gov/>

U.S. Census Bureau (2017). ACS Demographic and Housing Estimates, 2011-2016 American Community Survey 5-year estimates. Retrieved from <https://factfinder.census.gov/faces/>

tableservices/jsf/pages/productview.xhtml?src=CF

U.S. Census Bureau (2017). Household Size by Vehicle Available, 2011-2016 American Community Survey 5-year estimates. Retrieved from <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t&keepList=t>

U.S. Census Bureau (2017). Selected Economic Characteristics, 2011-2016 American Community Survey 5-year estimates. Retrieved from <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t&keepList=t>

United States Geological Survey (USGS). (2017). Report. The Haywired Earthquake Scenario. Retrieved from USGS website: https://www.usgs.gov/natural-hazards/science-application-risk-reduction/science/haywired-scenario?qt-science_center_objects=0#qt-science_center_objects

United States Geological Survey (USGS). (2017). Report. The Haywired Earthquake Scenario-- Engineering Implications. Retrieved from USGS website: https://www.usgs.gov/natural-hazards/science-application-risk-reduction/science/haywired-scenario?qt-science_center_objects=0#qt-science_center_objects

University of California Berkeley Office of the Vice Chancellor of Finance. (2017). Office of Planning and Analysis. Retrieved from the University of California Berkeley website: <https://opa.berkeley.edu/berkeley-fall-enrollment-trends>. Accessed December 4, 2017.

Yoon-Hendricks, A. & Stevens, M. California Today: The Costs of Making Buildings Safer. New York Times. August 30, 2018. Accessed August 30, 2018.



**Alta Bates Summit
Medical Center
RAPID HEALTH IMPACT
ASSESSMENT**