Climate Resilience Plan

Stanford Medicine 2024

A Message from Stanford Medicine's Sustainability Leaders:

Climate change presents tangible risks to the health of our communities and our organization. As a leading healthcare provider, Stanford Medicine has both a responsibility and an opportunity to address the effects of climate change in our community. This document, our inaugural Climate Resilience Plan, provides an overview of the work we are doing today to understand the climate risks in our community and ensure that we can continue to provide safe and equitable care for our patients in the face of future climate change. This is an important step in our journey towards a more sustainable and resilient future.

As part of our broader mission to be a national leader in eliminating healthcare disparities and a place where all patients have the potential to achieve their desired health outcomes, our organizations – Stanford Health Care, Stanford Health Care – Tri-Valley, and Stanford Medicine Children's Health – have committed to continued work in health equity alongside our community and government partners. We recognize that climate risks cannot be addressed in whole by a single institution, but rather see our work as a necessary complement to the work being done in our communities and at our municipal, state, and federal government levels. As such, Stanford Medicine will seek to strengthen our partnerships and relationships with other organizations committed to this work in our sector and region.

Stanford Medicine is focused on mitigating our own contribution to climate change by reducing our greenhouse gas emissions, conserving energy, reducing waste, conserving water, and addressing the chemicals of concern in our supply chain. In conjunction with our mitigation efforts, the work outlined in this Plan begins to bolster our ability to remain resilient in the face of increasing climate-driven risks, so that we can effectively and excellently serve our communities when they need us the most.

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Introduction

Climate change poses many threats to the health and well-being of our community members, including extreme weather events such as high heat and heavy storms as well as worsening spread and severity of certain diseases carried by everyday insects. Extreme climate events can also have negative impacts on the mental well-being of our community members. We already see evidence of these events throughout the United States and within California.

As one of the most significant contributors to greenhouse gas emissions, the health sector has an important role to play in addressing this threat. As a pioneer and innovator responsible for society's most important medical and technological advances, Stanford Medicine is committed to promoting the health and well-being of the people and communities we serve while safeguarding the environment for future generations.

In line with our mission to heal humanity through science and compassion, and our commitment to carbon neutrality, Stanford Medicine has developed this Climate Resilience Plan to detail the plans we have in place to ensure continuity of care and continuous operations in light of changing climate, and our efforts to support those communities most impacted by those changes.

Who We Are

Stanford Medicine is a leading academic health system that includes the Stanford University School of Medicine, Stanford Health Care, Stanford Health Care Tri-Valley, and Stanford Medicine Children's Health.   Stanford Medicine is renowned for breakthroughs in treating cancer, heart disease, brain disorders, and surgical and medical conditions.

Together, we harness the full potential of biomedicine through collaborative research, education, and clinical care.

Stanford MEDICINE | Health Care	**Stanford** MEDICINE | Health Care *Tri-Valley*	**Stanford** MEDICINE Children's Health
Stanford Health Care is part of the adult health care delivery system of Stanford Medicine. Combining clinical care, research, and education to advance the understanding and practice of medicine, Stanford Health Care provides compassionate, coordinated care personalized for the unique needs of every patient.	Stanford Health Care – Tri-Valley (SHC-TV) has been dedicated to providing high-quality, nonprofit health care to the Tri-Valley and surrounding communities since 1961 (joined SHC in 2015). Through state-of-the-art technology and highly skilled physicians, nurses, and staff, SHC - TV provides a wide range of health care services at its Livermore, Pleasanton, and Dublin medical facilities.	Stanford Medicine Children's Health is the largest Bay Area health network exclusively dedicated to pediatrics and maternal care. Our physicians and health care teams offer comprehensive clinical services, from treatments for rare and complex conditions to well-child care across the Bay Area and throughout California.
600 Licensed Beds **18,002** Employees **$734M** Community Benefit Investment	**167** Licensed Beds **2,390** Employees **$42M** Community Benefit Investment	**426** Licensed Beds **6,381** Employees **$265M** Community Benefit Investment
Magnet Hospital (2007, 2012, 2016, 2020) U.S. News & World Report; Ranked among the top 10 hospitals in the nation.	American Heart Association's Gold Plus Get With The Guidelines® –Stroke Quality Achievement Award	Magnet Recognized organization U.S. News and World Report – ranked in all 10 specialties and number 3 in the Pacific Region.
The Stanford Medicine Cancer Center includes the Stanford Cancer Institute, the only NCI-Designated Comprehensive Cancer Center between San Francisco and Los Angeles.		

Climate Resilience:
One element of our larger Climate Action Planning

Our commitment to health includes the health of our planet with the recognition that our environment has a significant impact on the health of our people. Climate change is visible in more intense heat days, more extreme weather events, in the greater spread of vectors and disease. In the San Francisco Bay Area, this means more frequent and intense heat waves, which can lead to dehydration and heatstroke; increased wildfires, causing respiratory distress or illness; and changing weather patterns that impact the availability and prices of healthy food, leading to increased food insecurity. Stanford Medicine is committed to reducing our impact on the environment for the good of our patients and our planet.

In June 2022, Stanford Medicine signed the U.S. Department of Health and Human Services Health Sector Climate Pledge. This included a commitment to reducing operational climate-warming emissions by 50% by 2030 and achieving net-zero emissions by 2050, as well as the development of a Climate Resilience Plan to address how we will prepare to serve our patients and community in the face of an increasing number of climate-related weather events.

Our resilience efforts are part of a larger climate action planning process that takes into consideration how we will mitigate our emissions impact, adapt to climate changes and the impacts that those changes will have on our organization, and how we will integrate a community centered approach that takes into consideration those patient populations most impacted by the effects of climate change. Resilience is defined as the capacity to **prepare for**, **respond to**, and **recover from** the impacts of hazardous climate events. This process begins with understanding the risks associated with climate related events, along with the impacts that those risks could have on our operations and the community we serve. These identified risks are then woven into our emergency preparedness efforts, community outreach and planning, and our operational plans.

The Elements of our Climate Resilience Plan

Our climate resilience plan addresses the following key elements:

Prospective Risk Assessment

A description of how our organization has integrated risk assessment into our planning process and our plans to evolve this approach to include a forward-looking assessment of risk based on climate change models.

Health Equity and Community Engagement

How we assess our patients' social and environmental determinants of health in clinical settings, how we identify patients with specific medical vulnerabilities to climate related events, and the community outreach and partnerships in place to support our patient communities.

### Assessment and Remediation in Infrastructure and Operations

Information about how we identify and remediate operational and infrastructure vulnerabilities to ensure that we can provide world class health care in the communities we serve.
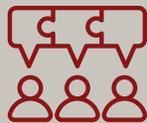
Collaboration Between Healthcare Organizations

How we partner with other organizations within our geographic area to enhance our resilience and ensure care for our patient populations.

The development of this plan is the product of multiple interdisciplinary planning processes and groups within Stanford Medicine, including but not limited to the office of emergency management, healthcare providers, community benefit and relations, facility and energy managers, administrators and executives, pharmacy, purchasing, food and nutrition services, information technology, and waste management.
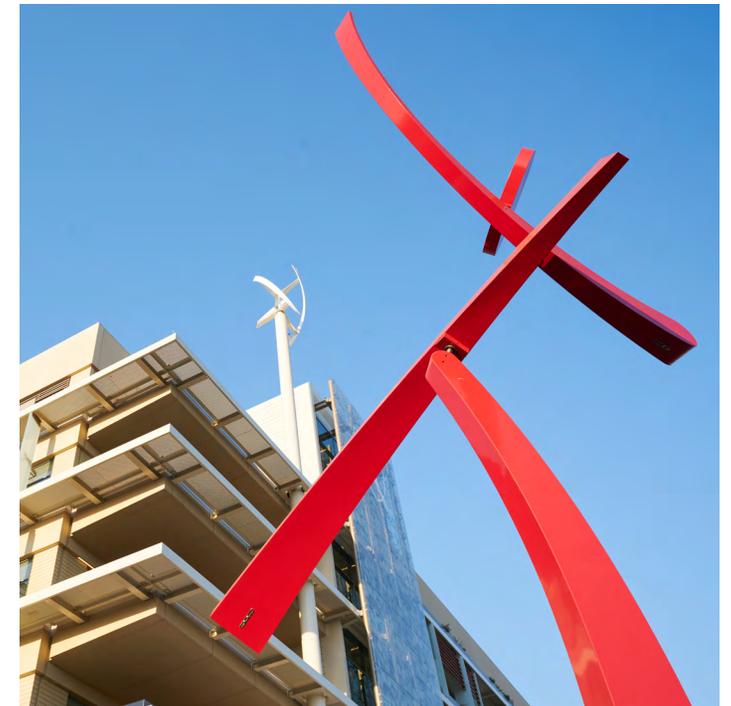
Prospective Risk Assessment

The Emergency Management teams of each organization encompassed within Stanford Medicine conduct annual risk assessment processes for their respective operations.

The Office of Emergency Management (OEM) is based in Stanford Health Care and is a shared service for Stanford Medicine Children's Health. Emergency Management – Tri-Valley is the equivalent organization for SHC-TV facilities. The mission of these groups is to lead the comprehensive emergency management program for any type of incident that could disrupt the organization's ability to

continue to provide safe, quality patient care. OEM and Emergency Management Tri-Valley facilitate an annual Hazard Vulnerability Assessment (HVA) that includes evaluation of incidents that could affect the demand for health services and/or the facility's ability to provide those services, in consideration of the unique characteristics of the facility, its patient populations, its response resources, and the surrounding community. Building from the framework of the Kaiser Permanente HVA tool (a widely adopted standard in healthcare and the common format for county-based healthcare coalition compilations), the annual joint Stanford Hospital – Lucile Packard Children's Hospital Stanford (SHC-LPCH) as well as the SHC-TV medical center Hazard Vulnerability Assessment (HVA) examines and scores the following characteristics of 49 human, technological, and natural hazard categories:

- **Number of occurrences** in the past year;
- **Probability to occur** at least once in the coming year;
- **Severity of impact** to people, property, and business;
- Internal and external **preparedness** for effective response.

Participants in the hospital sessions are primarily the interdisciplinary roster of leaders who serve on the Emergency Management Steering Committee/Emergency Management Council. Subject Matter Experts (SMEs) from internal departments as well as supporting external community response agencies (including Emergency Management, EMS, Law Enforcement, and Fire) present updates on mitigation measures recently completed or planned for the near future, as well as their evaluation of the organization's (and/or community's) outstanding vulnerabilities.

The group then discusses if there should be any adjustments to the scores that inform risk ranking, and corresponding opportunities for mitigation measures and/or resources needed to improve confidence in preparedness. Following the joint hospital HVA, OEM also convenes local and regional sessions for licensed ambulatory clinics to engage their management and staff teams in a simplified review of their top hazards of concern. OEM then presents the reports of highest rated vulnerabilities to the joint SHC-SMCH Emergency Management Steering Committee to inform planning, exercise, and continuity work for that upcoming calendar year.

In addition to these internal processes, the Stanford Medicine Emergency Management teams maintain awareness of equivalent community-based risk assessment processes including the City of Palo Alto's Threat and Hazard Identification and Risk Assessment (THIRA) led by its Office of Emergency Services. The THIRA provides additional insight into the local critical infrastructure and relationships to the Local Hazard Mitigation Plan (LHMP). A similar process is in place for the cities of Pleasanton and Livermore, where SHC-TV facilities reside.

Though the standing annual HVA process has included a number of incident types directly and indirectly associated with climate risk, intentionality to highlight their relationships to the intensity, interdependencies, and long-term outlook of environmental change is a recent development with many upcoming opportunities.

For many years, the HVA tool has included categories like drought and inclement weather, but other categories like air quality issues and wildfire are more recent additions. Even then, hazard categories for climate risk-related incidents are too broad and therefore lack the level of specificity needed to accurately evaluate risk factors or propose (or fund) meaningful mitigation strategies. For instance, the "Inclement Weather / Temperature Extremes" category could be subdivided into separate line items to distinguish severe weather incidents related to ocean warming (e.g., Southern California's first-ever tropical storm watch in August 2023) versus extreme high heat days.

Evaluation of climate risks are not unilateral and inevitably require consideration of cascading and/or compounding impacts. The stress of a high heat day on the electrical grid has been known to lead to rolling power outages across the state of California. If a generator fails – or for ambulatory healthcare sites not equipped with generator power – the absence of HVAC endangers the most vulnerable patient populations, presents an added risk of evacuation, and can limit access to healthcare resources at hand for a community already under duress.

Conversely the interdependencies among hazards can also present great opportunities for planning, where the existing assessment of one type of hazard provides complementary insight into an associated climate risk. For instance, we can more easily predict which locations will likely be susceptible to sea level rise based on what is already well understood from past and present assessments of risk for flooding and tsunami.

While climate change is inherently long-term, the HVA process is limited in its view by only looking 12 months back and 12 months forward. In addition, to calculate its overall hazard risk ranking percentages, the Kaiser HVA tool assigns greater weight to the number of incidents than the "low, medium, high" score entered for upcoming probability. As a result, the tool rewards reaction where a recent few incidents grab most of the attention and resources allocated to bolster preparedness, and risks skipping past a looming threat that might seem relatively innocuous now, but will undoubtedly be exacerbated by climate change and requires incremental mitigation to begin now.
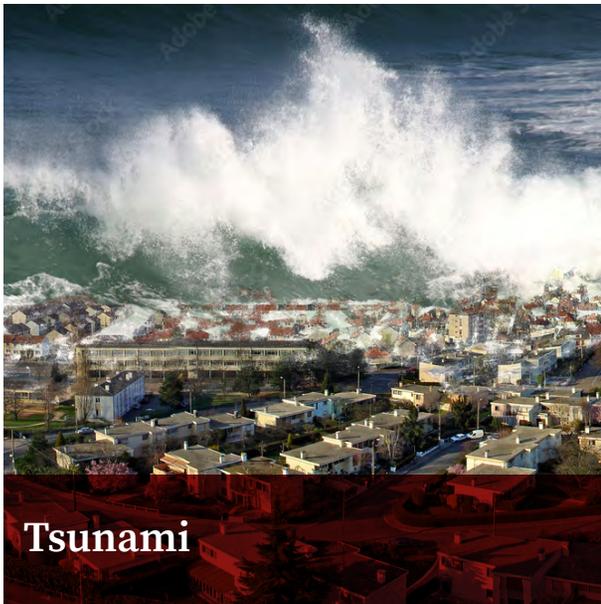
The following climate related risks have been identified as impactful to our service areas:
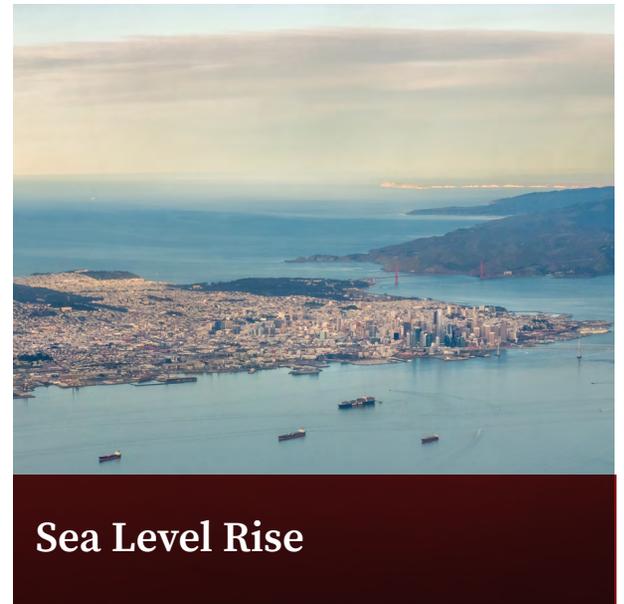
Extreme Temperatures

Wildfire

Tsunami

Heavy Rain - Flood & Landslide

Sea Level Rise

Health Equity & Community Engagement

Stanford Medicine is committed to improving the health of our community. Providing exceptional services, programs, and funding far beyond our hospital walls is part of our values and mission. As part of that commitment, we provide health care to some of our community's most vulnerable members, and partner with local government and community-based organizations to improve the health of our community members. Our mission to address health care disparities is driven by a committee of leaders, faculty, and staff from all entities within Stanford Medicine: Stanford Medicine Children's Health, Stanford School of Medicine, Stanford Health Care, Stanford Medicine Partners, and Stanford Health Care Tri-Valley. It is our goal to ensure all patients receive the highest level of care and are prioritized accordingly to meet their needs. The Stanford Medicine Health Equity (SMHE) Committee is comprised of highly experienced leadership, faculty, and staff from the Stanford School of Medicine, Stanford Medicine Children's Health, and Stanford Health Care, including Stanford Health Care Tri-Valley and University HealthCare Alliance. The mission of this Committee comprises of the following aspects:

- **Ensure** that all patients receive the highest level of care.
- **Improve** community health through upstream (social drivers) and downstream (health conditions) interventions that address healthcare disparities within our communities.
- **Measure** improvement in quality and safety for our patients and community.

Every three years, in partnership with community residents, experts, local public health departments, and other health systems, Stanford Medicine conducts a community health needs assessment (CHNA). The CHNA process applies a social drivers of health framework and examines social, environmental, and economic conditions that impact health in addition to exploring factors related to diseases, clinical care, and physical health. Analysis of this broad range of contributing factors results in identification of the priority health needs for each respective area. The CHNA process explores inequities and disparities placing particular emphasis on the health issues and contributing factors that impact historically underserved populations that disproportionately have poorer health outcomes across multiple health needs. These analyses then inform intervention strategies to promote health equity.

The CHNA process includes extensive community engagement to ensure that the voice of the populations we serve is captured within the assessment. Key informant interviews with health experts and focus groups with community residents are utilized to gather input around facilitators and barriers to health in the community as well as priorities for healthcare within the community and what made these priorities important.

Climbing temperatures, more extreme weather events, flooding and wildfires are all cited within the CHNA documents as impacting the health and well-being of our patients. The Tri-Valley area is noted as having significantly higher risk for drought, high heat and floods compared to the state, as well as a higher incidence of asthma. Santa Clara and San Mateo Counties are noted as having greater risk of heat waves and coastal flooding than the state as a whole. Santa Clara County also has a higher risk of drought than the state overall. Climbing temperatures can also make it more challenging to get outdoors and exercise, resulting in secondary impacts to health. Smoke and ash may exacerbate respiratory issues for many of our patient populations.

There are a variety of factors that may result in our communities experiencing a disproportionate amount of impact from climate related events. Inequities in access to care and economic factors like inability to qualify for affordable insurance, lack of housing, and language access may prevent patients from being able to receive the treatment they need. These same factors may result in additional stress for these communities related to evacuations from flood or wildfire events further compound stress and vulnerabilities of communities. Populations that are especially vulnerable to climate impacts include people in low-income households, people of color, people with limited English proficiency, Indigenous people, children, pregnant and postpartum women, older adults, outdoor workers, people with disabilities and people with chronic medical conditions.

In addition to the CHNA results, other tools were utilized to help identify communities that may be more vulnerable to climate related events in our geographic areas.

The Social Vulnerability Index (SVI) takes into consideration socioeconomic status, housing composition and disability, minority status and language, and housing and transportation. For the counties that represent the majority of our patient population, the SVI indicates a low to moderate vulnerability range.
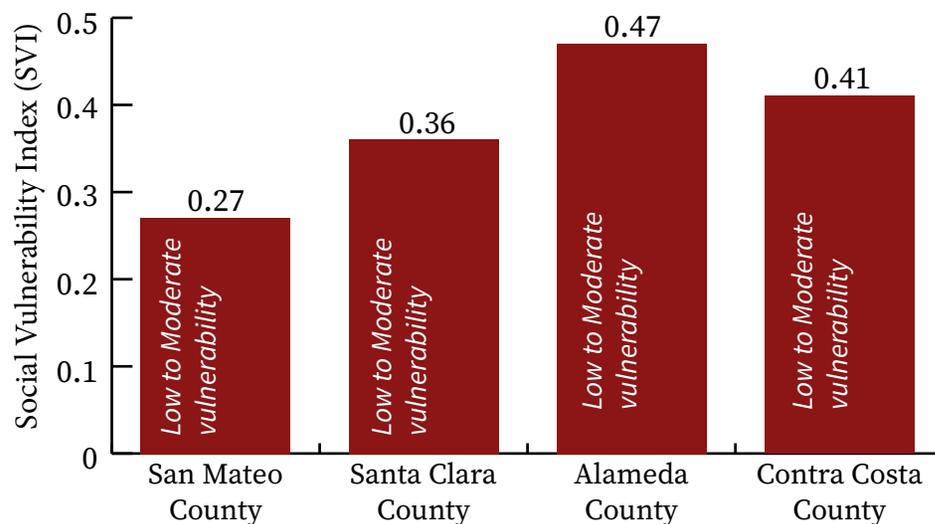
The Environmental Justice Index (EJI) utilizes three main groups of indicators to rank the cumulative impact of environmental injustice on health. This indicator is also useful in identifying communities that may be at greater risk of impacts from climate related events.
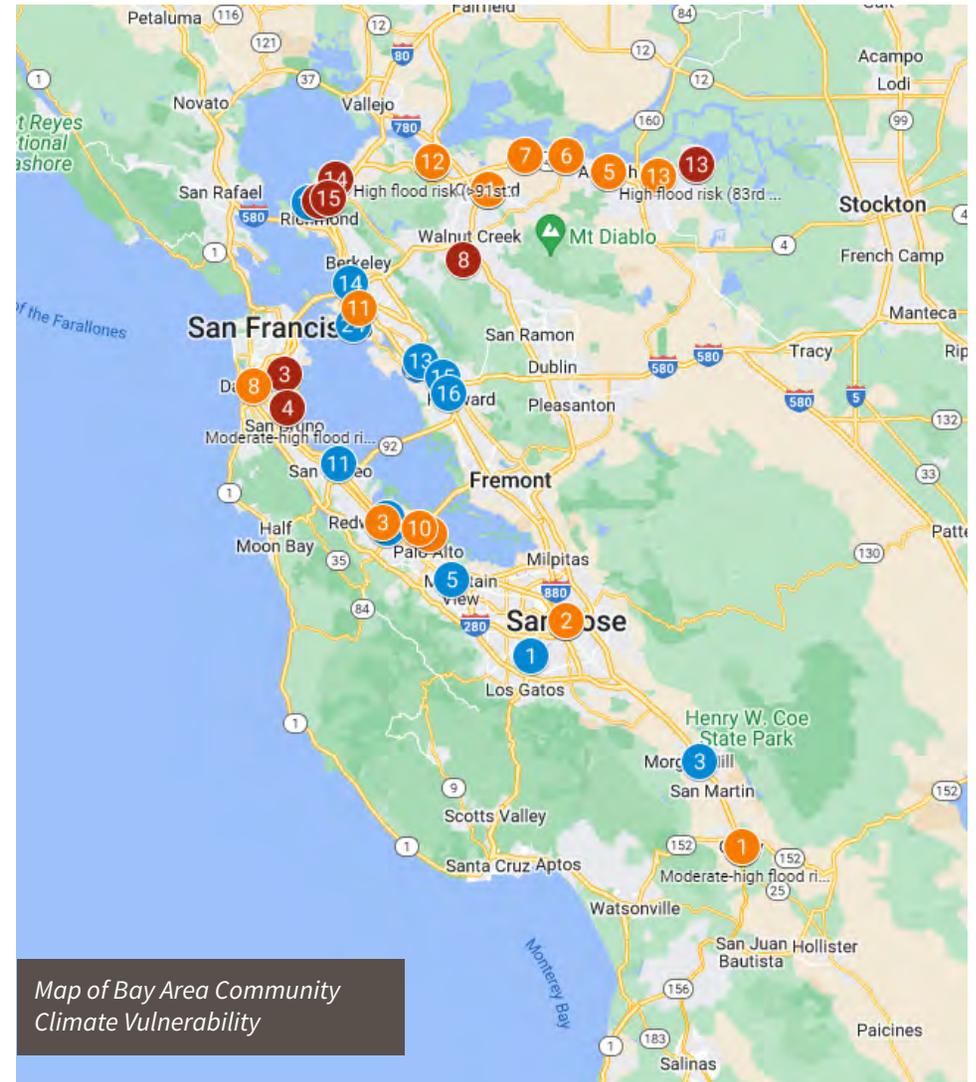
Social Vulnerability

Environmental Burden

Health Vulnerability

Stanford Medicine Climate Resilience Plan

OVERALL ENVIRONMENTAL JUSTICE RANK			
Social Vulnerability	Racial / Ethnic Minority Status	Minority Status
	Socioeconomic Status	Poverty
		No High School Diploma
		Unemployment
		Housing Tenure
		Housing Burdened Lower-Income Households
		Lack of Health Insurance
		Lack of Broadband Access
	Household Characteristics	Age 65 and Older
		Age 17 and Younger
		Civilian with a Disability
		Speaks English "Less than Well"
	Housing Type	Group Quarters
		Mobile Homes
Environmental Burden	Air Pollution	Ozone
		PM2.5
		Diesel Particulate Matter
		Air Toxics Cancer Risk
	Potentially Hazardous & Toxic Site	National Priority List Sites
		Toxic Release Inventory Sites
		Treatment, Storage, and Disposal Sites
		Risk Management Plan Sites
		Coal Mines
		Lead Mines
	Built Environment	Recreational Parks
		Houses Built Pre-1980
		Walkability
	Transportation Infrastructure	High-Volume Roads
		Railways
		Airports
	Water Pollution	Impaired Surface Water
Health Vulnerability	Pre-existing Chronic Disease Burden	Asthma
		Cancer
		High Blood Pressure
		Diabetes
		Poor Mental Health

For our patient population counties, the following areas were noted as higher risk within the EJI:

- **Contra Costa County:** There are multiple areas within the county (areas of Concord, Antioch, Martinez, and Pittsburgh) that have proximity to hazardous or toxic sites, lower income households, limited English proficiency, and high percentages of individuals without a high school diploma.

- **Alameda County:** Areas of Fairview, Sunol, Union City, Hayward, Castro Valley and Oakland were noted as having high minority populations. Areas of Castro Valley and Oakland were noted as having low walkability.

- **Santa Clara County:** Areas of San Jose and the Coyote Creek and Valley areas were noted as having large minority populations, low walkability, high population over 65 years of age, and a high percentage of group living quarters and high percentages of the population without a high school diploma. Areas of Morgan Hill were noted as having older housing (pre-1980), lack of walkability and high-volume roads. Other areas of Morgan Hill near Dunn Avenue were noted as having high concentrations of residents under the age of 17, high percentages of group living quarters, and limited English proficiency.

- **San Mateo County:** Areas of San Bruno, Millbrae, East Palo Alto, Redwood City, and Half Moon Bay were noted as high populations with no high school diploma, and limited English. Areas of San Mateo near Crystal Springs were noted as having a high percentage of mobile homes, limited English, and a high prevalence of cancer. The area around Highlands/Baywood Park was noted as having older homes (pre-1980), a lack of walkability and high-volume roads.

Map of Bay Area Community Climate Vulnerability

Google Maps, 2024

🔵 Low Income and Flood Risk

🟠 Low Income and Extreme Heat Risk

🔴 Low Income and Wildfire Risk

$$\text{Risk Index} = \frac{\text{Expected Annual Loss X Social Vulnerability}}{\text{Community Resilience}}$$

The **National Risk Index** utilizes available data for natural hazards and community risk factors to develop a baseline risk assessment measurement by county and Census tract. The index score represents a percentile risk ranking for that area when compared to other similar communities across the U.S. It can be viewed for each of the 18 identified hazards, or as a composite score. The score utilizes the expected annual loss, multiplied by the community social vulnerability score divide by the resilience score. For Risk, Expected Annual Loss, Social Vulnerability, and Community Resilience, there is a qualitative rating that describes the community in comparison to all other communities at the same level, ranging from "Very Low" to "Very High". Because this risk index includes earthquake, which is not directly related to climate change, the overall climate risk for each county may be lower than indicated by these scores. However, we chose to include this data as it also includes indicators such as flood, landslide and drought.

The following areas of interest were noted for the communities we serve:

Alameda County (99.87)
Very High Risk

This represents a very high expected annual loss, a relatively moderate social vulnerability score, and a very high rating for community resilience. Very high hazards for this area include earthquake, drought, landslide, and riverline flooding. Heatwave and wildfire were noted as relatively moderate hazards for the area.

Contra Costa County (99.59)
Very High Risk

This represents a very high expected annual loss, with relatively moderate social vulnerability and relatively high community resilience. Earthquake was noted as a very high hazard for this area, and relatively high hazards included drought, heat wave, and riverline flooding. Landslide and wildfire were noted as a relatively moderate hazard.

Santa Clara County (99.84)
Very High Risk

This represents a very high expected annual loss, with relatively low social vulnerability and relatively high community resilience. Earthquake was noted as a very high hazard for this area (with a score of 100), and heatwave, landslide, and wildfire were noted as relatively high. Drought was noted as a relatively moderate hazard.

San Mateo County (99.33)
Relatively High Risk

This represents a very high expected annual loss, a relatively low social vulnerability and very high community resilience. Drought, earthquake and landslide were noted as relatively high risks for the region.

Identification of patients with specific medical vulnerabilities to climate related hazards

Our clinical teams identify and care for patients with unmet health-related social needs and medical vulnerabilities. These same needs and vulnerabilities put these patients at higher risk from climate-related hazards. Our team members play a critical role in informing patients about how to mitigate these risks, and helping them to connect to protective programs and services through referrals and care coordination. Existing examples of such screening include questions around race/ethnicity, language, physical activity, caregiver education and food insecurity. In the near future we will begin to screen for transportation and housing needs as well.

Our aim is to identify those patients at higher risk, connect them to existing networks and identify additional areas for collaboration that can assist in connecting these patients with resources to help them prepare for and respond to climate related events that could lead to or exacerbate existing health issues.

Community outreach and partnership with community organizations

Stanford Medicine has a variety of existing partnerships that serve to address health equity and improve the health of the populations we serve. Stanford Medicine entities, through their respective Community Benefit organizations, have established partnerships with community organizations to address health related social and environmental needs in the areas of economic stability, housing and homelessness, health care access and delivery, food insecurity, obesity, maternal and child health, and behavioral and mental health. These same organizations offer additional potential opportunity for climate event preparation and support.

Stanford Medicine Children's Health:

- **Bay Area Women's Sports Initiative (BAWSI):** Provides free after school sports programs for girls in under-resourced communities.

- **The Health Trust:** Invests in organizations, programs, and projects that seek to address health inequality, prioritizing deeply impacted communities.

- **Acknowledge Alliance:** Supports students, teachers and administrators (k-12) through resilience, social emotional wellness and academics.

- **LifeMoves:** Provides interim shelter along with food, clothing, household necessities, case management, and supportive services to help homeless families rapidly return to stable housing.

- **Sacred Heart Community Service:** Provides food and clothing services, utility assistance, and housing assistance.

- **Roots Community Health Center:** Provides primary care and preventative health services, behavioral health, and health access assistance.

- **Second Harvest of Silicon Valley:** Distributes food through a network of nearly 400 partners at more than 900 sites across Santa Clara and San Mateo Counties.

- **Adolescent Counseling Services:** Empowers youth in our community to find their way through social-emotional support and by building safe accepting communities.

Stanford Health Care:

- **Asian Americans for Community Involvement:** Supports better health outcomes through interventions supporting clinical care and social determinants of health.

- **Puente:** Increases local healthcare services, improves client linkage to services and reduces client barriers for very vulnerable and medically underserved community members in coastal San Mateo County.

- **Medical Respite Program:** Provides health care and supportive care to address the "total health" needs of homeless patients post discharge, and links to other services.

- **Ravenswood Family Health Center:** Cares for approximately 21,000 patients, mostly low income with 88% identifying as an ethnic minority. Pediatrics, family and adult medicine, women's health, dental, counseling, pharmacy, lab, imaging, chiropractic care, immunization, podiatry, social services, optometry, flu clinic.

- **Avenidas-Rode Kleiner Center:** Provides a wide range of programs, information, and services to older adults with cognitive and physical challenges.

- **Peninsula Healthcare Connection:** Serves people experiencing homelessness or exhibiting a high risk of experiencing homelessness, and provides them with comprehensive, client-oriented health and wellness services.

- **Samaritan House:** Provides services and resources to low-income and homeless San Mateo County residents in need, including families with children, seniors and individuals living with a disability, veterans and homeless adults.

Stanford Health Care Tri-Valley:

- **Axis Community Health:** Licensed Marriage and Family Therapist to service uninsured Tri-Valley residents at Axis' clinical site.

Assessment and remediation of vulnerabilities in infrastructure and operations

A critical element of our resilience planning is the processes we have in place to assess the vulnerabilities within our buildings, operations, and supporting infrastructure (such as utilities and roads). When vulnerabilities are identified, they can be integrated into short-term maintenance operations or long-term capital planning for remediation. In some cases, these vulnerabilities necessitate additional planning and coordination within Stanford Medicine and our extended healthcare partners to ensure that we can continue to provide care for our patient populations.

Buildings

As climate change intensifies, additional adaptative strategies will need to be put in place in our buildings to more effectively manage the increasing heat, humidity, and air quality challenges. Strategies should focus on enhancing thermal performance through advanced insulation and ensuring that HVAC equipment, which is designed to last for 20-30 years, is consistently being optimized to perform in the face of rising temperatures. Humidity control systems, such as dehumidifiers and improved ventilation, will become crucial for maintaining operational efficiency and ensuring optimal comfort in indoor environments. To combat deteriorating air quality due to wildfires, high-efficiency air filtration systems and airtight construction techniques will be key to ensure clean indoor environments.

Land Use

As we grow and expand operations, we must consider climate implications in our land use planning. Proposed sustainable building standards include elements of both climate resiliency and reducing the impact of our operations. Future land use resiliency plans will include further study of flooding, drought, high temperatures, wind, and wildfire on our existing land as well as proposed areas of development. Community Health Situation Analysis is a newly added process in our building development standards and helps to identify specific environmental and community vulnerabilities that should be addressed as part of new development.

Energy Systems

Our hospitals and outpatient surgical centers are equipped with emergency generators with diesel fuel storage capable of providing up to 96 hours of emergency power to support life safety and critical and essential equipment. Diesel fuel contracts are established to ensure that these emergency power systems can continue to run in the event of an extended outage. Clinic locations without emergency generators are more vulnerable to energy system disruptions, and additional risk assessment is in process to better understand the impacts of potential interruptions.

Water Sanitation

Incoming water is routinely tested for quality and includes monitoring for pH, chloramine, and temperature. Our newest hospital buildings include large water and wastewater holding tanks with backup water to sustain operations in the event of service disruption. A water rationing plan is in development for the hospitals to ensure that adjustments in operations can be implemented in the event of a disruption to water supply. Future plans may include establishing contracts with vendors for emergency water supply and wastewater collection.

Redwood City Campus Severe Weather, Flood, and Power Instability Mitigation

Significant rain events and flooding due to stormwater issues have been identified as one of the climate hazards that our Stanford Medicine Redwood City Campus must prepare for. The campus is in a flood prone area, and there have been 42 significant flood events in the area since 1951. In addition to risk from flooding, the power provided to that campus from the local utility has been unreliable, and winter storm outages have resulted in loss of power on eight (8) occasions in the last year. Patient care appointments, surgery center procedures, infusion therapy, sleep studies and imaging have had to be canceled due to these outages.

Two primary factors have been identified as contributing the flood risks in this area. One is insufficient infrastructure to convey or detain stormwater. The second is related to tidal influences and sea-level rise, which are both projected to have more significant impacts in the future.

As short-term measures to increase building resilience to flooding, utility vaults are being upgraded to increase the height of the vault walls above sea level. Conduits that run from the vaults into basement areas have been sealed to prevent water from traveling into these areas. Flood barriers have been purchased to help divert water from vulnerable areas such as the electrical rooms, elevator entrances and parking garage areas.

The mid-term projects have been submitted to Federal Emergency Management Agency (FEMA) for funding projects such as increasing

sump pump redundancy and capacity, adding flood gates to garage entries, raising elevation of stairs and ramps above flood levels, and installing check valves in sump drains. In addition to these resiliency projects, Stanford Medicine has worked on mitigation plans that can be immediately implemented. This includes better forecasting and communication for severe weather events, mitigation steps such as ensuring that storm drain outlets are clear and creating standardized flood response stages.

As part of our long-term goals, Stanford Medicine is actively collaborating with Stanford University, Redwood City, the County of San Mateo, and the State of California to make the Redwood City area more resilient to flooding. These long-term goals include, but are not limited to additional infrastructure to help channel water away from vulnerable areas, including new pump stations, flood walls, and increasing culvert size.

To address power instability issues, short-term projects are underway to expand the emergency power system. As a long-term measure, SHC is developing a campus energy master plan that will help stabilize current operations and prepare for potential campus expansion and growth. There is also a larger regional and statewide effort to work closely with the utility provider to reinforce overhead power lines to help decrease interference and disruptions due to wind.

A long-term approach to increase power stability involves moving the power lines underground.
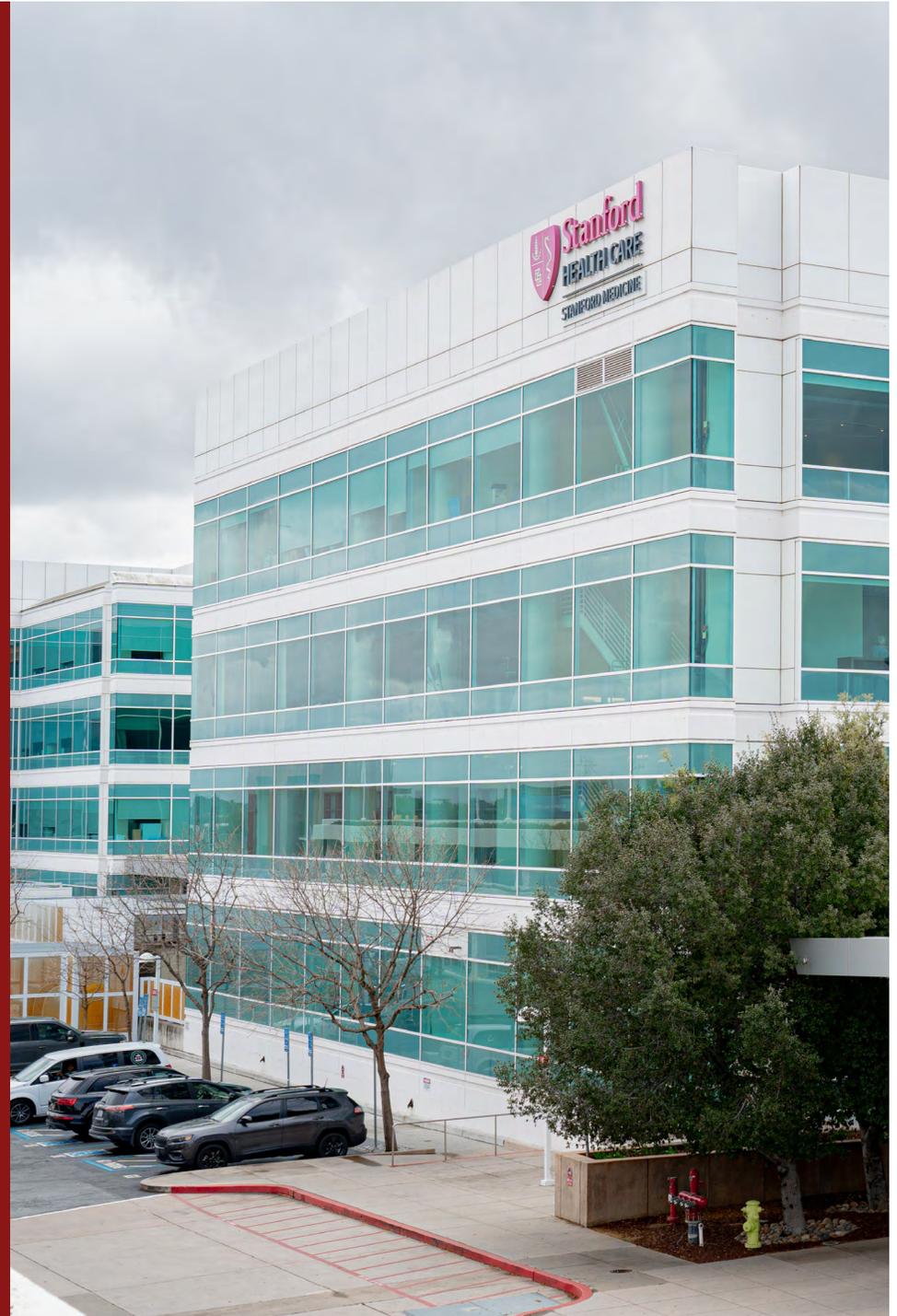
Transportation

The success of Stanford Medicine's transportation programs and infrastructure depends on collaboration with external organizations, such as public agencies, businesses, and community-based organizations. A Stanford Transportation Policy Team, consisting of representatives from Stanford Transportation, Land Use and Environmental Planning, and the Office of Government Affairs meets frequently to discuss ongoing transportation-related projects, programs, policy, and regulatory efforts that are or may become relevant to the organization. Examples of regional projects and programs include Caltrain electrification, the Cal Trans Bay Area Bike Plan update, the Metropolitan Transportation Commission Bay Area Freeways Study and the Valley Transportation Plan.

Supply Chain

To ensure resilience of our supply chain and continuous care for our patient populations, Stanford Medicine has developed a comprehensive supply chain resilience program. Our resiliency distributions center consists of a 65,000 ft^2 warehouse for storage of critical supplies. That warehouse has been equipped with backup power, redundant internet service providers, redundant phone lines, and an HVAC system that provides a positive pressure environment similar to a cleanroom to ensure supply integrity. The facility is designed so that trucks can load and unload inside the facility in the event of bad air quality or other severe weather events. Data tools provide constant enterprise wide visibility to all available supplies and their use and stock numbers. Hundreds of shortages worldwide are processed each day, and data is organized and prioritized according to risk and need. The Supply Chain resiliency group acts as a "air traffic control tower" for supply shortage risks and works with providers to offer alternate solutions, clinical work arounds, and

conservation methods when a product shortage is occurring. In addition to the resiliency center, we have developed in collaboration with Office of Emergency Management disaster response carts that include Personal Protective Equipment (90 day supply+) and critical supplies. These supplies are maintained to avoid expiration, and future plans include distributing these carts throughout our service area to help protect against disruptions that may impact our ability to get supplies to our remote facilities. Standard Operating Procedures for these carts are in development as well as plans to test their use in simulated emergency scenarios. The resiliency distribution center also maintains a 90-day supply of PPE for all Stanford Medicine staff in accordance with state mandates.

Our resilience program utilizes risk mitigation software to provide worldwide visibility 24/7 for supply disruption or interruptions. This software also serves as a storehouse for all supplier business continuity plans. The system provides automated notification when a supplier is in the pathway of a weather-related hazardous event, and this advanced notice can allow for stockpiling of critical supplies. Internal testing of critical suppliers and routes is done using this software. Stanford Medicine is leading a collaborative effort with the Healthcare Industry Resilience Collaborative (HIRC) to make this information accessible for all healthcare facilities. Climate specific risk assessments have been completed for the supply resilience warehouse and all supply transportation routes within our services areas. These assessments included sea level rise and flooding, wind, wildfire, and high heat assessment for warehouse operations specifically.

Diversity, inclusion, and health equity sit at the heart of Stanford Medicine's mission. Through its Supplier Diversity Program, Stanford Medicine seeks to uplift communities through job creation and increased wages where diverse businesses are located. Promoting supplier diversity is also an effective strategy to enhance supply chain resilience and mitigate risk and impacts associated with predictable and unprecedented disruptions, including those that are climate-related, such as wildfires, hurricanes, droughts and floods. Stanford Health Care signed the Healthcare Anchor Network's (HAN) Impact Purchasing Commitment (IPC) and has organizationally committed to increasing spend with diverse suppliers in the local community to foster healthy, equitable, and climate-resilient local economies.

Collaboration between healthcare organizations

Stanford Medicine Emergency Management teams actively participate in and have held voluntary leadership positions in a number of local, regional, and national healthcare collaborations. At the most local level, each hospital team regularly participates in its corresponding county-level healthcare coalitions in partnership with colleagues representing a variety of healthcare organizations, including skilled nursing, ambulatory, outpatient surgery, and hospitals. The Stanford Medicine teams are currently most active in the San Mateo, Santa Clara, and Alameda County coalitions.

In addition, Office of Emergency Management (OEM) leaders have previously chaired and continue to actively participate in the monthly Santa Clara County Hospital Emergency Preparedness Partnership (SCCHEPP) Committee, inclusive of hospital emergency managers, Public Health, Emergency Medical Services, and representatives from the California Hospital Association (CHA) and the Hospital Council.

Sharing the academic medical center's drive for exploration and innovation, the Emergency Management teams – including their physician medical directors – also participate in several national committees to advance the field including:

- Top Academic Medical Center Emergency Management Consortium
- Emergency Management Advisory Committee (EMAC)
- Hospital Incident Command System National Advisory Committee (HICS NAC)
- Western Regional Alliance for Pediatric Emergency Management (WRAP-EM)
- Maternal Infant Disaster Preparedness Collaborative

The teams also engage in a number of partnerships with local responders and Stanford University including:

- City of Palo Alto Citizen Corps Council
- Silicon Valley Homeland Security Coordination Group (SV-HSCG)
- Stanford University / School of Medicine / Stanford Health Care Emergency Management Collaborative

Our transfer centers work collaboratively on a daily basis with other area hospitals to help place patients who need specialized care or where space is not available to provide treatment for those patients. This network has been utilized in wildfire events, local patient surge events, and in situations where local emergencies have impacted access to another regional hospital. This same collaboration can be utilized when our health system is impacted and needs to find care for our patient populations.

Mitigating our Impact

In addition to preparing for the impacts of future climate events, Stanford Medicine is committed to reducing our own impact on climate. As a signatory to the U.S. Department of Health and Human Services Climate Pledge, we have committed to transparently reducing our operational Green House Gas (GHG) emissions 50% by 2030 and achieving net zero emissions by 2050. Our emission reduction work includes a focus on energy efficiency, with a future goal of adding more renewable energy and moving away from fossil fuels wherever possible. Highlights of our energy efficiency work include Stanford Health Care reducing its energy intensity by 9.5% over its FY2021 baseline, and Stanford Medicine Children's Health reducing its energy intensity by 13% since 2020 and reducing emissions from hospital natural gas use 31% since 2019. Anesthetic gases are also potent greenhouse gases. We have eliminated use of the most potent gas, desflurane, and are working to minimize waste in delivery of nitrous oxide. Through a strong partnership with Stanford University Transportation, we continue to build programs that will encourage our staff to move away from single occupancy vehicles in their day-to-day commute. Waste reduction is another major focus for our organization, with work focused on both source reduction as well as landfill diversion. We adopted a Sustainable Procurement Policy to help guide our own internal purchasing decisions and set expectations for our suppliers. We also developed sustainable building standards to help guide future development and renovation, minimizing our environmental impact and integrating aspects of resilience into these projects. Through our sustainability governance structure, we can continue to monitor projects and opportunities across the organization to ensure that we are minimizing our impact while focusing on maintaining our excellence in patient care.

Moving Forward & Next Steps

In our ongoing commitment to supporting the communities we serve, we have identified three principal areas to continue integrating climate resilience into our planning and operations:

- In our **Emergency Preparedness planning**, we will continue to utilize a prospective risk assessment integrating a longer-term climate change lens during our annual Hazard Vulnerability Analysis process. This will help inform our overall preparedness activities and prioritize resources for additional planning.

- As part of our ongoing **community partnership and outreach** processes, we will continue to integrate climate and environment in our Community Health Needs Assessment process, develop communication pathways to help inform our patients on how to better prepare for climate related events, and help connect our vulnerable patient populations to additional resources that can assist them during climate events. With the integration of our Health Situation Analyses into building standards implementation, we can identify the set of interventions most likely to provide the greatest co-benefits within our communities.

- For our **buildings and infrastructure**, we will be exploring additional tools and resources to help better understand the vulnerabilities within our facilities and utility infrastructure. These same considerations will be integrated into future facility siting and planning so that we can better understand and mitigate risks related to climate events.

In addition to the specific actions noted above, we are looking to strengthen our community outreach to include feedback from our community members around the elements of this plan. This may be part of existing outreach channels, city and county climate resilience planning efforts, and additional specific feedback workshops or efforts to gather input from the community.

As part of our overall commitment to health and well-being of the patients and communities we serve, Stanford Medicine is working to integrate a climate lens into our strategic planning, operational objectives, and day-to-day operations. With the support of our internal teams across the organization, we will re-evaluate and update this plan on an annual basis to ensure that the needs of our organization and community are visible and integrated into our strategy.

Climate Action Plan Contributors

Our inaugural Climate Action Plan development process was a coordinated effort across Stanford Medicine Children's Health, Stanford Health Care and Stanford Health Care-Tri Valley. We would like to acknowledge the subject matter experts who contributed to the material within this plan.

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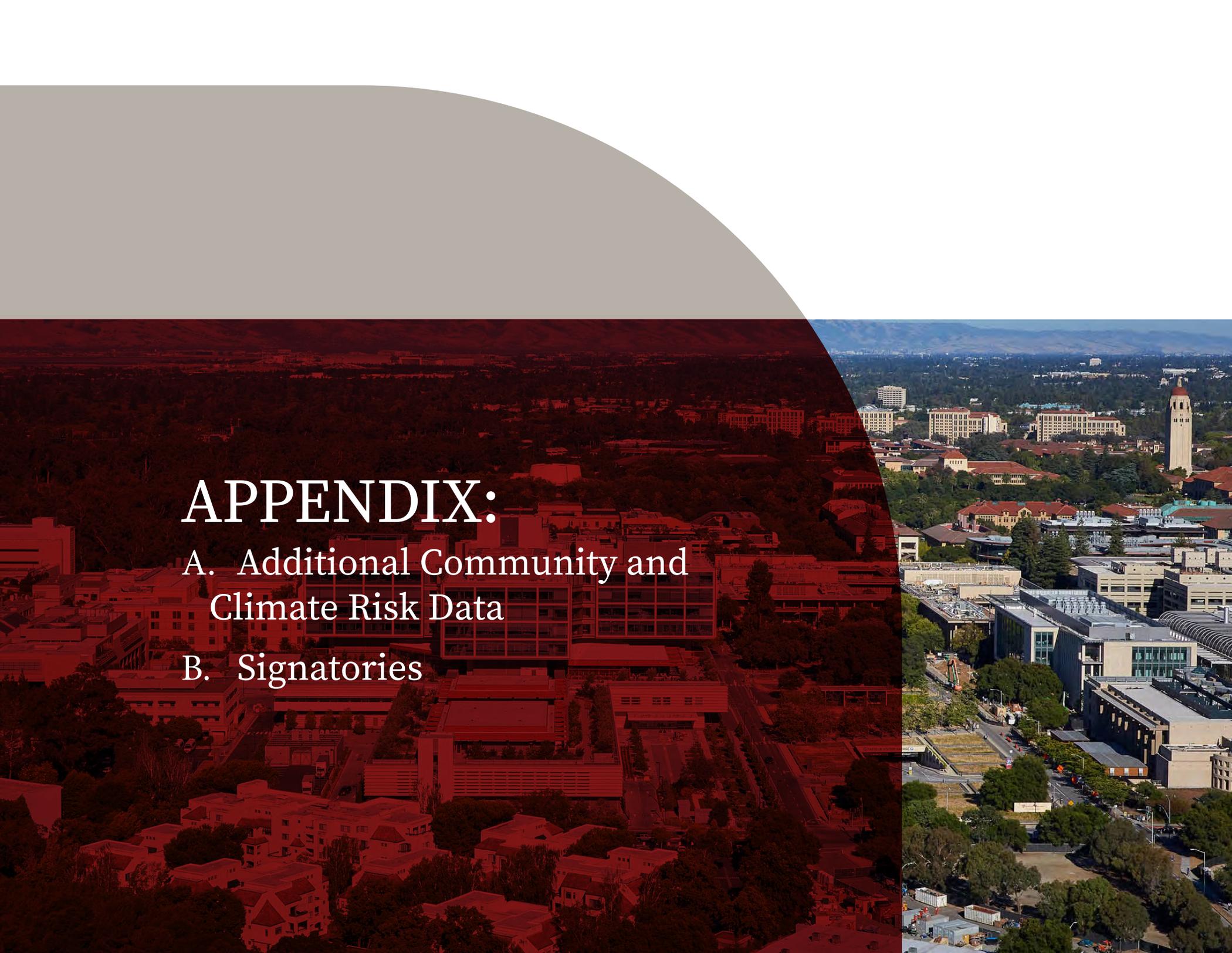
APPENDIX:

A. Additional Community and Climate Risk Data
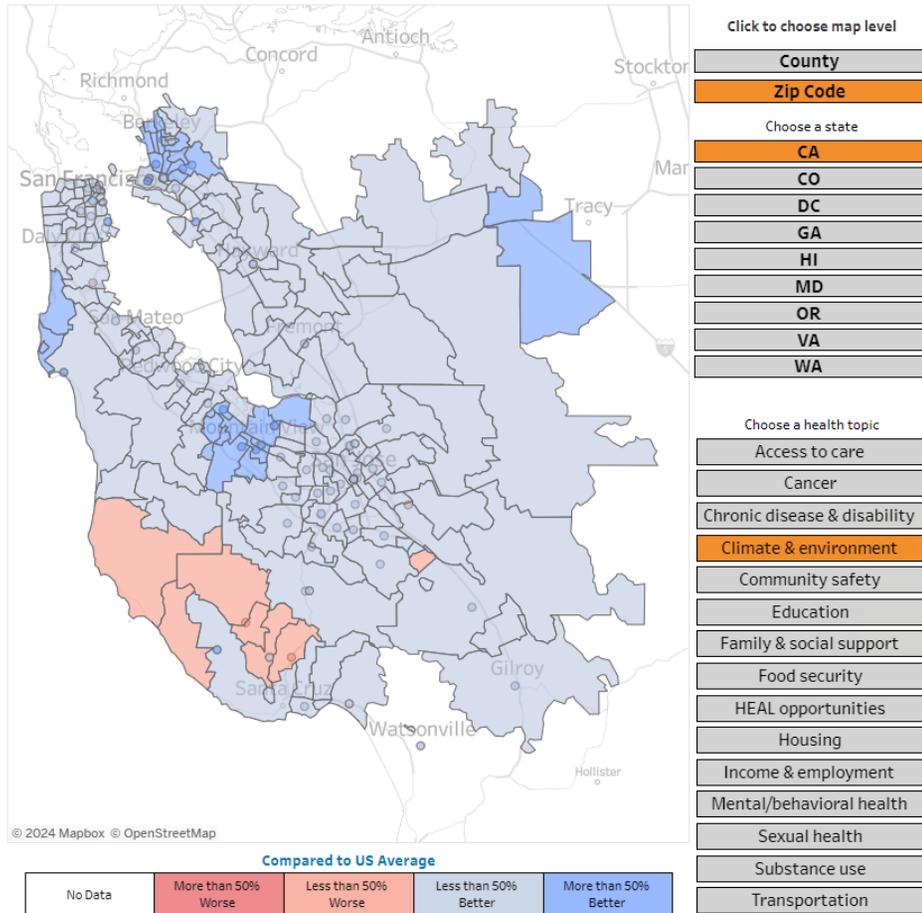
B. Signatories

Kaiser Permanente Tool:
Community Risk Disparities by Geographic Region

Heat Wave

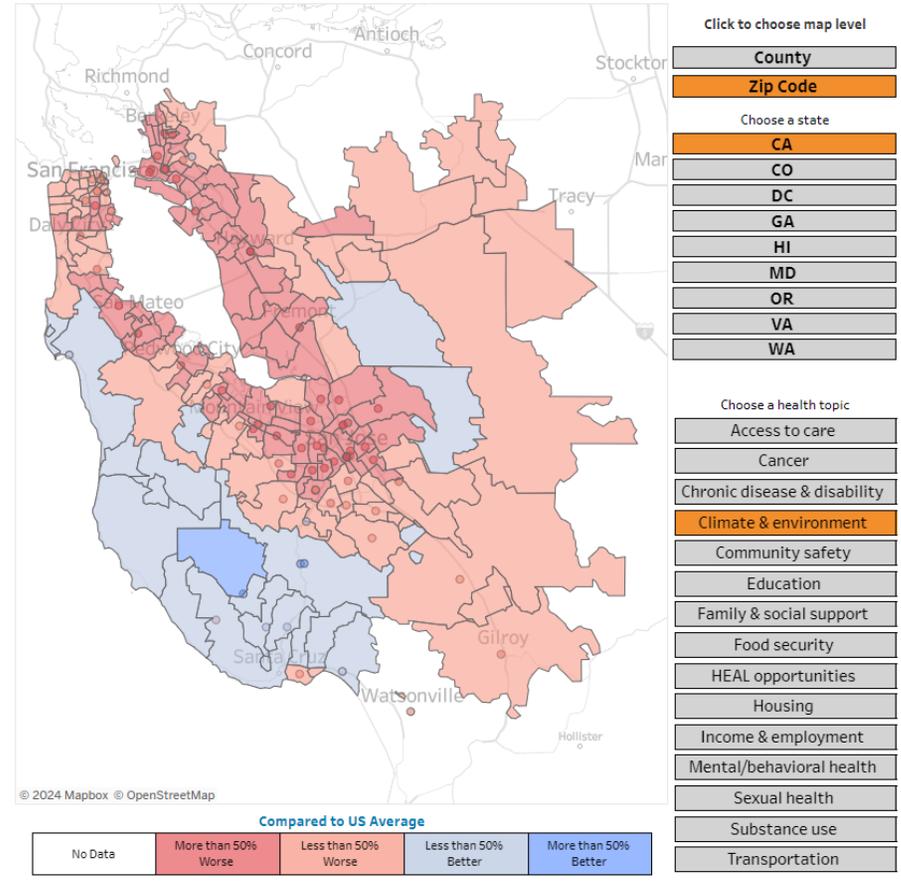**Heat wave risk:** How do communities in **California** compare?

County : Alameda, San Francisco, San Mateo and 2 more

Air Pollution

Air pollution: PM2.5 concentration: How do communities in **California** compare?

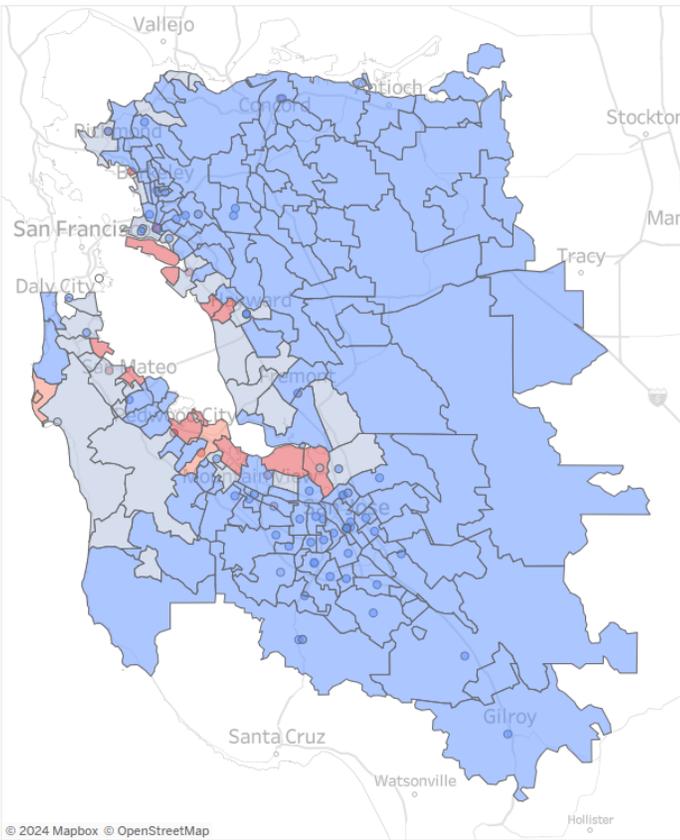County : Alameda, San Francisco, San Mateo and 2 more

Kaiser Permanente Tool:
Community Risk Disparities by Geographic Region

Coastal Flooding

River Flooding

Kaiser Permanente Tool:
Community Risk Disparities by Geographic Region

Drought Risk

Drought risk: How do communities in **California** compare?

County : **Alameda, San Francisco, San Mateo and 2 more**

Click to choose map level

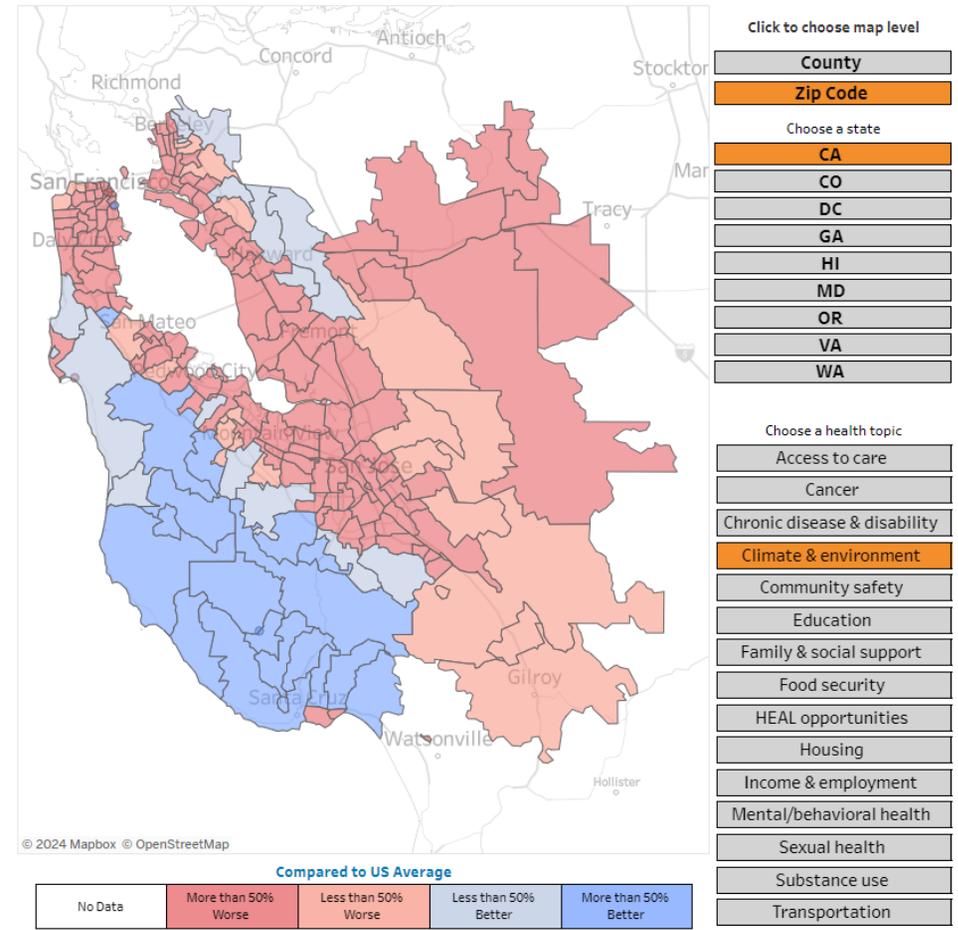| County |
|--------|
| **Zip Code** |

Choose a state

CA
CO
DC
GA
HI
MD
OR
VA
WA

Choose a health topic

Access to care
Cancer
Chronic disease & disability
Climate & environment
Community safety
Education
Family & social support
Food security
HEAL opportunities
Housing
Income & employment
Mental/behavioral health
Sexual health
Substance use
Transportation

© 2024 Mapbox © OpenStreetMap

Compared to US Average

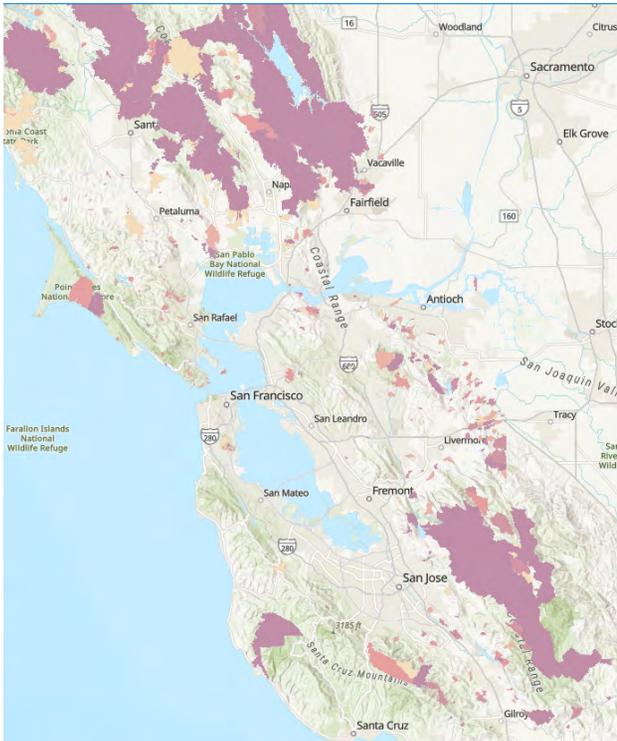| No Data | More than 50% Worse | Less than 50% Worse | Less than 50% Better | More than 50% Better |

Tree Canopy Cover

Tree canopy cover: How do communities in **California** compare?

County : **Alameda, San Francisco, San Mateo and 2 more**

Click to choose map level

County
Zip Code

Choose a state

CA
CO
DC
GA
HI
MD
OR
VA
WA

Choose a health topic

Access to care
Cancer
Chronic disease & disability
Climate & environment
Community safety
Education
Family & social support
Food security
HEAL opportunities
Housing
Income & employment
Mental/behavioral health
Sexual health
Substance use
Transportation

© 2024 Mapbox © OpenStreetMap

Compared to US Average

| No Data | More than 50% Worse | Less than 50% Worse | Less than 50% Better | More than 50% Better |

Historical Wildfire Map

The map shows the footprint of past wildfires (1950-2022) greater than 10 acres. Wildfire perimeter data includes general statistics for the fire, including the name and associated dates. Some areas may have multiple historic wildfires. Source Link (arcgis.com)
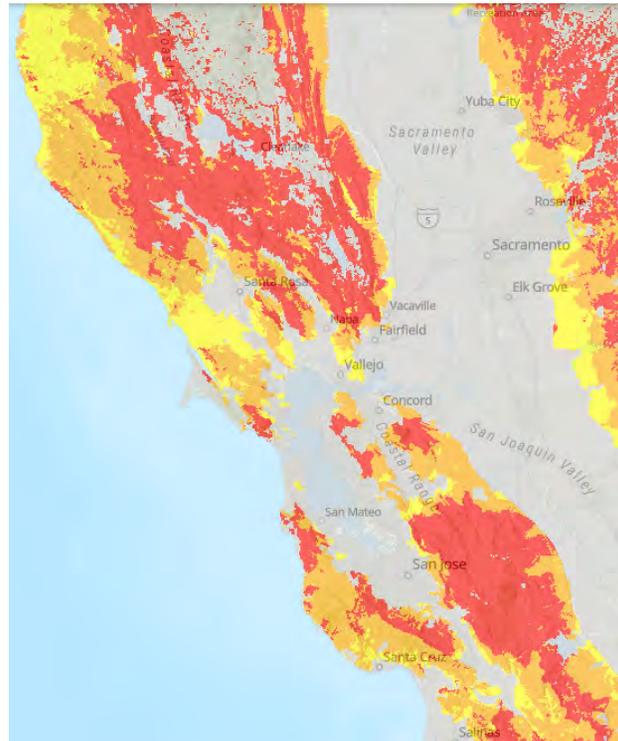
Fire Hazard Severity Zone

This map is based on CAL FIRE's assessment of significant wildfire hazards within the region. If you click on an area, it will display who is responsible for that area – the state, or local jurisdiction. Only very high severity zones are shown inside local jurisdictions; high and moderate severity zones are not mapped within local jurisdictions. Source Link (ca.gov)
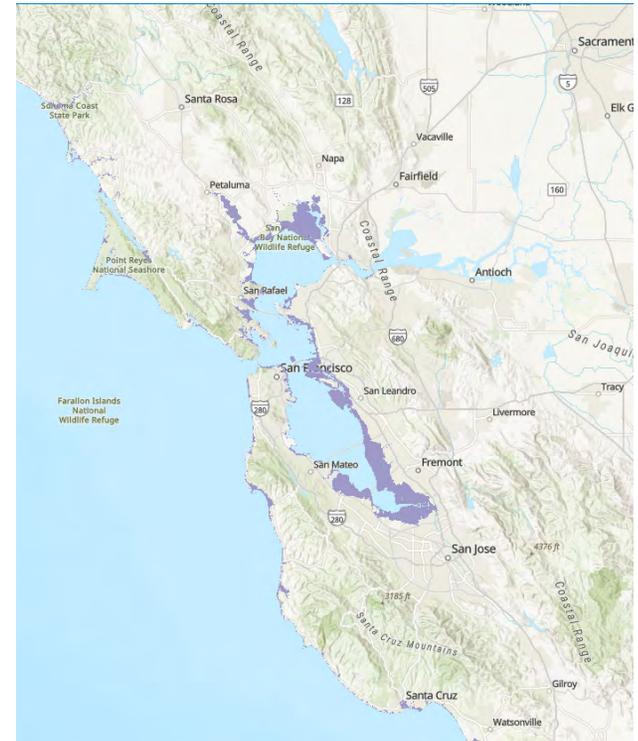

Tsunami Evacuation Zone

This map shows zones that may be affected by a potential tsunami event. This data does not represent inundation from a single scenario event but is rather an ensemble of potential source events that may affect the region. As of 2022, updated data is now available for all Bay Area counties. Source Link (Updated 2022)

420-450 Broadway,
Redwood City / Stanford Health Care
Redwood City Outpatient Center

Sea Level Rise

This map is not shown on the MTC/ABAG hazard viewer because a special, more detailed web viewer already exists for sea level rise. Visit the Bay Conservation Development Commission's ART Bay Area Shoreline Flood Explorer to view sea level rise exposure.
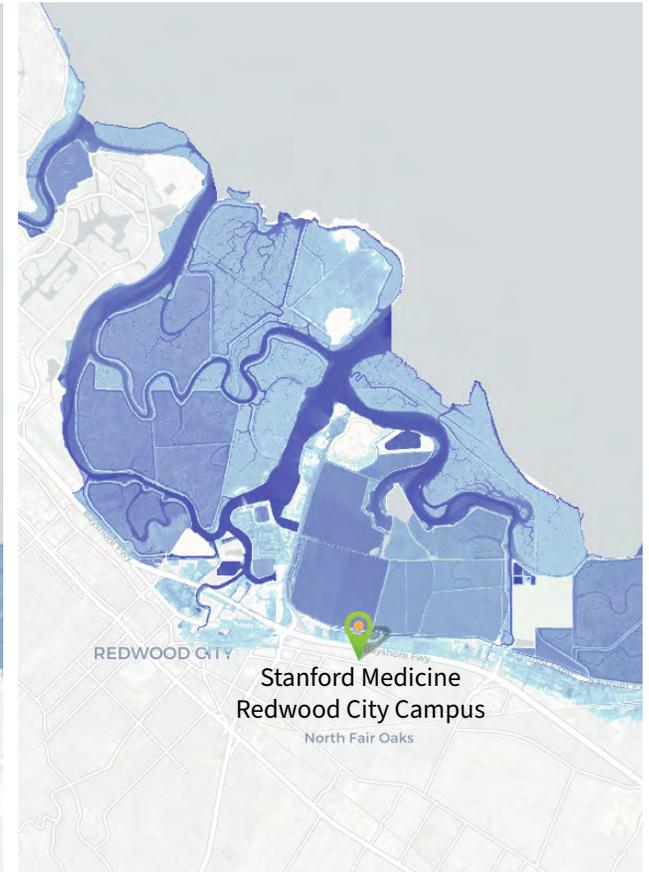*Source: [ART Bay Area Shoreline Flood Explorer](#)*
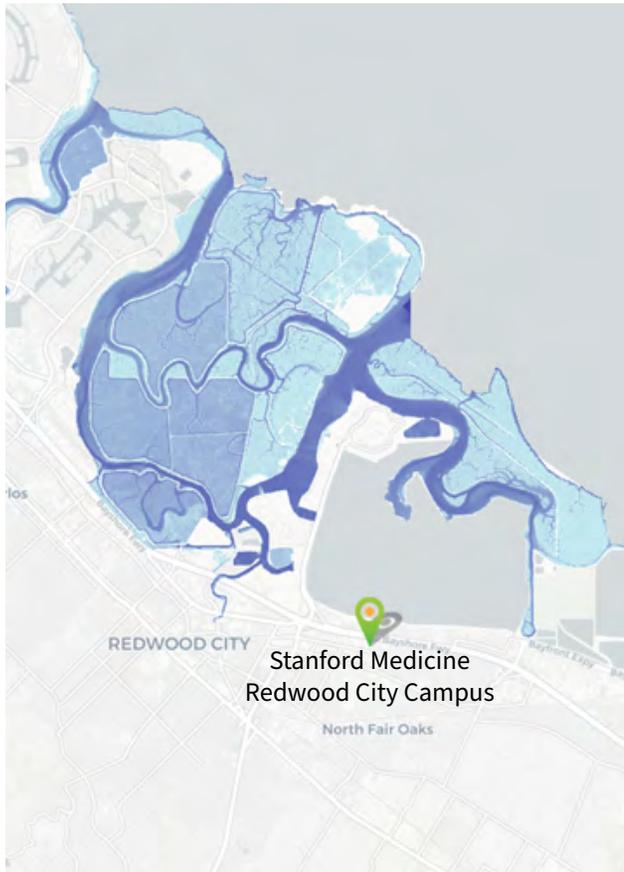
Scenario: No Sea Level Rise + King Tide = 12" Total Water Level resulting from King Tide.
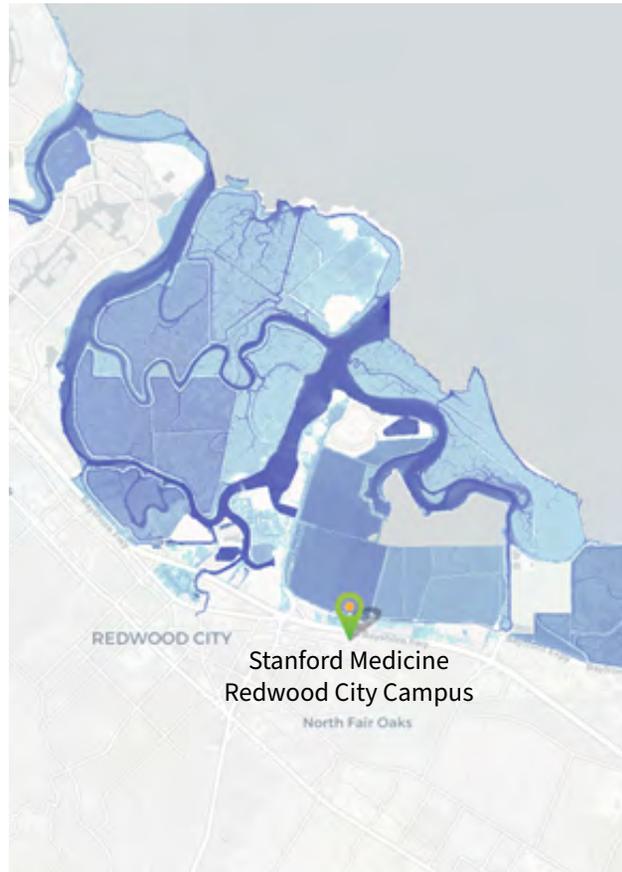
Scenario: No Sea Level Rise + 5-year storm surge over the current mean higher high water = 24" Total Water Level.

Scenario: 12" Sea Level Rise + 5-year storm surge impacts.

Signatories

We, the undersigned, commit to supporting and implementing the Climate Resilience Plan for Stanford Medicine. Recognizing the critical importance of addressing climate change and its impacts on our healthcare system, we pledge to collaborate, innovate, and lead in fostering a resilient, sustainable, and healthy future for our community.

By signing below, each entity acknowledges its role and responsibility in advancing the goals outlined in the Climate Resilience Plan and commits to ongoing efforts to enhance the resilience of our healthcare infrastructure and community.
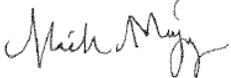
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