Park Equity, Life Expectancy, and Power Building

Park Equity, Life Expectancy, and Power Building: Part 1

Webinar One: Park Equity and Life Expectancy Research Findings

November 18, 2020

UCLA Fielding School of Public Health
Center for Healthy Climate Solutions

PREVENTION INSTITUTE

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Webinar Series: Park Equity, Life Expectancy, and Power Building

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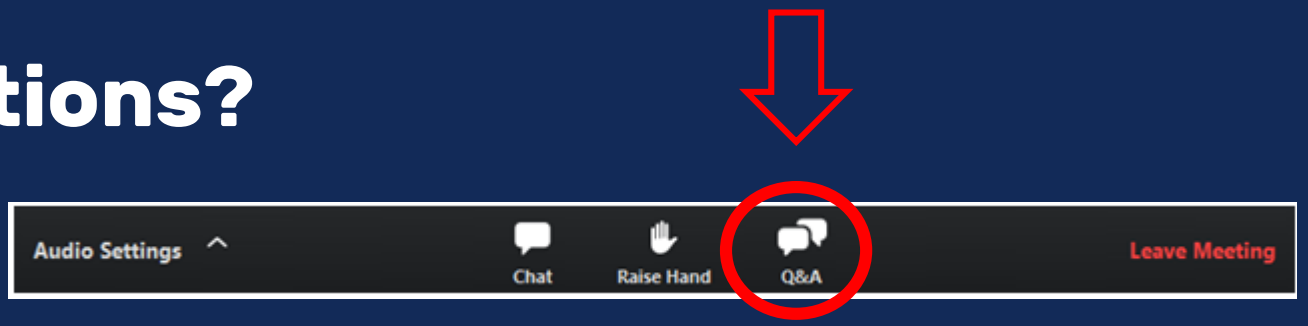
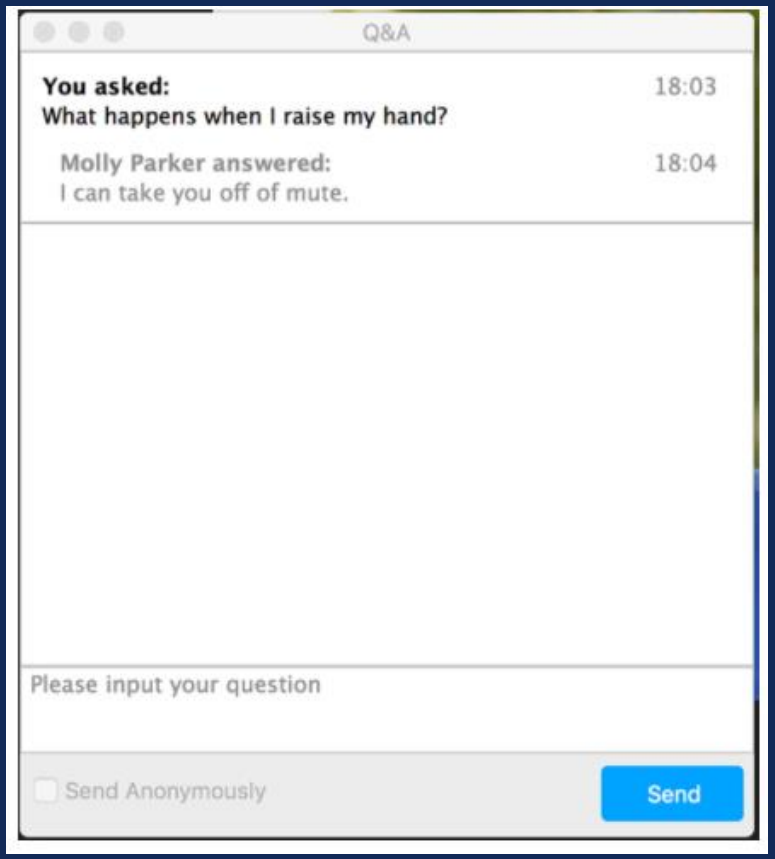
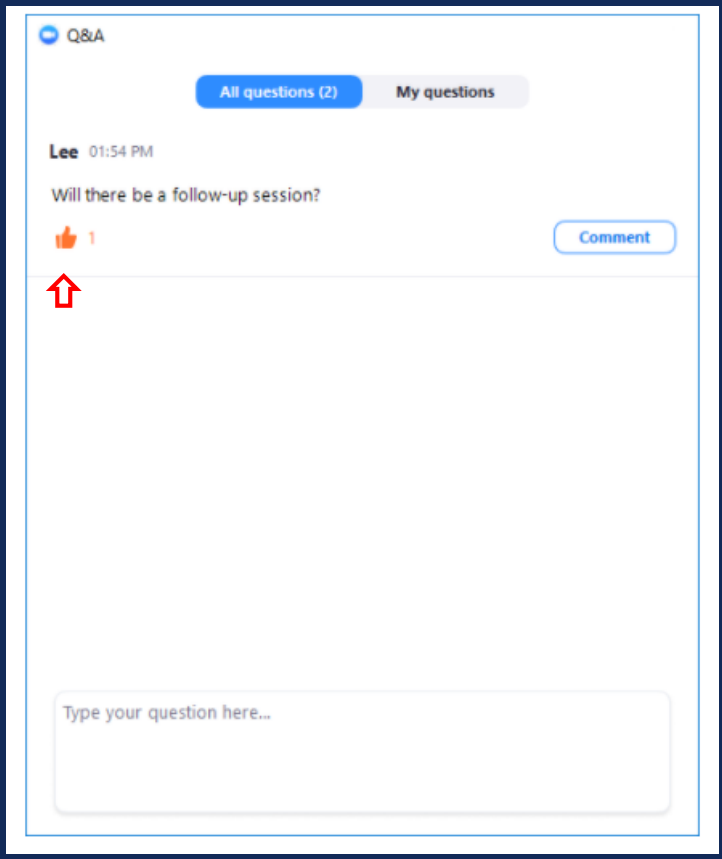
Questions?







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Creating A Healthy Environment:

The Impact of the Built Environment on Public Health

"In its broadest sense, environmental health comprises those aspects of human health, disease, and injury that are determined or influenced by factors in the environment. This includes not only the study of the direct pathological effects of various chemical, physical, and biological agents, but also the effects on health of the broad physical and social environment, which includes housing, urban development, land-use and transportation, industry, and agriculture."

–Healthy People 2010, U.S. Department of Health and Human Services '

Richard J. Jackson, MD, MPH
Chris Kochtitzky, MSP

Centers for Disease Control and Prevention

SPRAWL WATCH CLEARINGHOUSE MONOGRAPH SERIES

UCLA Fielding School of Public Health

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Powering Healthy Lives Through Parks: Life Expectancy, Parks, Green Space and Tree Canopy

UCLA Research Team:
Michael Jerrett, PhD, Professor, Department of Environmental Health Sciences, Fielding School of Public Health
Director, Center for Occupational and Environmental Health
Co-Director, Center for Healthy Climate Solutions
and
Rachel Connolly, PhD Student, Department of Environmental Health Sciences

November 18, 2020

Map of Presentation

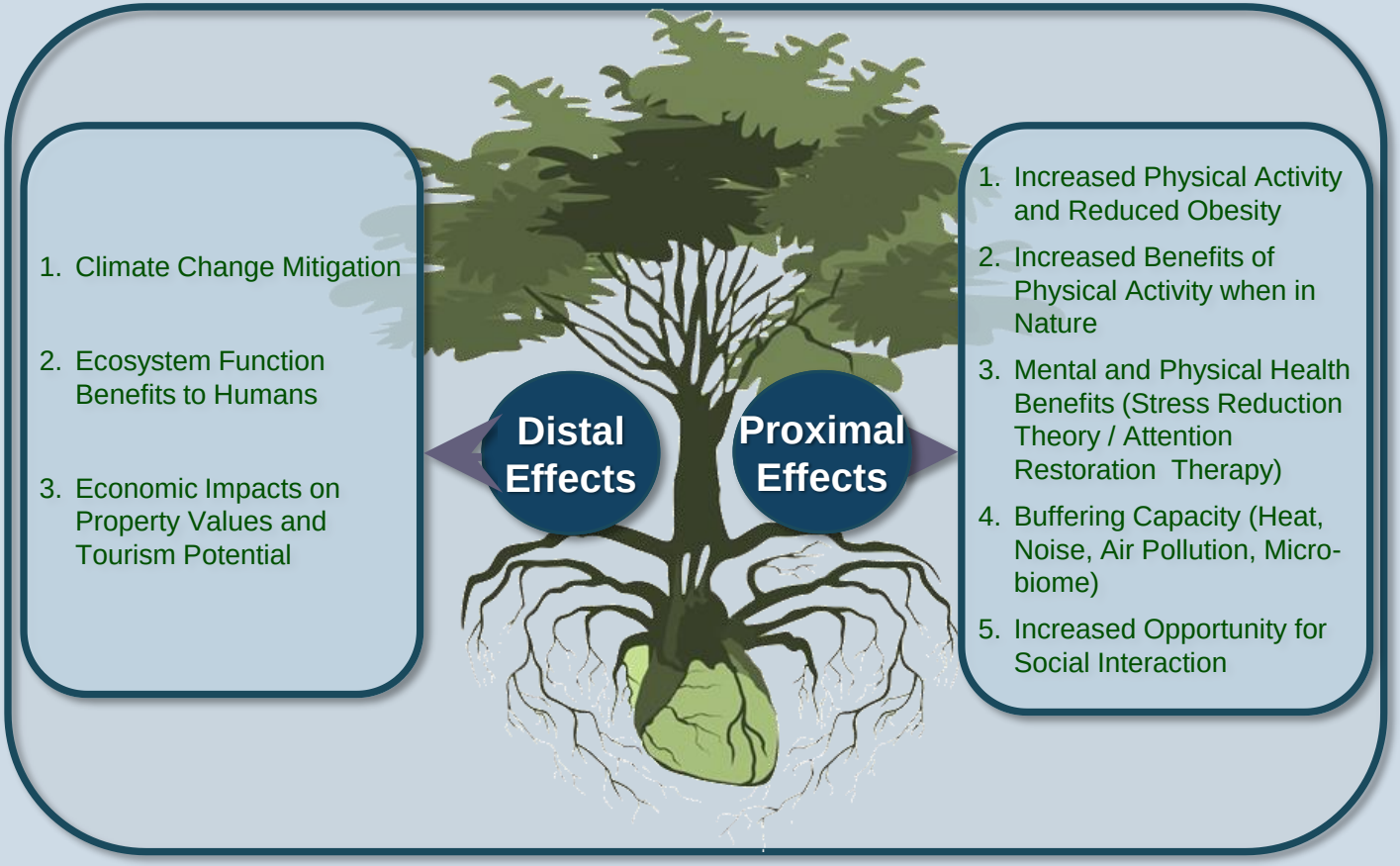
- Background & Objectives
- Methodology
- Results & General Findings
- Next Steps
- Discussion

Goals of the Project

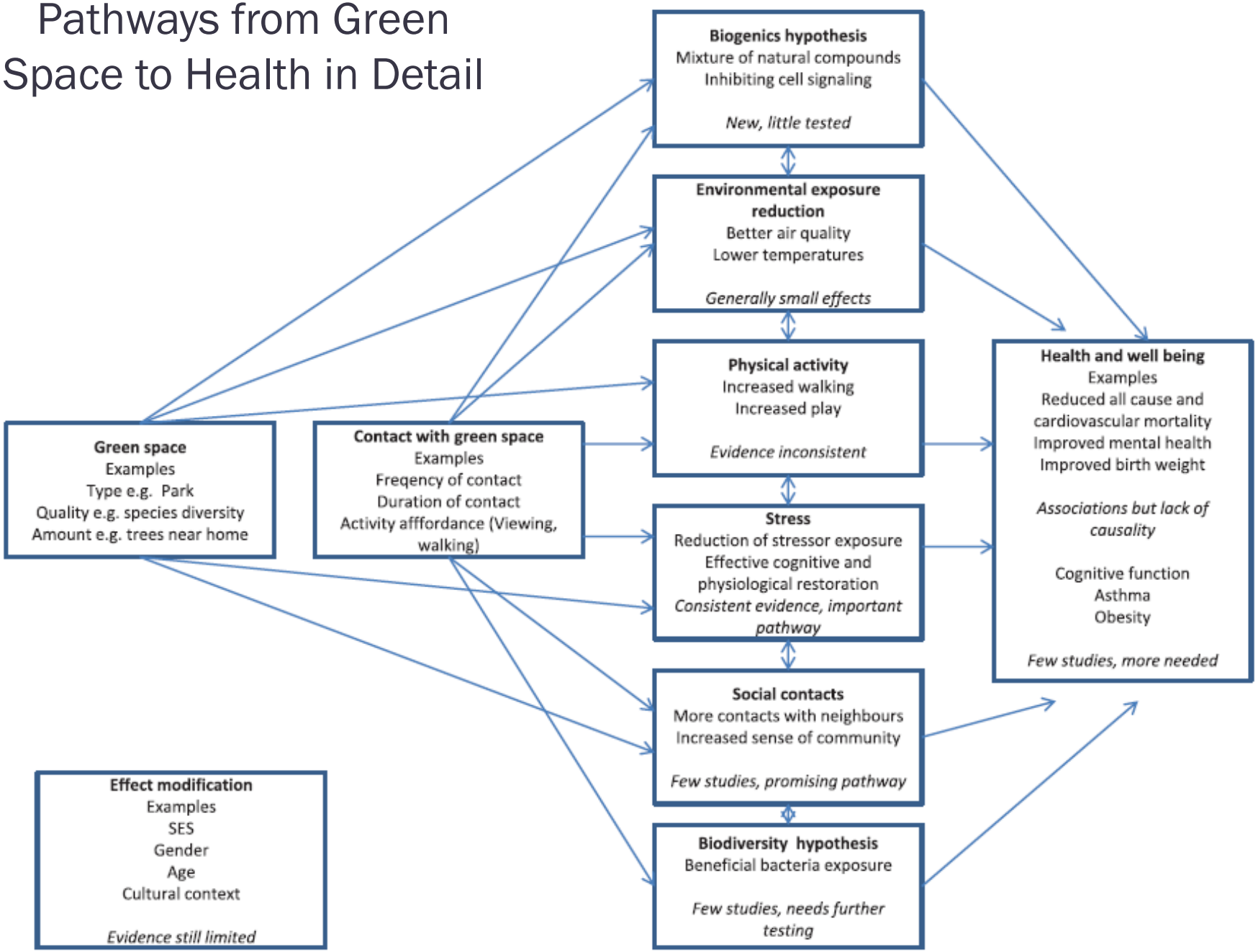
- **Overarching goal**: To assist community advocates by developing mapping tools and advocacy toolkits focused on increasing park access in underserved areas

- **Research goal**: To develop a predictive statistical model to quantify the relationship between life expectancy and access to parks, green space, and tree canopy in neighborhoods of LA county

Pathways from Green Space and Parks to Health



Pathways from Green Space to Health in Detail



Nieuwenhuijsen et al. 2017

An Increasing Number of Studies Show Various Health Effects of Exposure to Green Space

REDUCED

- Symptoms of **ADHD** (*e.g. Kuo & Taylor, 2004*)
- **Mortality** (*e.g. Villeneuve et al. 2013; Crouse et al. 2018*)
- **Cardiovascular** and **respiratory illness** (e.g. *Tamosiunas et al. 2014*)
- **Depression** (*e.g. McEachan et al. 2016; South et al. 2018)*
- **Type 2 Diabetes** *(e.g. Astell-Burt et al. 2014)*

IMPROVED

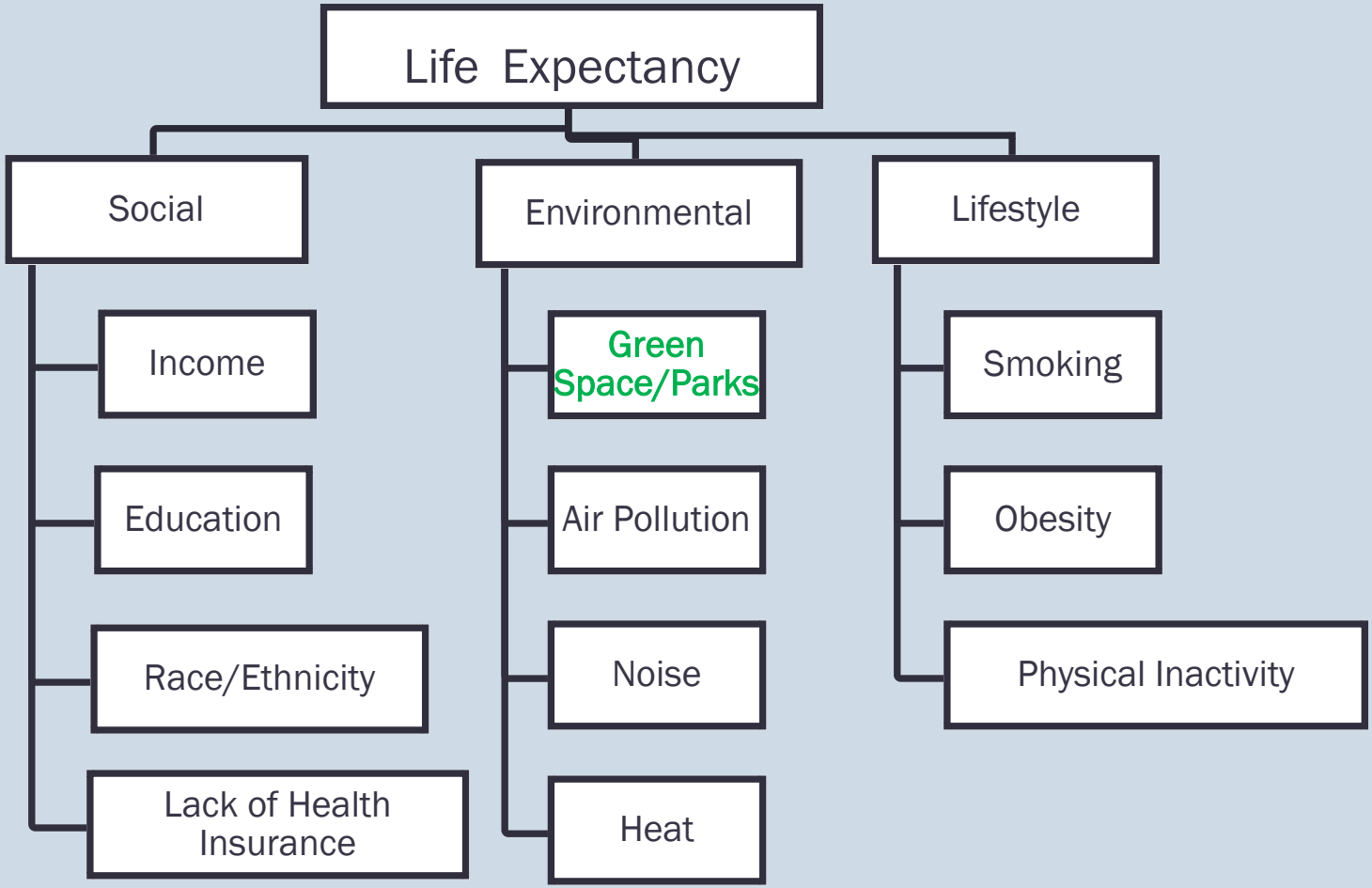
- **Pregnancy outcomes** (*e.g. Hystad et al. 2014; Dadvand et al. 2014*)
- **Wellbeing** and **happiness** *(e.g. MacKerron & Mourato, 2013)*
- **Cognitive development and brain function** *(e.g. Dadvand et al. 2015; Dadvand et al. 2016)*
- **Academic performance** *(e.g. Sivarajah 2018)*
- **Life expectancy** *(e.g., Jonker et al. 2014)*

Slide modified from Dr. M. van den Bosch

Developing the Predictive Model

- Model at the census tract level to quantify the relationship between life expectancy (LE) and access to green space, tree canopy and parks in neighborhoods of LA County
- **LE at the census tract level (outcome variable)**
- **Relevant input variables: green space, tree canopy, park access**
- Model adjusted for other factors that are known to have a relationship with health and potentially green space, tree canopy or parks, including various socioeconomic, demographic, and environmental characteristics
- Estimates the relative impact of each factor on life expectancy

Factors Influencing LE (Determinants of Health)



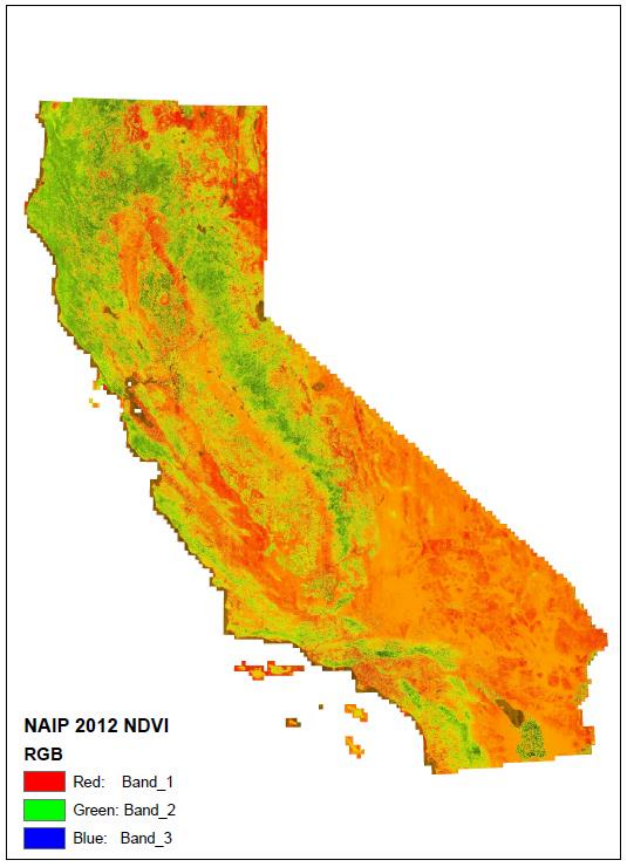
USALEEP Data (Outcome Variable)

- USALEEP = U.S. Small-area Life Expectancy Estimates Project
- **Census-tract life expectancy** at birth for the period 2010-2015
- Calculated using National Vital Statistics System mortality data and census population estimates
- **For Los Angeles County, life expectancy ranges from 68.8 – 93.3**
- This dataset is novel due to the small geographic scale – previous analyses have been done at the county level
- LE is the outcome variable for our model, meaning we are quantifying the impact green space/park access have on LE

Examples of Metrics of Green Space and Park Access

- Green Space Metrics
  - *NDVI: Normalized Difference Vegetation Index (see next slide – using satellite imagery at 0.6 m grid)*
  - *Tree Canopy developed by "Tree People" and colleagues*
- Park Access Metrics – using LA County Park Needs Assessment data & other sources
  - *Available Park Acres discounted for distance to the park*
- We developed multiple models to look at the association of several of these with life expectancy (separate models for each metric and interaction)

NDVI Greenspace Dataset



Source: National Agriculture Imagery Program (NAIP) aerial imagery

Tree Canopy

O'Neil-Dunne, Tree People and Loyola Marymount University 2019

Benefits of Using this Type of Model

- Researchers can estimate the quantitative impact that park access has on life expectancy
- Example: If a specific neighborhood has *X* acres of park area, residents are expected to live for *Y* years, how much higher would the life expectancy be with an additional acre of park area?
- Limitation: This model will not be **causal** (i.e., we cannot definitively say that parks *cause* a specific life expectancy change). However, it will be **predictive**, so we can state that we do *anticipate* life expectancy to change with higher or low green space, tree canopy, or park acres

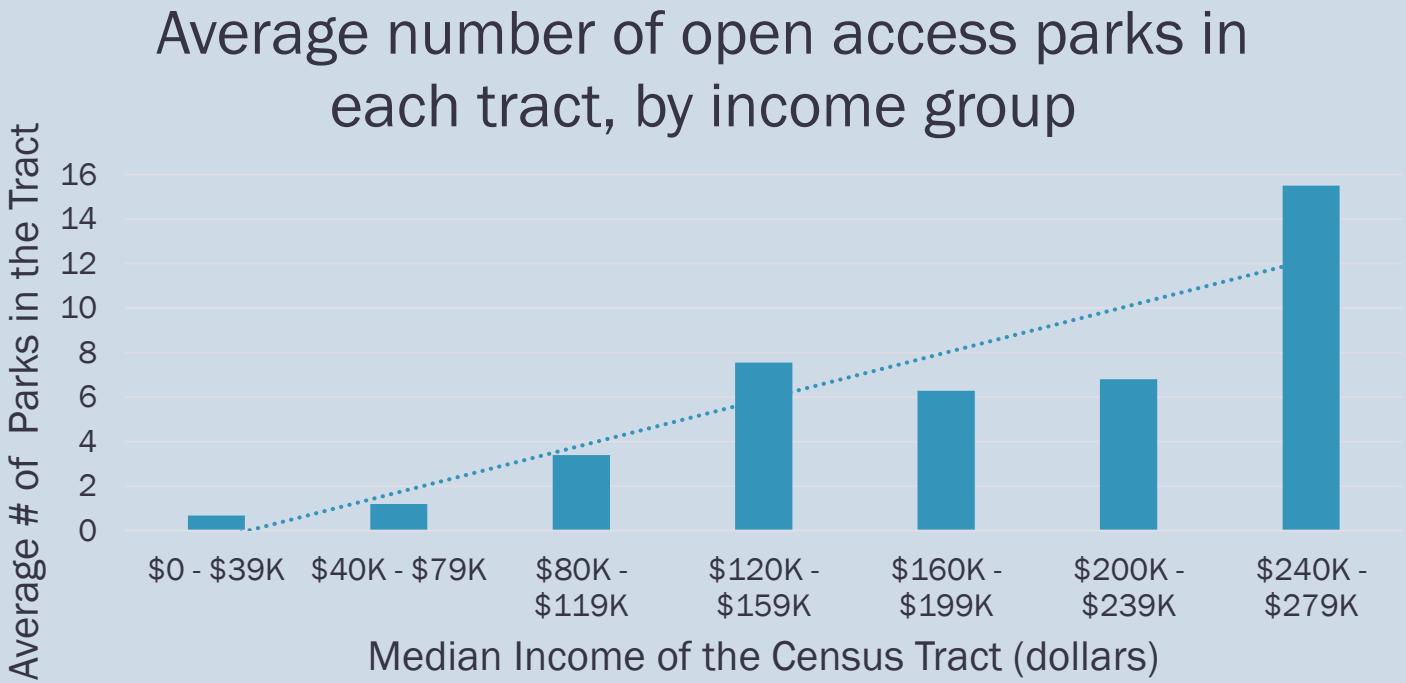
List of Potential Confounders Used

- Smoking (CDC 500-cities)
- Obesity (CDC 500-cities)
- Lack of physical activity (CDC 500-cities)
- Percent of adults ages 18-64 that are uninsured (ACS 5-year)
- Household median income (ACS 5-year)
- Education – percent of population that is a high school graduate or higher (ACS 5 yr)
- Race/ethnicity – percent of the population that is not white alone (ACS 5-year)
- Linguistic isolation – percent of limited English-speaking households (ACS 5-year)
- CDC social vulnerability index
- CalEnviroScreen 3.0 score
- $PM_{2.5}$ (Downscaler 2015)
- Ozone (Downscaler 2015)
- NO_2 (Su et al. 2020 coverage)
- Noise (USDOT)
- Heat (cooling degree days – LBNL)

Principal Component Analysis (PCA)

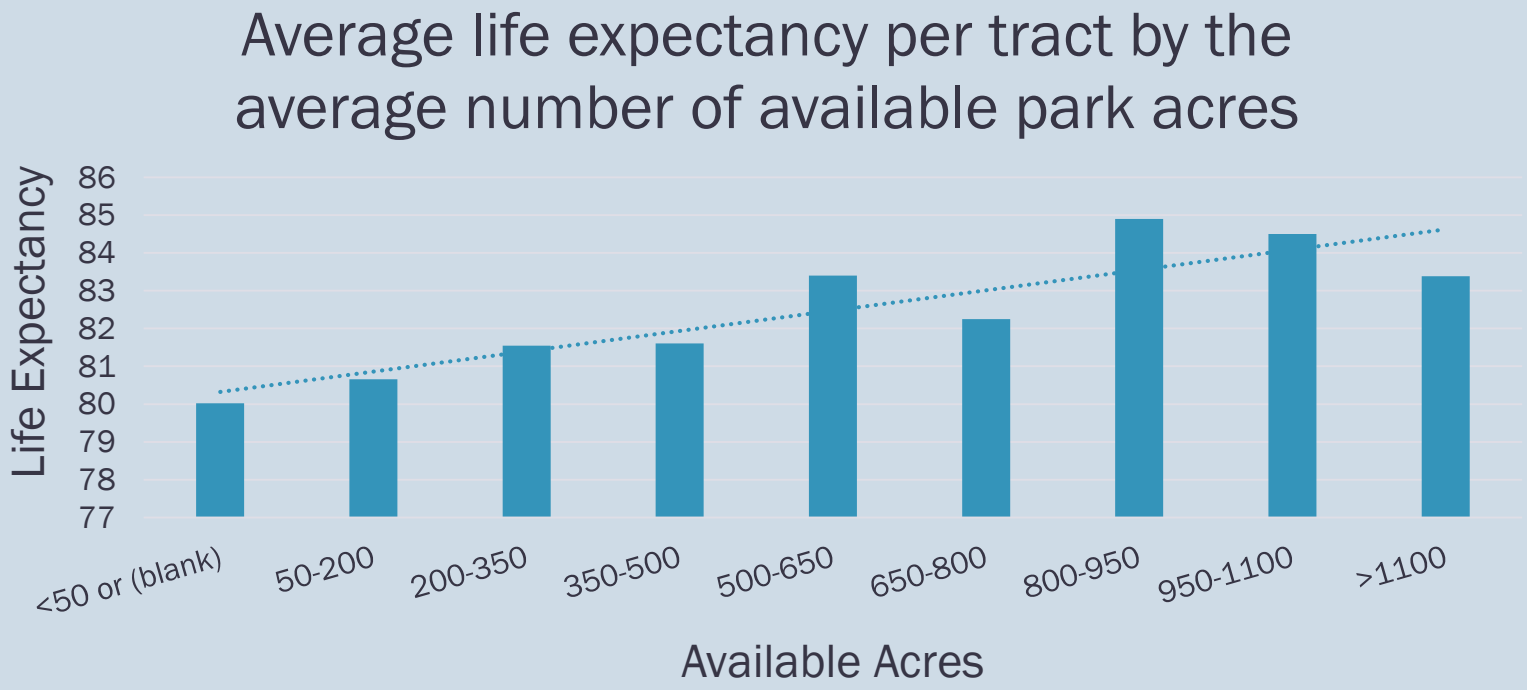
- PCA is a statistical procedure used to transform a set of highly correlated variables – meaning, they have a strong statistical relationship – into a set of uncorrelated "principal components"
  - *Example of highly correlated variables: higher smoking rates are found in tracts with lower median incomes*
  - *In our case, lifestyle and social variables are correlated with each other, and also often correlated with green space/park access variables*
- We can use predicted values for these components in our statistical model, and this strengthens the model

General Findings



Note: This doesn't indicate full parks, just having any piece of a park (designated as open access) in a tract

General Findings

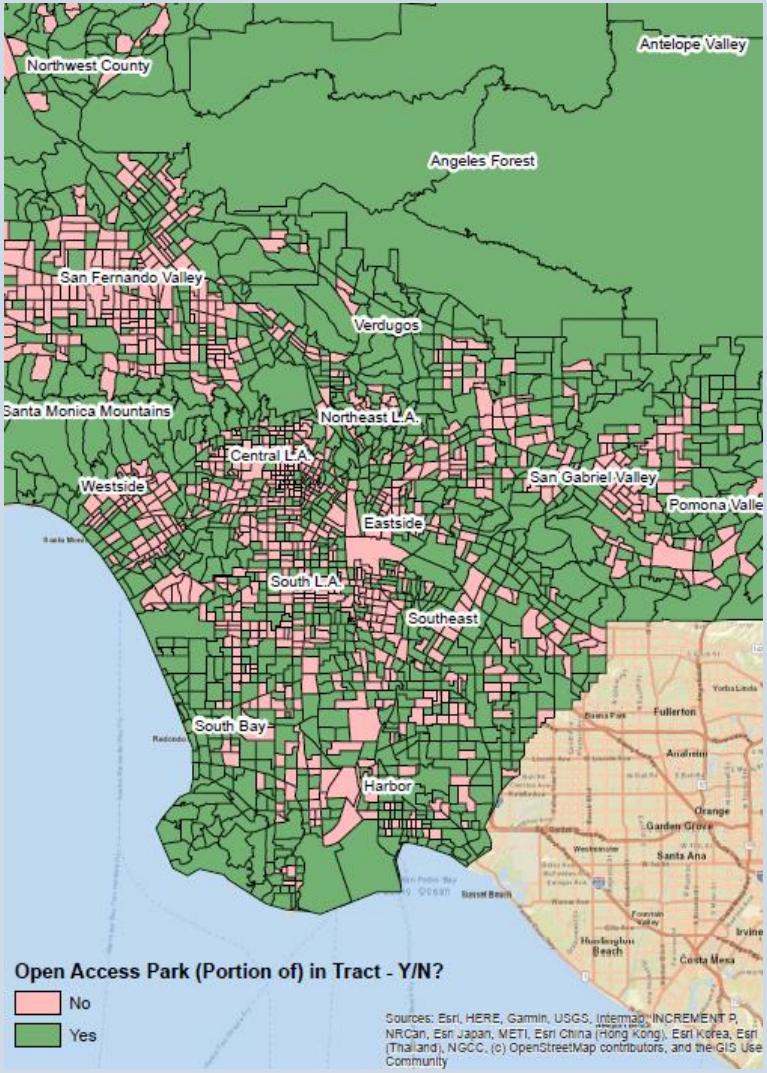


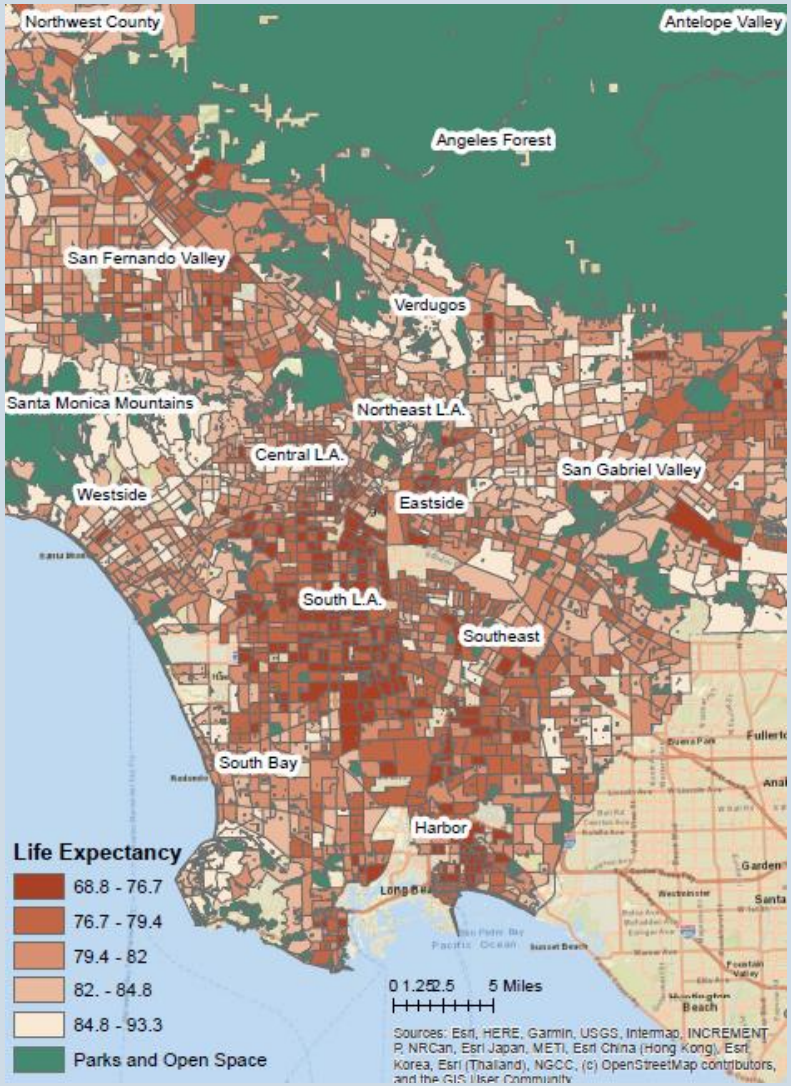
Note: the available acres metric is from the LA County Park Need Assessment, taking into consideration the size of the park. We can say people living within a certain area have access to X acres based on the buffers of how much people are willing to travel. This layer was then used as part of the overall weighted overlay to determine need for the assessment.

General Findings

- Green space (NDVI) results: Los Angeles is not very green in many places
  - *Very low values of NDVI (0.1 and below) correspond to barren areas of rock, sand, or paved areas.*
  - *Moderate values (0.2 to 0.3) represent shrub and grassland*
  - *High values (0.6 to 0.9) indicate temperate and tropical rainforest.*
- **43% of tracts in LA County do not contain any parks or open space.** This includes natural areas and parks with all access designations
- The average CalEnviroScreen percentile of tracts with no park area is 8.6 percentile points higher than those containing some, indicating more environmental justice vulnerability in those areas

General Findings: Tracts with and without parks, and associated life expectancy





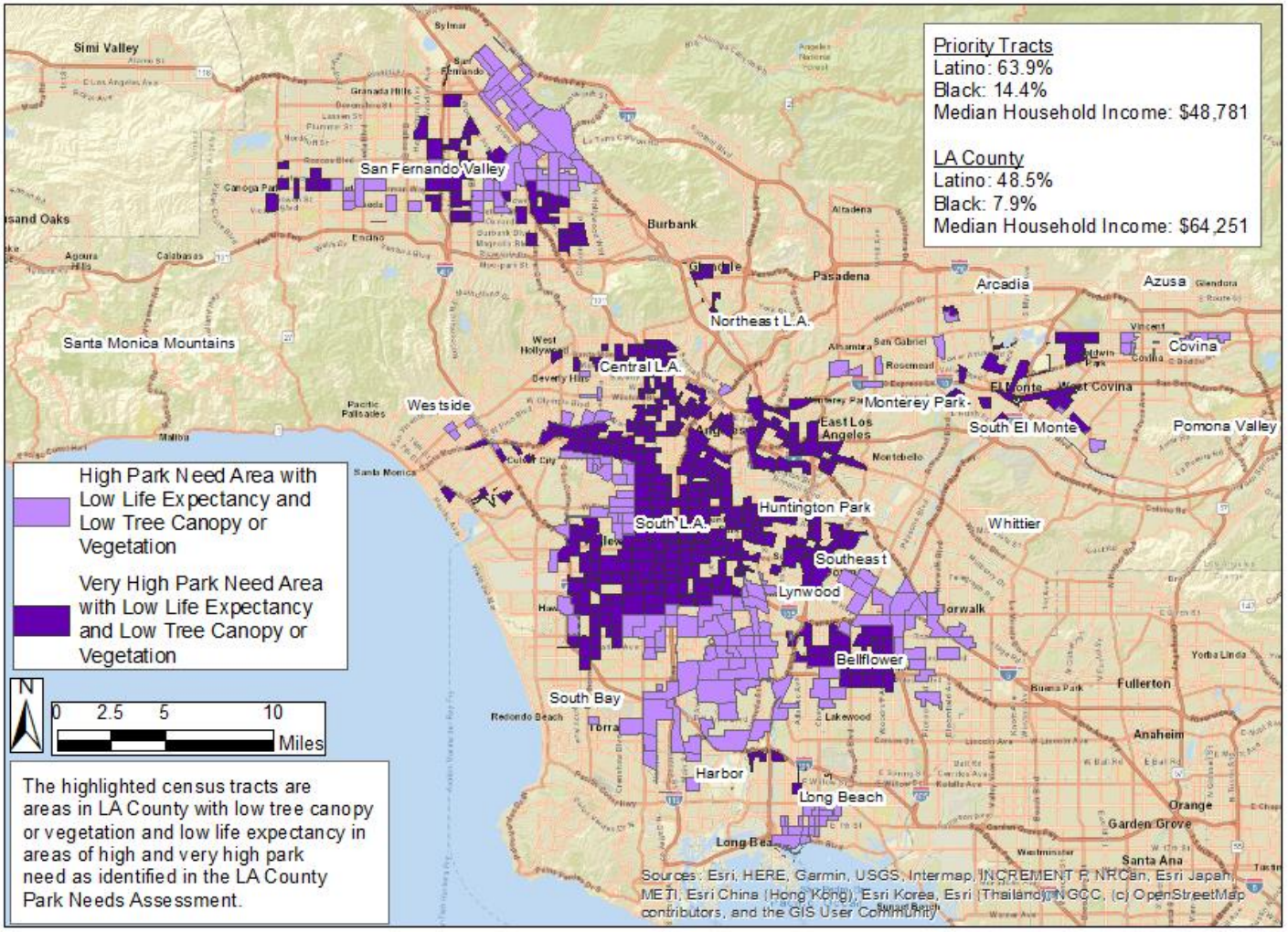
Main Findings

- Presence of NDVI green space and tree canopy are both associated with an increase in life expectancy
  - *Comparing lowest 25% of green space to the highest 25% of either green space or tree canopy results in about 0.5 years increase in life expectancy*
- Increasing park acreage has the potential to increase life expectancy in areas that are less green or have less tree canopy – a significant interaction exists
  - *Comparing lowest 25% of green space to the highest 25% of park acres in areas below the median of either green space or tree canopy relates to 1.5 month increase in life expectancy*
- Census tracts that are less green are typically park poor, disproportionately low income, and generally home to majority people of color:
  - *60% of the Latino population*
  - *67% of the Black population*
  - *31% of the white population*

Simulation Predictive Findings

- If all the tracts in LA County with park deficits and low tree canopy or green space levels had an increase in park acreage up to the county median:
  - *Approximately* ***164,700 years in life expectancy could be gained across the county***
  - *For just* ***Latinx and Black residents: an increase of almost 118,000 years of life expectancy***
  - ***An environmental justice issue***

Reduced Life Expectancy in High and Very High Park Need Areas with Low Tree Canopy or Vegetation



Data Sources: Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment (2016), USALEEP Life Expectancy 2010-2015 Estimates (2018), TreePeople and Loyola Marymount Center for Urban Resilience 2016 Tree Canopy Coverage (2019), National Agriculture Imagery Program (NAIP) Aerial Imagery (2016), United States Census Bureau American Community Survey 5-Year Estimates (2018)

Strengths and Weaknesses

Weaknesses

- Cannot confer causality because of self selection and possibility of residual confounding
- We did not assess the quality of the park resources
- Some data do not cover the entire county (CDC 500-Cities)
- Exact mechanisms from parks or green space to life expectancy no fully understood

Strengths

- High resolution data from small areas allowed us to control for many possible confounders
- This the first attempt in North America to quantify relationships between parks, green space or tree canopy and life expectancy and only one of a few attempts in the world
- Statistical models complex but reliable
- Findings highlight the environmental justice aspects of the park access problem and suggest unequal park distribution likely contributes to health inequalities among racial-ethnic groups

Next Steps

- Finalize models
- Publish scholarly paper summarizing the results
- Apply for funding to create statewide or national models

Conclusions

- Green space and tree canopy both highly predictive of life expectancy in the census tracts of LA county, even when we control for numerous other possible confounding variables
- In areas with lower green space or tree canopy, more parks also predict greater life expectancy
- Potential population benefits are substantial, particularly in Black and Latinx populations
- The unequal distribution of parks is an environmental justice issue that likely contributes to health inequalities by race, ethnicity and socioeconomic position

Acknowledgments

This project was supported by the Urban Institute through funds provided by the Robert Wood Johnson Foundation.

Tree People and Loyola Marymount University shared tree canopy data.

Dr. Jason Su, UC Berkeley, shared the NO_2 pollution surface.

Dr. Matilda van den Bosch, IS Global and the University of British Columbia, shared background slides.

Prevention Institute led the overall project.

Thank you!

Questions?

Contact:

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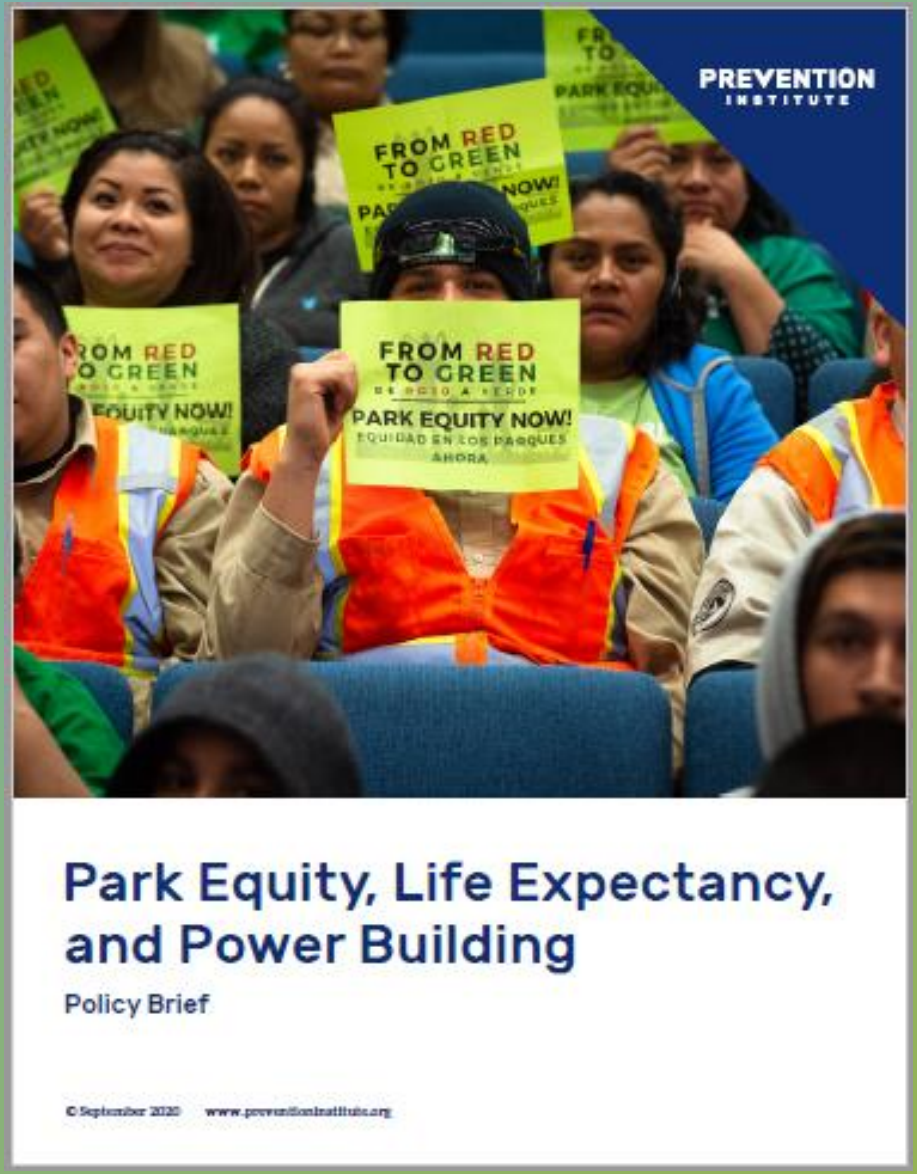
Rachel Connolly: rachelconnolly@g.ucla.edu, 818-468-6628
Website: https://ehs.ph.ucla.edu/pages/

Citations from this presentation available upon request

Q&A So Far

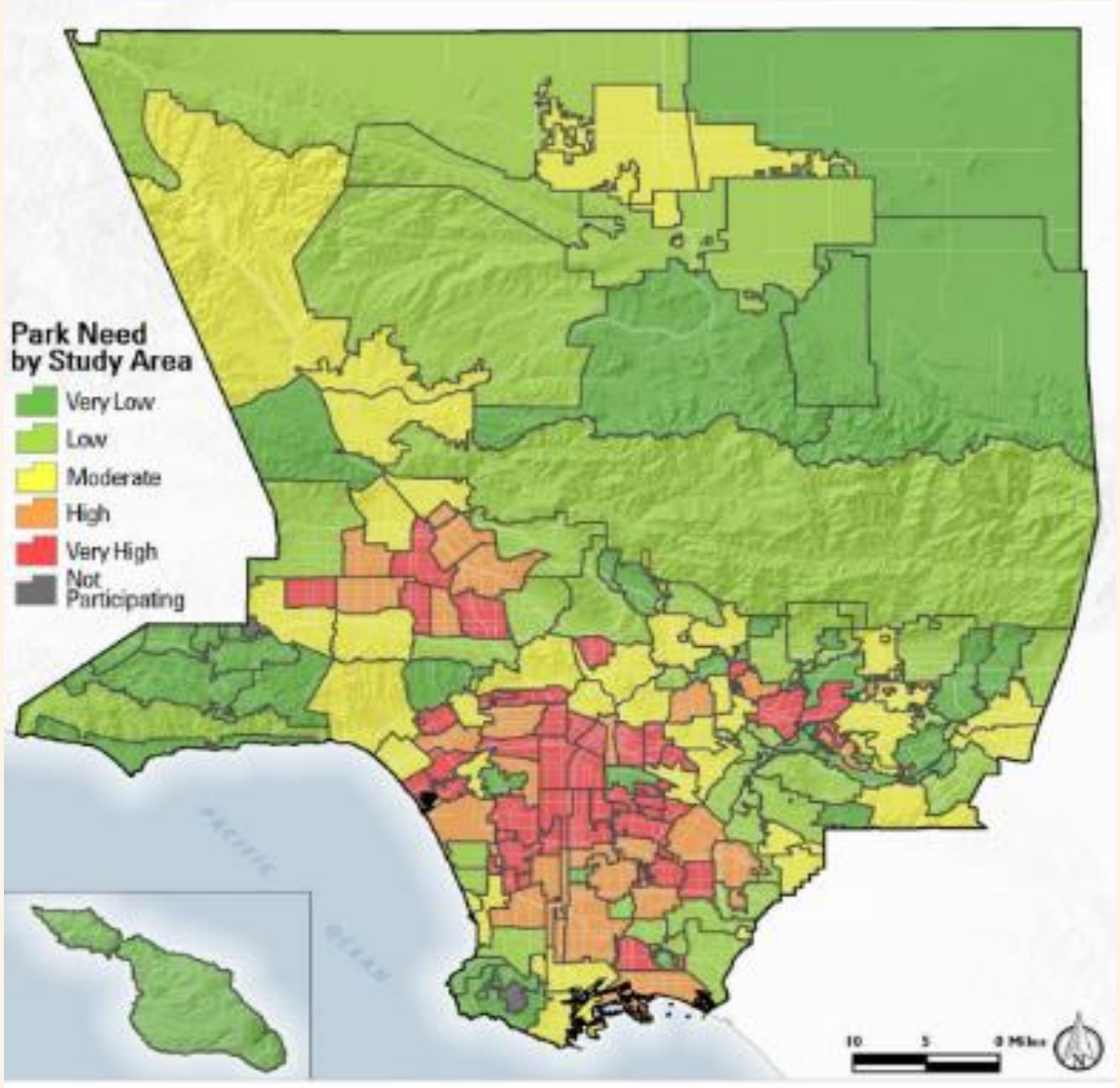
Policy Implications Moving Forward by Dr. Richard Jackson

Roadmap to Equity: Recommendations for Reversing Park Inequities



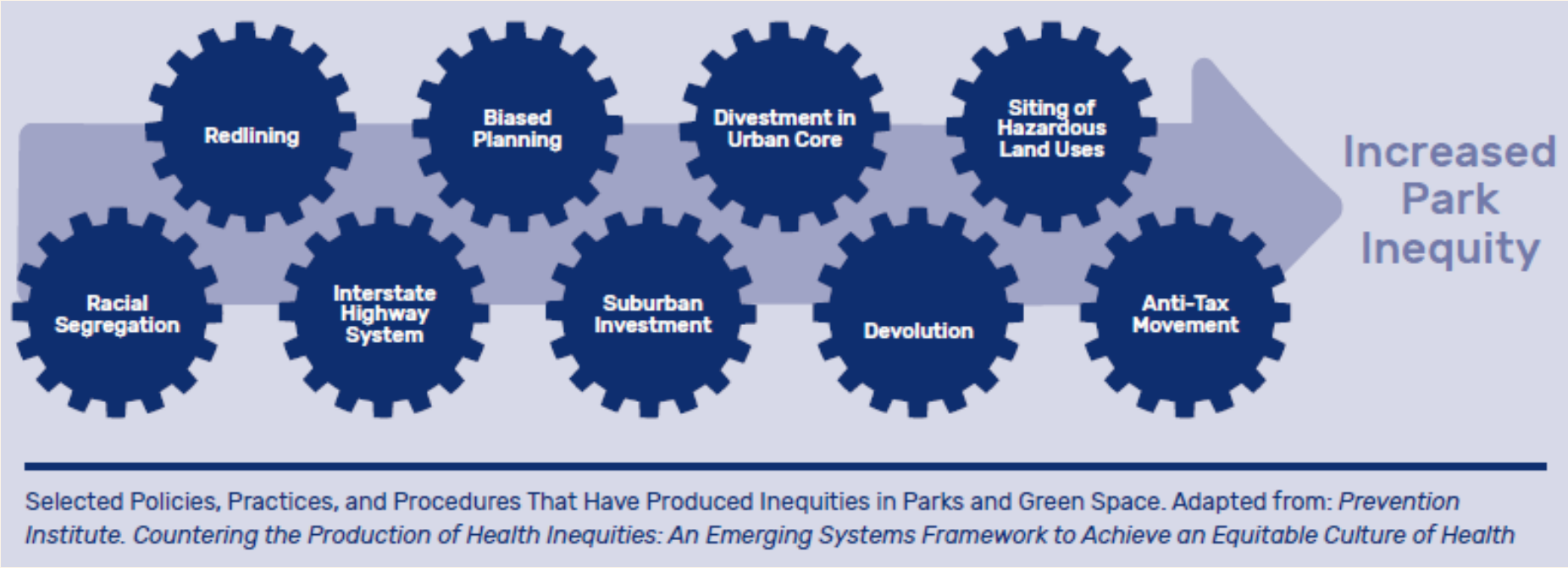
Park inequities are the unfair and unjust distribution of parks, green spaces, and associated resources (e.g. programming, amenities, staffing, and funds for maintenance and operations) by race, place, and income, among other factors.

Park Need in Los Angeles County



Source: Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment

Production of Park Inequities



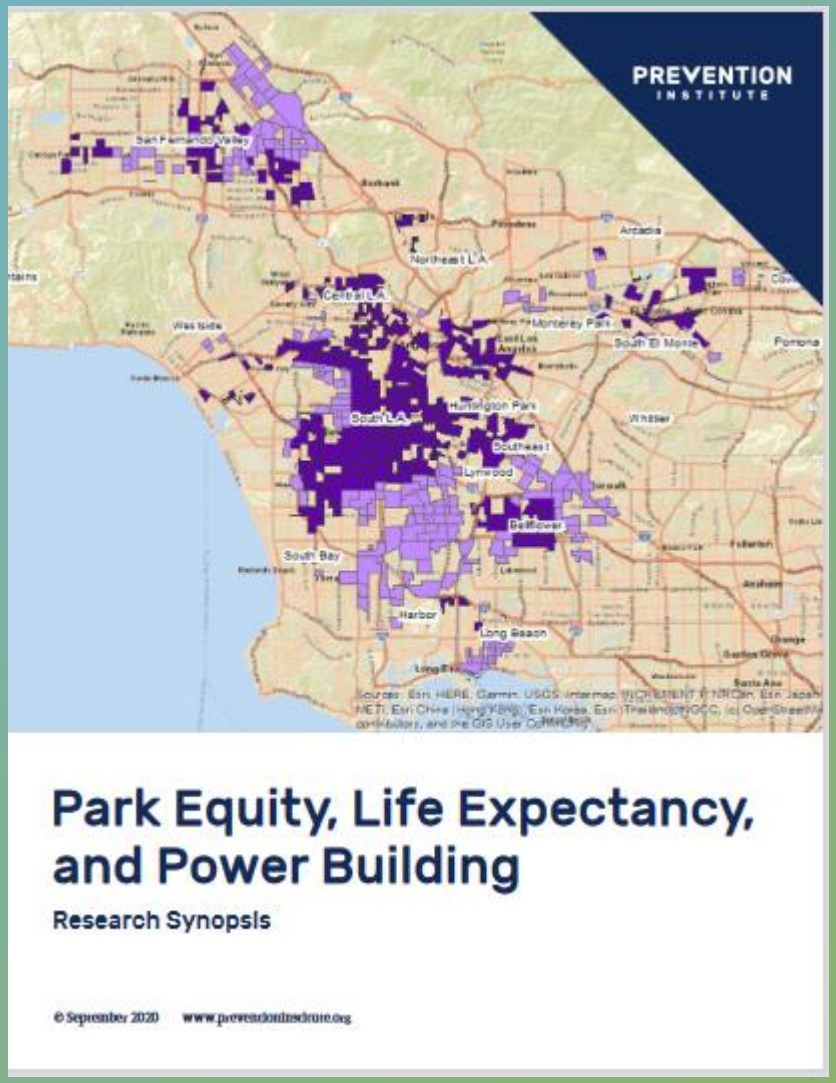
Selected Policies, Practices, and Procedures That Have Produced Inequities in Parks and Green Space. Adapted from: *Prevention Institute. Countering the Production of Health Inequities: An Emerging Systems Framework to Achieve an Equitable Culture of Health*

Prop 13 Enacted in 1978

Creating Pathways to Park Equity

Toolkit Contents

- **Overview***
- **Policy brief**
- **Research synopsis**
- **Three community profiles***
  - Boyle Heights and unincorporated East Los Angeles
  - Panorama City, Pacoima, and Sun Valley
  - South Los Angeles
- **Presentation slides** with talking points
- **Maps**
- ***** **Available in English and Spanish**



Park Equity, Life Expectancy, and Power Building

Research Synopsis

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Park Equity, Life Expectancy, and Power Building

Policy Brief

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Park Equity, Life Expectancy, and Power Building: An Overview

September 2020

Los Angeles County voters recently enacted two countywide parcel tax measures (Measure A, the Safe, Clean Neighborhood Parks and Beaches Measure of 2016, and Measure W, the Safe, Clean Water Act of 2018) and a statewide bond (Proposition 68, the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018) that will generate hundreds of millions of dollars for parks, open space, and stormwater-related green infrastructure. These measures, now in their implementation phases, hold the potential to build or revitalize parks and green space in the LA region's highest need communities. Strategically spent, the revenue from these measures could set us on a path to eliminate the region's deplorable park inequities while reducing associated health inequities and gaps in life expectancy.

What do parks have to do with health and health equity?

Urban parks and green spaces are essential community infrastructure that protect public health by providing opportunities for physical activity, time in nature, social connection and respite. Parks filter air, remove pollution, buffer noise, cool temperatures, filter stormwater and replenish groundwater.[1,2] Exposure to green spaces can confer improvements to mental health as well.[3] Exposure to nature has been associated with mental and psychological wellbeing and social cohesion.[4]

A study by LA County Department of Public Health found that on average, LA County cities and unincorporated areas with less park space per capita have higher rates of premature mortality from cardiovascular disease and diabetes, higher prevalence of eating- and activity-related chronic illness among children, and greater economic hardship compared with cities and communities with more park space per capita. It also found that Blacks and Latinos are more likely than Asian Americans and whites to live in cities and communities with less park space.[5]

Parks are not distributed equitably

All communities do not have access to safe, well-maintained, and programmed parks and green spaces. Many studies across multiple geographic areas, including the LA region, show that Blacks, Latinos, and people who live in low-income neighborhoods have less access to parks and green spaces than people who live in more affluent or predominately white communities.[6]

Park and green space inequities reflect the systematic production of inequities through historical and current day policies, practices, and procedures throughout the United States.[7] Factors contributing to park inequities include racial segregation, biased planning decisions, discriminatory post-WWII home loan practices, exclusionary zoning, racial covenants, and redlining, among others.[8]

Present day drivers of park inequities include shifting responsibility for public services and reduced ability of cities with limited tax-bases and large low-income populations to provide parks and recreation services.[9] Tax and fiscal restructuring, like California's Proposition 13,

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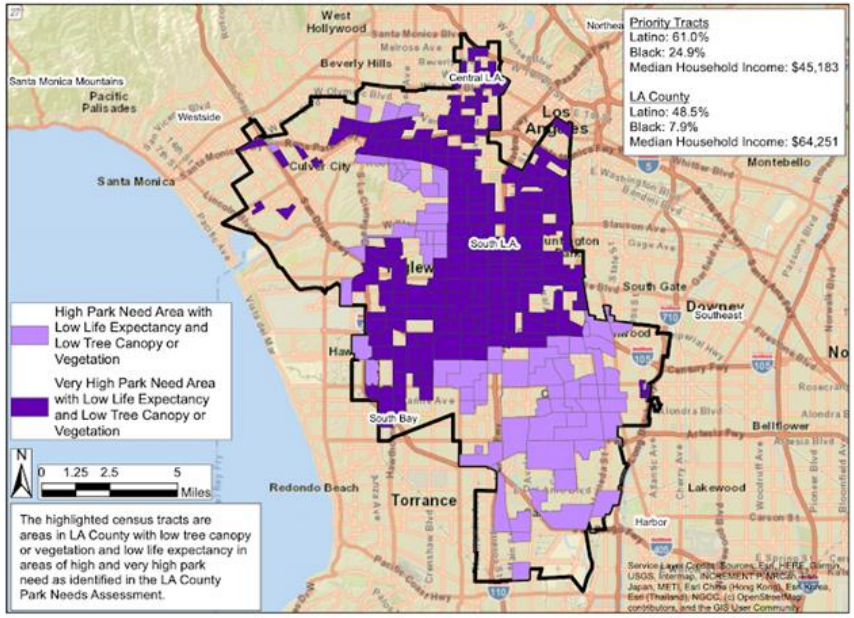
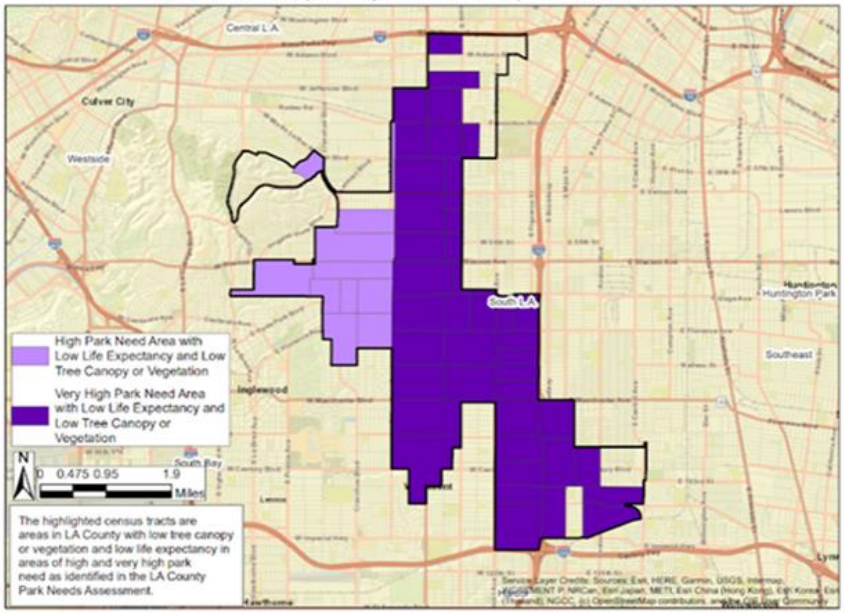
Reduced Life Expectancy in High and Very High Park Need Areas with Low Tree Canopy or Vegetation - LA County Supervisorial District 2



Data Sources: Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment (2016), USALEEP Life Expectancy 2010-2015 Estimates (2018), TreePeople and Loyola Marymount Center for Urban Resilience 2016 Tree Canopy Coverage (2019), National Agriculture Imagery Program (NAIP) Aerial Imagery (2016), United States Census Bureau American Community Survey 5-Year Estimates (2018)

Reduced Life Expectancy in High and Very High Park Need Areas with Low Tree Canopy or Vegetation - LA City Council District 8



Data Sources: Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment (2016), USALEEP Life Expectancy 2010-2015 Estimates (2018), TreePeople and Loyola Marymount Center for Urban Resilience 2016 Tree Canopy Coverage (2019), National Agriculture Imagery Program (NAIP) Aerial Imagery (2016)

Park Equity, Life Expectancy, and Power Building

Community Profile for Boyle Heights and Unincorporated East Los Angeles

September 2020

Photo credit: Office of Los Angeles County Supervisor Hilda Solis

Since 2016, voters have enacted two countywide parcel tax measures in Los Angeles County (Measure A and Measure W) and a statewide bond (Proposition 68) to develop new parks and green spaces or improve existing ones. Combined, these public finance initiatives will generate hundreds of millions of dollars each year for parks and green spaces in Los Angeles County. This community profile focuses on the positive impact these funds could have if invested in the predominantly Latino communities of Boyle Heights and unincorporated East Los Angeles. It provides advocates and community leaders with information they can use to make the case for reversing the historic and pervasive park inequities experienced by Latino and Black residents. By building the power and capacity of the residents who are most impacted by park inequities, they will be able to seize this unique moment to ensure fair and just park investments.

About Boyle Heights and unincorporated East Los Angeles

The Boyle Heights community in the City of Los Angeles and unincorporated East Los Angeles (hereafter referred to as East LA) have

Park Equity, Life Expectancy, and Power Building

Community Profile for Pacoima, Panorama City, and Sun Valley

September 2020

Photo credit: Office of Los Angeles County Supervisor Hilda Solis

Since 2016, voters have enacted two countywide parcel tax measures in Los Angeles County (Measure A and Measure W) and a statewide bond (Proposition 68) to develop new parks and green spaces or improve existing ones. Combined, these public finance initiatives will generate hundreds of millions of dollars each year for parks and green spaces in Los Angeles County. This community profile focuses on the positive impact these funds could have if invested in the Northeast San Fernando Valley communities of Pacoima, Panorama City, and Sun Valley. It provides advocates and community leaders with information they can use to make the case for reversing the historic and pervasive park inequities experienced by Latino and Black residents. By building the power and capacity of the residents who are most impacted by park inequities, they will be able to seize this unique moment to ensure fair and just park investments.

About Pacoima, Panorama City, and Sun Valley

The communities of Pacoima, Panorama City, and Sun Valley are located in Los Angeles' Northeast San Fernando Valley. 20 miles northwest of downtown LA. Lesser known than its identity as a classic American

Park Equity, Life Expectancy, and Power Building

Community Profile for South Los Angeles

September 2020

Photo credit: National Health Foundation – Genesis Productions

Since 2016, voters have enacted two countywide parcel tax measures in Los Angeles County (Measure A and Measure W) and a statewide bond (Proposition 68) to develop new parks and green spaces or improve existing ones. Combined, these public finance initiatives will generate hundreds of millions of dollars each year for parks and green spaces in Los Angeles County. This community profile focuses on the positive impact these funds could have if invested in South Los Angeles. It provides advocates and community leaders with information they can use to make the case for reversing the historic and pervasive park inequities experienced by Latino and Black residents. By building the power and capacity of the residents who are most impacted by park inequities, they will be able to seize this unique moment to ensure fair and just park investments.

About South LA

South Los Angeles in the City of Los Angeles (hereafter referred to as South LA) has a rich history of Black culture and tradition showcased in culinary, artistic, musical, and architectural achievements. Located just south of downtown Los Angeles, South LA has a vibrant heritage and well-recognized legacy of community organizing which continues to this day in the form of advocacy and community-building initiatives

Q&A

UCLA Fielding School of Public Health Center for Healthy Climate Solutions

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Park Equity, Life Expectancy, and Power Building
Webinar Two: Park Equity Policy and Advocacy

December 10, 2020 · 11:30 AM – 1:00 PM PT

Register at http://bit.ly/ParkEquityNow

Simultaneous Spanish interpretation will be provided

Featured speakers:

Manal J. Aboelata
Deputy Executive Director
Prevention Institute

Alessandro Rigolon, PhD
Assistant Professor
University of Utah

Elva Yañez
Health Equity Director
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Francisco Romero
Program Manager of Community Transformation
Promesa Boyle Heights

Naomi Humphrey
Undergraduate Health Equity Fellow
National Health Foundation

Veronica Padilla
Executive Director
Pacoima Beautiful

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