

Esri News

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Envisioning a Community of Health, Hope, and Purpose

Civic leaders from Washington, DC, to California face a worsening health crisis publicized by the White House but manifested locally—one spotlighted by a growing epidemic of preventable health conditions linked to how we build our cities. Here's how San Bernardino, California, is facing the problem, aided by GIS.

San Bernardino, the 99th largest city in the United States with a population of 220,000, is ground zero in the battle for improving public health in California. In recent times, San Bernardino has been challenged with tackling high levels of unemployment, violent crime, lack of parks, poor food options, and air pollution. These issues have contributed in part to poor health markers that rival or exceed many other communities in California. They have also

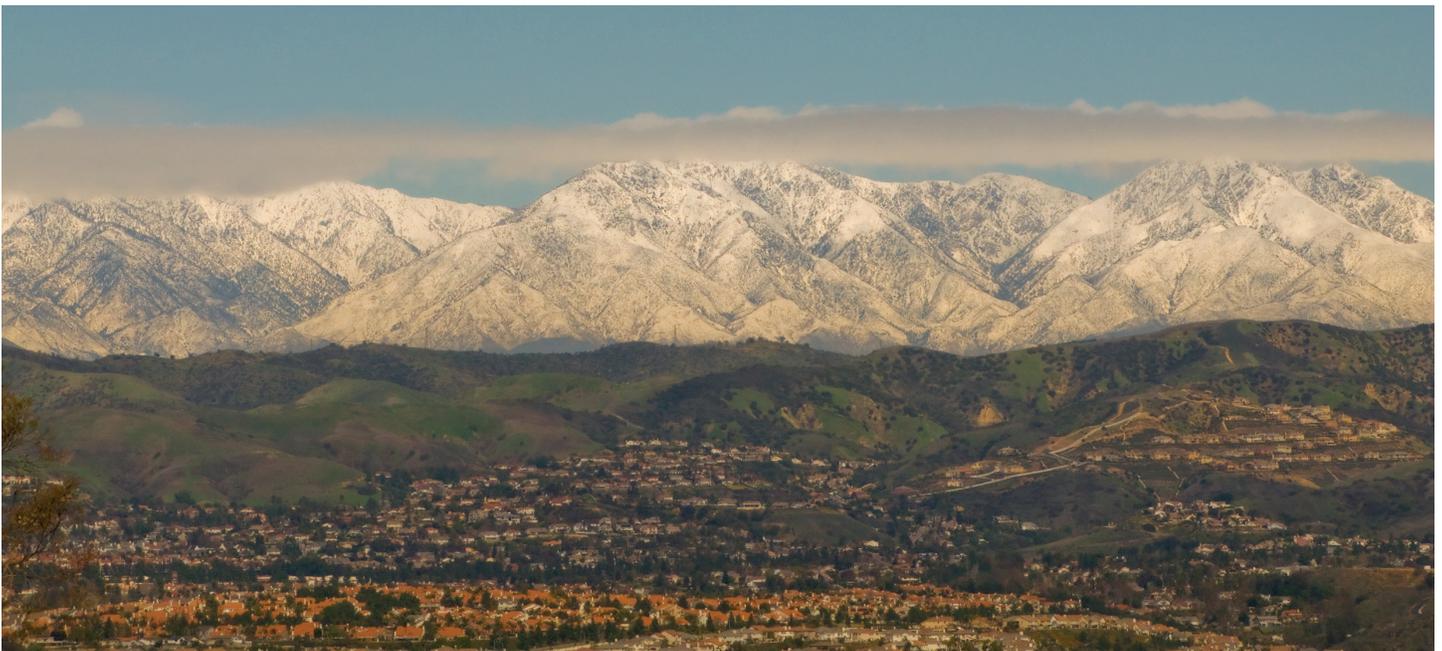
“We knew there were pressing health conditions facing the city [of San Bernardino]. And we suspected that the environment was a strong contributing factor. But the data needed to be connected in a coherent and compelling manner.”

Mark Hoffman, Senior Planner, The Planning Center|DC&E

led to growing efforts among civic leaders to address underlying social and physical determinants of health.

The challenge is daunting. Mortality rates in San Bernardino far exceed those in other cities in San Bernardino County and the state of California. The average age of death in San Bernardino is 65 years, fully 8 years younger than the average of 73 in California. Preventable disease and injury are the key

culprits. Compared to statewide averages, the city's heart disease rate is 70 percent higher, lung disease is 90 percent higher, diabetes is 100 percent higher, and homicide is 150 percent higher. Surveys of San Bernardino school-age children also reveal predictive markers of poor health: a large percentage of overweight students and inferior performance on physical fitness tests.



Although lifestyle choices and socio-economic factors influence health outcomes, equally important is the quality of the environment—in other words, how we build our cities contributes to the problem, according to Mark Hoffman, senior planner for The Planning Center|DC&E, an Orange County, California-based urban planning and environmental firm that recently completed a study of San Bernardino’s health issues using Esri ArcGIS.

“We heard complaints of violent crime, lack of healthy food, liquor stores, and not enough parks. Yet the larger question was whether the poor health outcomes among city residents were related to the quality of the built environment in San Bernardino,” said Hoffman, principal author of the study, City of San Bernardino Environmental Scan: A Model for Building Communities That Support Healthy Eating and Active Living.

According to Hoffman, not until The Planning Center|DC&E moved these issues

out of the realm of the anecdotal and came up with measurable geospatial data was the City of San Bernardino able to correlate poor health outcomes to the quality of the city’s built environment.

“Using Esri ArcGIS allowed our team to connect the pieces, tell the story, and visually communicate in a compelling manner to decision makers,” said Hoffman. “Our goal was to present a clear and compelling portrait of San Bernardino’s challenges that could motivate civic leaders to make bold changes in policy, systems, and the environment.”

“This is the first time in San Bernardino County that a community used geographic information systems not only to map the environment but also to analyze what was contributing to the health—or lack of health—of its residents, said Angelica Baltazar, former field representative to chairwoman Josie Gonzales (San Bernardino County Board of Supervisors, Fifth District) and current health and human services industry support specialist at Esri.

New Direction Needed

San Bernardino residents, businesses, health care providers, organizations, and other stakeholders, had long known the city faced a crisis, said Hoffman. Lower quality of life and significantly increased health care costs also detracted from economic competitiveness. San Bernardino sorely needed public policies directed at the built environment and social determinants of health. These included the availability of parks, the food and alcohol environment, and violent crime.

In response to Hoffman’s study, in 2010 the San Bernardino Mayor’s Office and the Latino Health Collaborative spearheaded an innovative coalition called the Healthy San Bernardino Coalition (HSBC) with seed funding from the County of San Bernardino Healthy Communities Program. HSBC adopted a vision of San Bernardino as an active, engaged, and prosperous community with green and safe public spaces supporting healthy lifestyles.

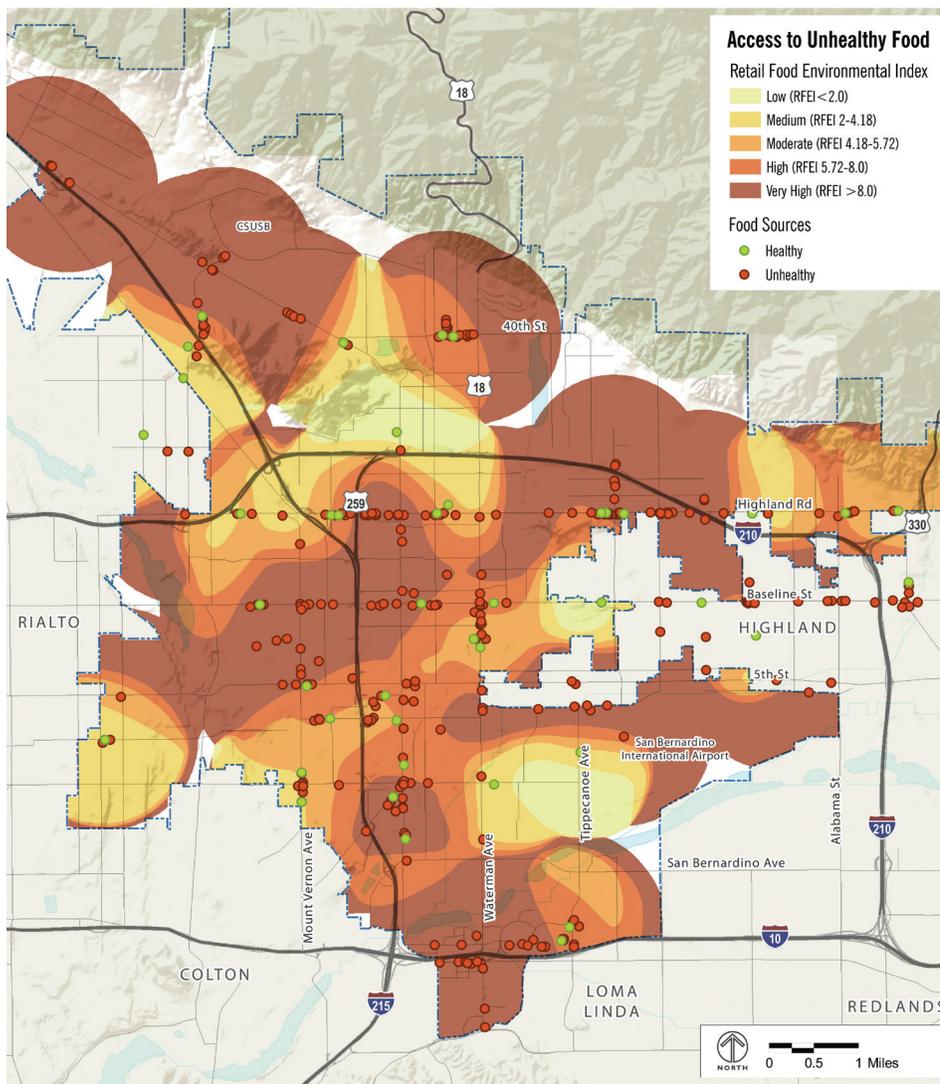
Working with Claremont, California-based professional facilitators Cynthia Luna and Max Freund, HSBC provided the impetus for a growing and cohesive coalition of community organizations, schools, faith-based groups, residents, hospitals, and other partners. Within a year, HSBC grew into a broad coalition of 75 organizations—all determined to collaborate on ways to address the environmental barriers to health and wellness in San Bernardino.

Community Environmental Scan Commissioned

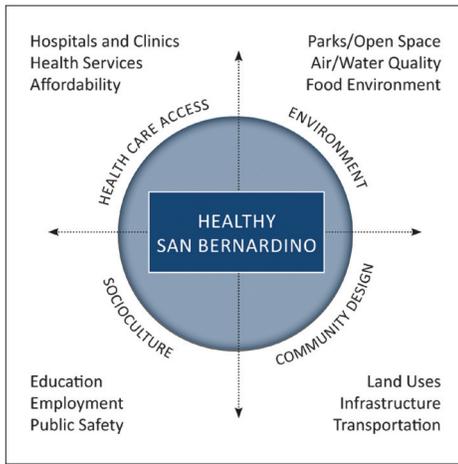
As a first order of business, HSBC commissioned the community environmental scan from The Planning Center|DC&E to document existing health conditions in San Bernardino and help define its agenda. Hoffman likens the scan to an MRI or other diagnostic tool—it examines the underlying aspects of the environment that influence the health of residents. However, the scan goes a step further and proposes innovative solutions as well.

From the beginning, said Hoffman, it was apparent how the conditions of the built and natural environment, health care access, and social factors had contributed over time to create negative health consequences. HSBC mapped out a course of action to address four key factors as part of its environmental scan.

“We asked ourselves, ‘How can we use this document, the mapping, and the charts [see sidebar] to really illustrate what the problems are, citywide?’” Hoffman recalled. “We also wanted to demonstrate in a very compelling way the issues on a neighborhood scale. If we could get a consensus about the issues and disparities the city faces, it would lend



↑ San Bernardino has nine unhealthy-food stores for every one healthy-food store. This is double the statewide average and four times higher than healthier communities.



↑ Framing a Healthy San Bernardino

more power and cohesiveness to HSBC as its members formed [its] health agenda.”

To that end, the environmental scan had three purposes:

- Help civic leaders understand the health crisis facing the city of San Bernardino
- Identify features of the city’s environment that influence health
- Propose evidence-based strategies known to improve the environment and residents’ health

In just one year, HSBC has achieved tremendous success at raising awareness in San Bernardino and effecting policy, systems, and environmental changes, including the following milestones:

- Creation of two new community gardens in underserved neighborhoods, including one dedicated to training and rehabilitating disabled veterans
- Adoption of city policies supporting community gardens, regulation of retail alcohol outlets, and other ordinances
- Speaking engagements at multiple health and planning conferences, both regional and national

Evelyn Trevino, public health coordinator for San Bernardino County’s Healthy Communities Program, stated, “The Planning Center|DC&E has demonstrated exceptional knowledge and leadership in the Southern California healthy communities movement, which exemplifies the multisectorial analysis and collaboration needed to transform communities into places where residents can be healthy and safe.”

Major Findings of the Scan

The following updated excerpt from the City of San Bernardino Environmental Scan report, authored by senior planner Mark Hoffman of The Planning Center|DC&E, summarizes key findings regarding the park, recreational, and food environments of this sprawling inland

ArcGIS in Scan—How We Did It

Esri News for Health & Human Services asked The Planning Center|DC&E to explain the basic techniques employed in bringing ArcGIS into the City of San Bernardino Environmental Scan project. GIS analyst Robert Mazur and cartographer Kim Herkewitz collaborated on the effort and discuss mapping park acres per 1,000 people:

The idea of calculating park acres per unit of population is a well-established method for measuring the adequacy and availability of parks in a community. The

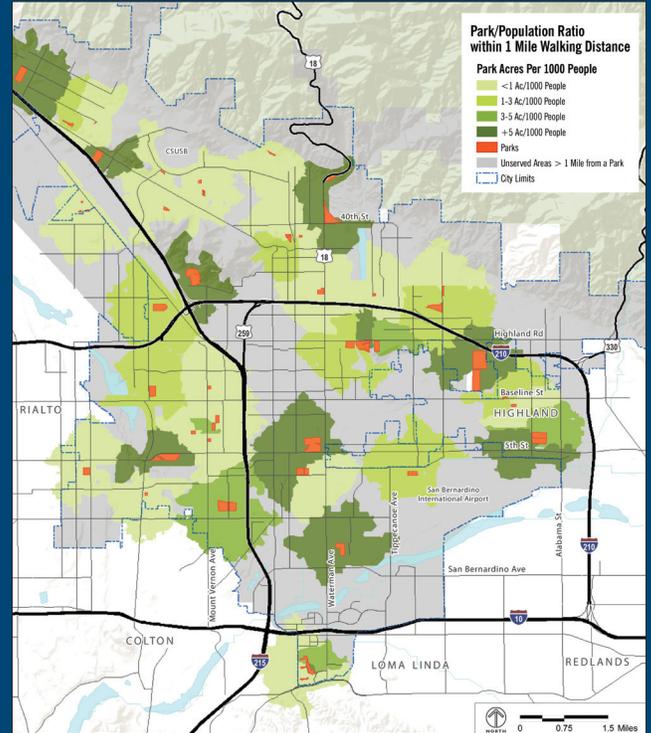
original park ratio methodology was derived from early studies of the National Recreation and Parks Association [NRPA] as refined by communities across the country.

Certainly, it is a simple exercise to calculate park acres per 1,000 people for a city as a whole, but showing which neighborhoods are underserved is another story. Mapping this population-to-park-acres ratio is most appropriate for communities with good park coverage (every resident is at least one to two miles from a park). For communities with poor park coverage, a more generalized analysis may suffice.

The mapping process requires detailed park area boundaries and acreage calculations. Having this data is the key to using GIS analysis to clearly illustrate health issues that can inform and drive policy, systems, and environmental change. ArcGIS Network Analyst and ArcGIS for Desktop Advanced tools are used to run detailed analysis and calculations to obtain park-acres-per-1,000-people values for any given location within the study area. In addition to the park’s polygon database, a detailed road/walking network and census block population data are needed.

Network Analyst is used to create driving/walking distance buffers around each park, and the park acreage values are migrated to each buffer. Typically, the buffer distance values vary based on park size, purpose, and available recreational amenities. For instance, community parks that draw visitors from a larger area have a larger buffer than pocket parks serving smaller areas. Once created, buffers are intersected using the ArcGIS Union tool, and acreage values are summed for overlap areas. This creates a park access analysis area showing total park acres available from any given location within a community. Areas outside the buffers are considered unserved.

Once these steps are complete, the park access analysis area is intersected with census block population, and a dissolve is run to sum total population with specific areas. There are multiple steps in this process, but the end result paints a comprehensive picture of park access for any given location within the study area.



↑ San Bernardino Park Availability Map

city. All the mapping data was obtained and/or analyzed with the aid of Esri geospatial technology (see sidebar). Future phases of this report will include topics such as public safety, transportation access, and air and water quality.

Park and Recreation Environment

Residents living at the base of the San Bernardino Mountains have access to broad regional park and open space amenities. Yet within urban parts of San Bernardino, the experience is altogether different. San Bernardino's system of about 40 parks provides about 447 usable acres of parkland, or 2.2 acres per 1,000 residents. However, this is less than half the city's standard of 5 acres per 1,000 residents and below the minimum 3-acre standard in California law. Meeting the state standard will require 185 additional acres of parkland. Because of the current shortage of parks, 8 in 10 residents do not have access to 3 acres of parkland within walking distance (1 mile).

Access to Bike Routes

San Bernardino has one of the smallest numbers of linear miles of bicycle trails in the county. The city's network encompasses 80 miles of planned bicycle routes, yet only 10 percent of the routes are built. Although walking can be an alternative to bicycling along the streets, many neighborhoods either

have no sidewalks or the sidewalks are in need of substantial repairs, rehabilitation, or replacement.

Retail Food Environment

San Bernardino's retail food environment has long been a source of concern. Although home to many fast-food eateries, the city lacks complementary grocery stores, produce markets, and so forth. With nine unhealthy-food outlets (e.g., convenience stores, fast food) for each full-service grocery or other healthy-food outlet, San Bernardino has one of the most unhealthy food environments in California. This ratio is conservative; it does not include the city's many donut stores, gas stations, and liquor stores. Still, this is double the statewide average and four times worse than healthier communities.

Forging a Health Agenda

The Environmental Scan documents the answer to a simple yet profound question—Does San Bernardino's environment affect the health of the community? The answer is a resounding yes.

This study found that the city's mortality rates for heart disease, diabetes, liver disease, and other preventable diseases are significantly higher than those for the county and the state.

HSBC is actively working with the San

Bernardino Mayor's Office through its policy subcommittee to change policies, systems, and the environment to improve health. Five principles for action guide this effort:

1. Pursue evidence-based strategies. HSBC is addressing all sectors—parks and recreation, active transportation, food environment, and air and water quality—with evidence-based strategies to achieve environmental change.
2. Prioritize initiatives. HSBC is targeting administrative and financial resources to prioritize initiatives consistent with its vision and make the necessary long-term investments to achieve desired change.
3. Advance health equity. HSBC is focusing on improving the health of all residents. This may require reducing health disparities in some neighborhoods, while in other cases it will involve improving the health of everyone.
4. Focus on policy change. To ensure maximum impact, HSBC is focusing on changing system-wide policies that drive local decisions and priorities wherever possible to affect the greatest number of people.
5. Maximize collaboration. HSBC is continuing to collaborate with residents, business leaders, and other stakeholders to collectively solve the challenges facing the San Bernardino community.



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