

How Much Do Neighborhood Parks Contribute to Local Residents' MVPA in the City of Los Angeles? -- A Meta-Analysis

Bing Han, Deborah Cohen, Kathryn Derose,
Terry Marsh, Stephanie Williamson, Laura Raaen

RAND Corporation
Santa Monica, CA
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Background

- Few Americans get the recommended amount of physical activity.
- The neighborhood park system in the City of Los Angeles is a great resource for its urban residents to engage in MVPA.
- In particular, parks are important resources for subpopulations: children, senior, low-income.



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Levels of Physical Activity (PA)

- Intensity of physical activity has been characterized as sedentary, moderate, and vigorous, although energy expenditure is a continuous function
- Recommended quantity of MVPA
 - Adults need 150 minutes/week
 - Children and teens need 60 min/day
- Few adults and a minority of children achieve the recommended guidelines according to the NHANES accelerometry data.



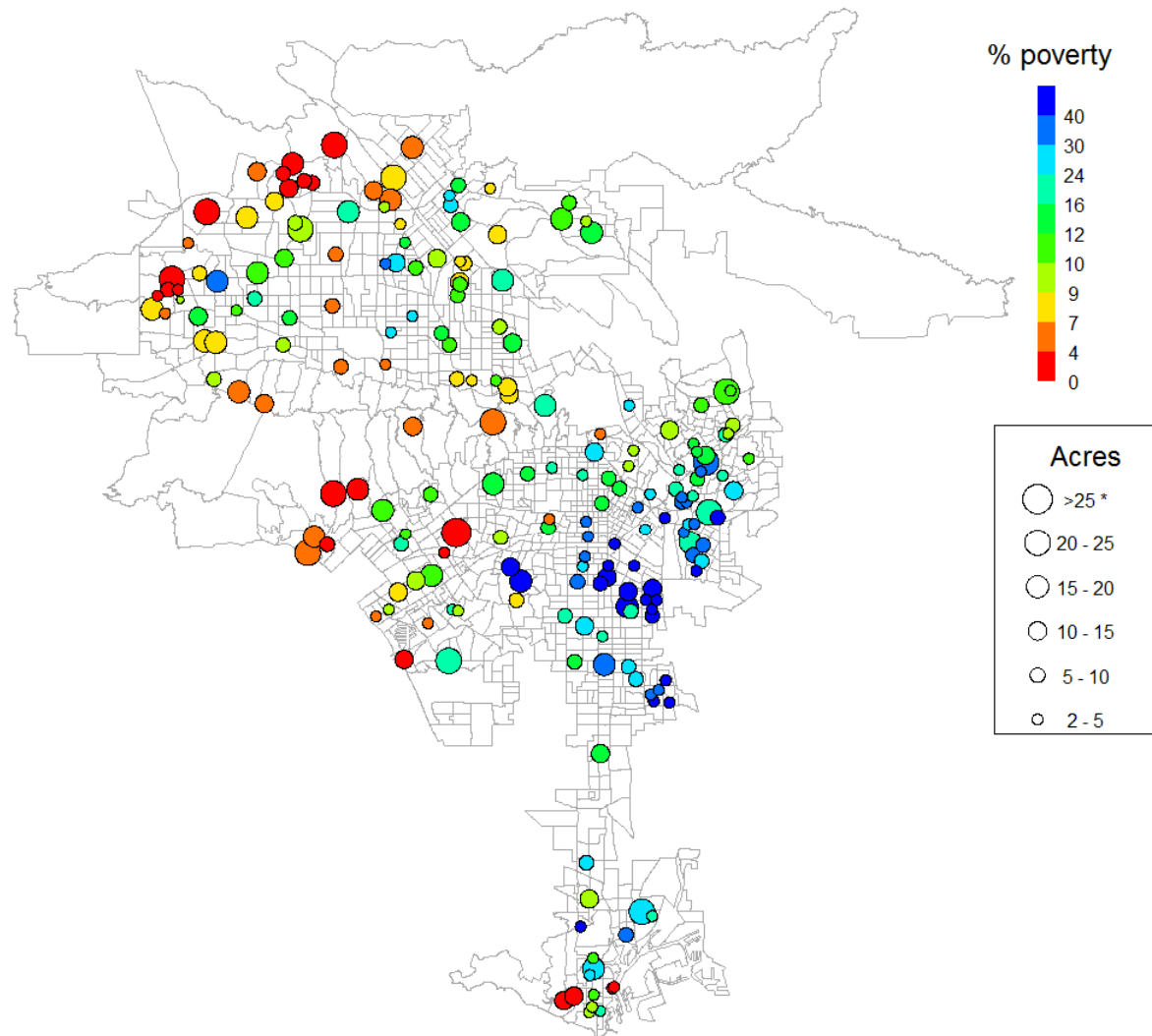
Park System of Los Angeles



- According to the Rec & Park Dept. of Los Angeles
 - 488 sites (split to 548 administrative units) totaling approximately 16,000 acres of lands
- Categorized by size and function
 - < ~2 acres (201 sites, 121 acres): pocket parks
 - ~ 2 -- 25 acres (222 sites, 2,162 acres): neighborhood parks with multiple functions, recreation centers *
 - > ~ 25 acres (64 sites, 13,721 acres): regional attractions
- Neighborhood parks and recreation centers are the main focus for their public health benefits.

* A few sites whose sizes fall out the range were still included due to their functions.

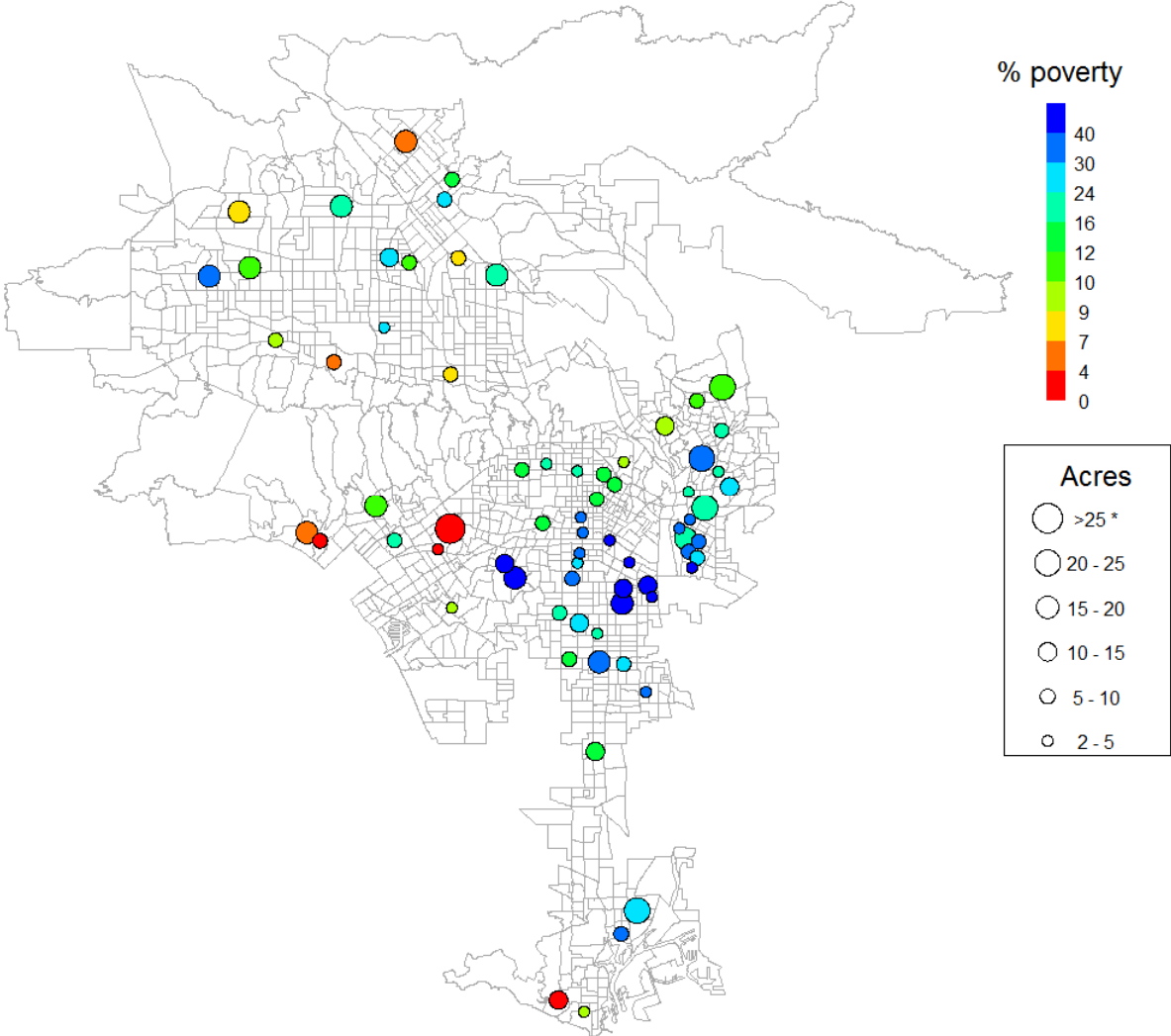
System of Neighborhood Parks and Recreation Centers in LA



Methods

- During the past years (2003-2014) and onward, we studied 83 (~40%) neighborhood parks and recreation centers in LA in five primary studies.
- Representing a wide variety of neighborhoods with some oversampling in low-income areas.
- We measured park use using SOPARC
 - Direct observation of snapshot MVPA status in parks
 - Repeated measurements: most study parks have been observed 3~4 times a day and 4 to 7 days a week. Most parks have 4 to 8 weeks' observations in 2 or more years.

Neighborhood Parks and Recreation Centers in Our Studies (2003-2014)



Methods (cont'd)

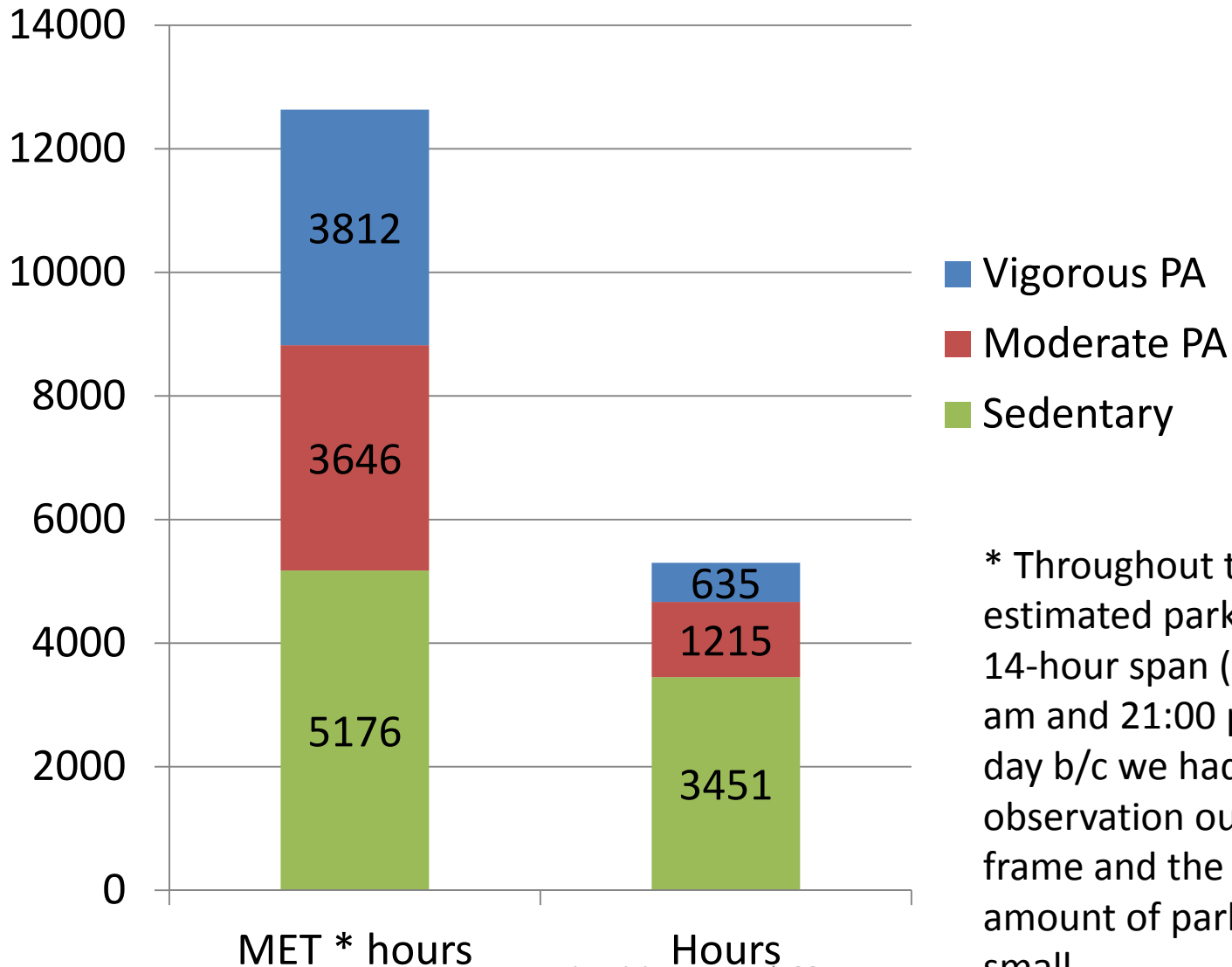
- Conducted surveys among park users and residents
- A park's neighborhood is defined as within 1 mile from the park's street address
- Statistical approach:
 - T = Time of MVPA within parks' boundaries, estimated by longitudinal regressions for field observation data*
 - S = Time of MVPA accumulated by the local population, estimated by population stratified analysis and NHANES accelerometry data*
 - ρ = % park users from the local neighborhood, estimated from the cumulated park user surveys*
 - Parks' contribution to MVPA is assessed by $\omega = \frac{T \times \rho}{S}$

* For more technical details see Han, Cohen, and McKenzie (2013) Preventive Medicine, 53, 483–487.

Study Parks and Their Neighborhoods

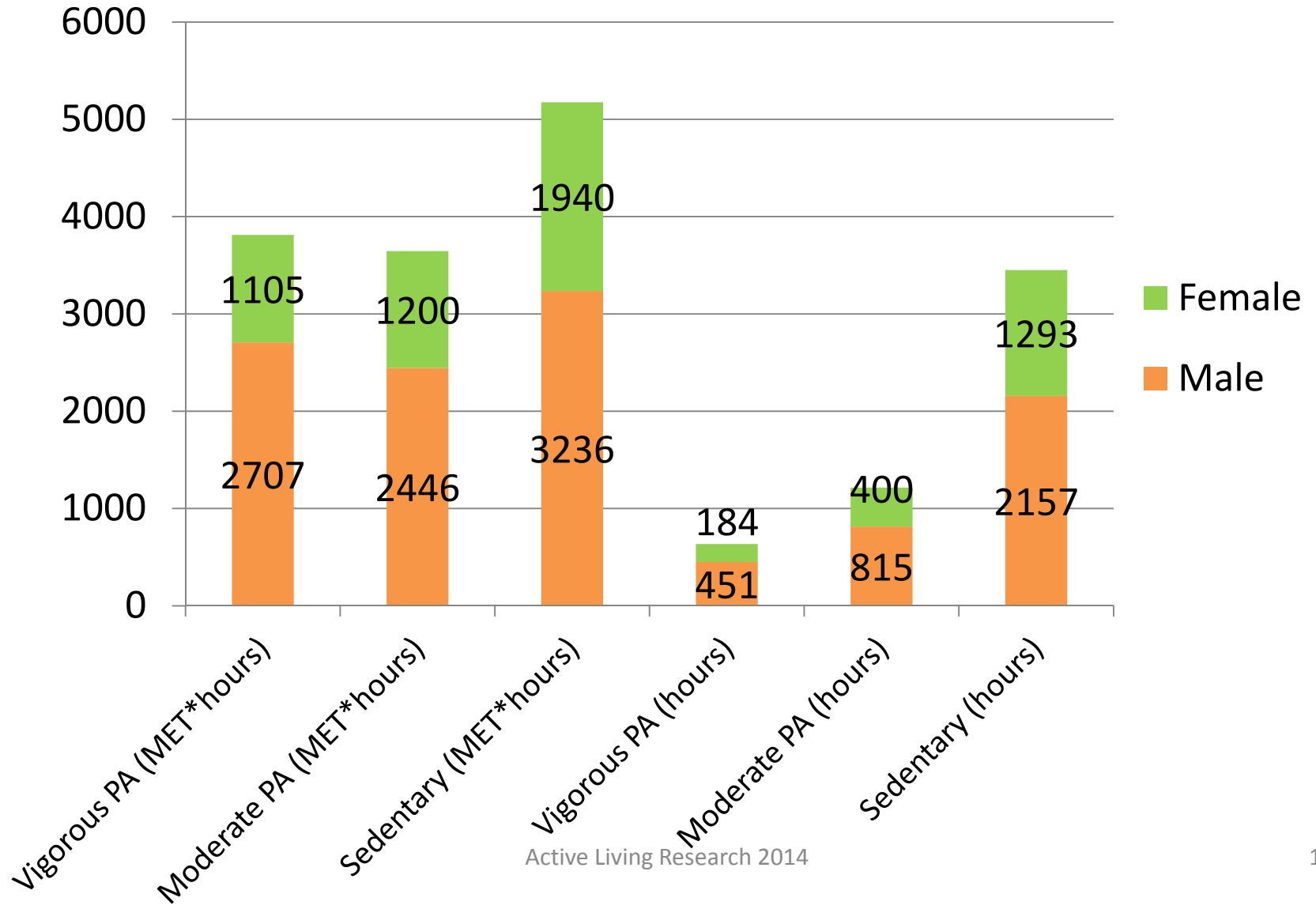
Characteristics	Mean	SD (between-parks)
Size (acres)	10	7
Population (1-mile)	~40,000	~20,000
Population (½-mile)	~10,000	~7,000
% households in poverty (1-mile)	22	10
% race: white (1-mile)	46	10
% race: black (1-mile)	10	14
% race: Asian (1-mile)	11	8
% Hispanic (of any race, 1-mile)	58	27

Estimated Average Total Weekly Park Use and PA *

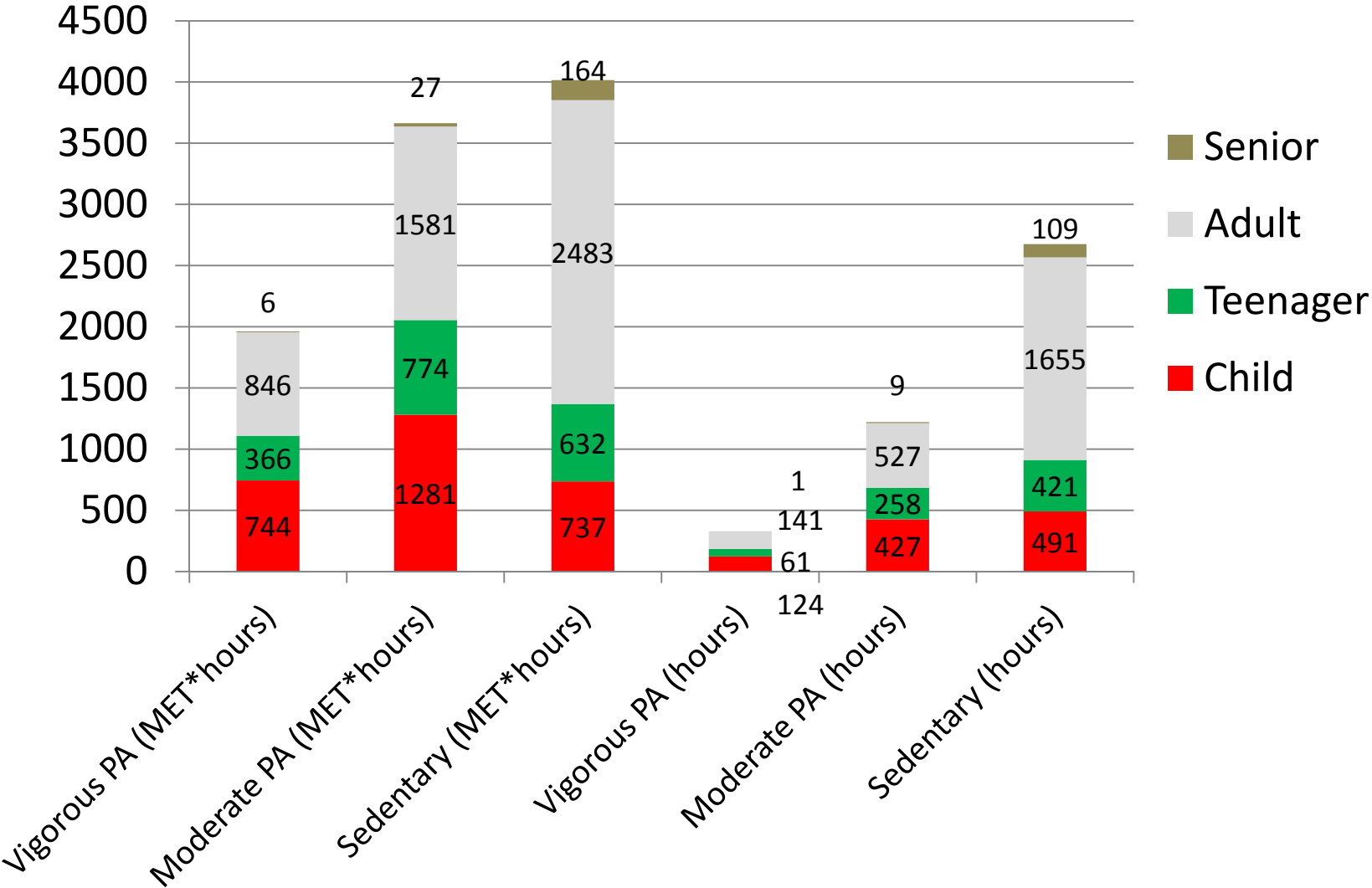


* Throughout this work, we estimated parks' use during 14-hour span (between 7:00 am and 21:00 pm) on each day b/c we had no observation out of this time frame and the ignored amount of park use is very small.

Estimated Average Weekly Park Use and PA by Gender

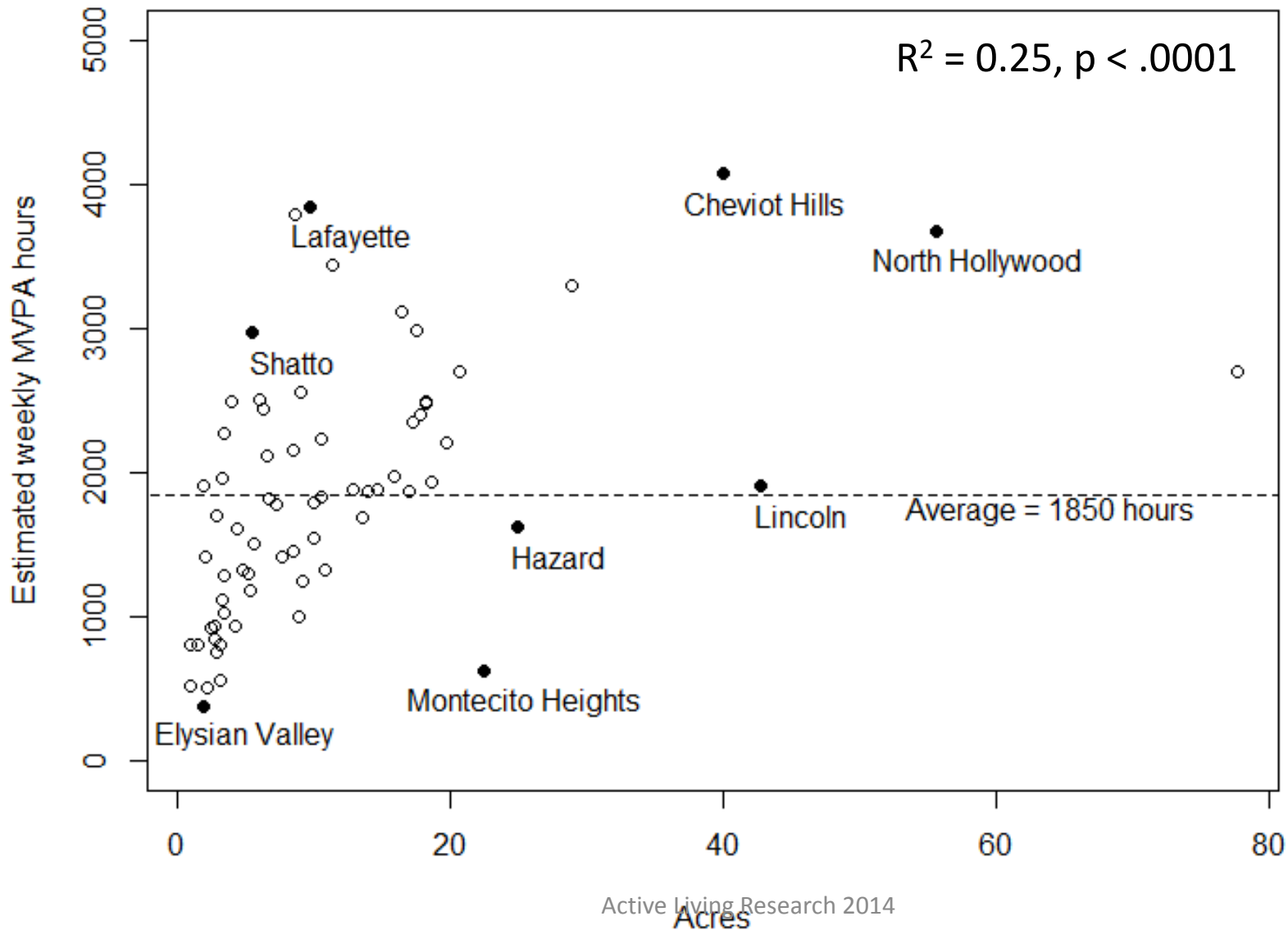


Estimated Average Weekly Park Use and PA by Age *

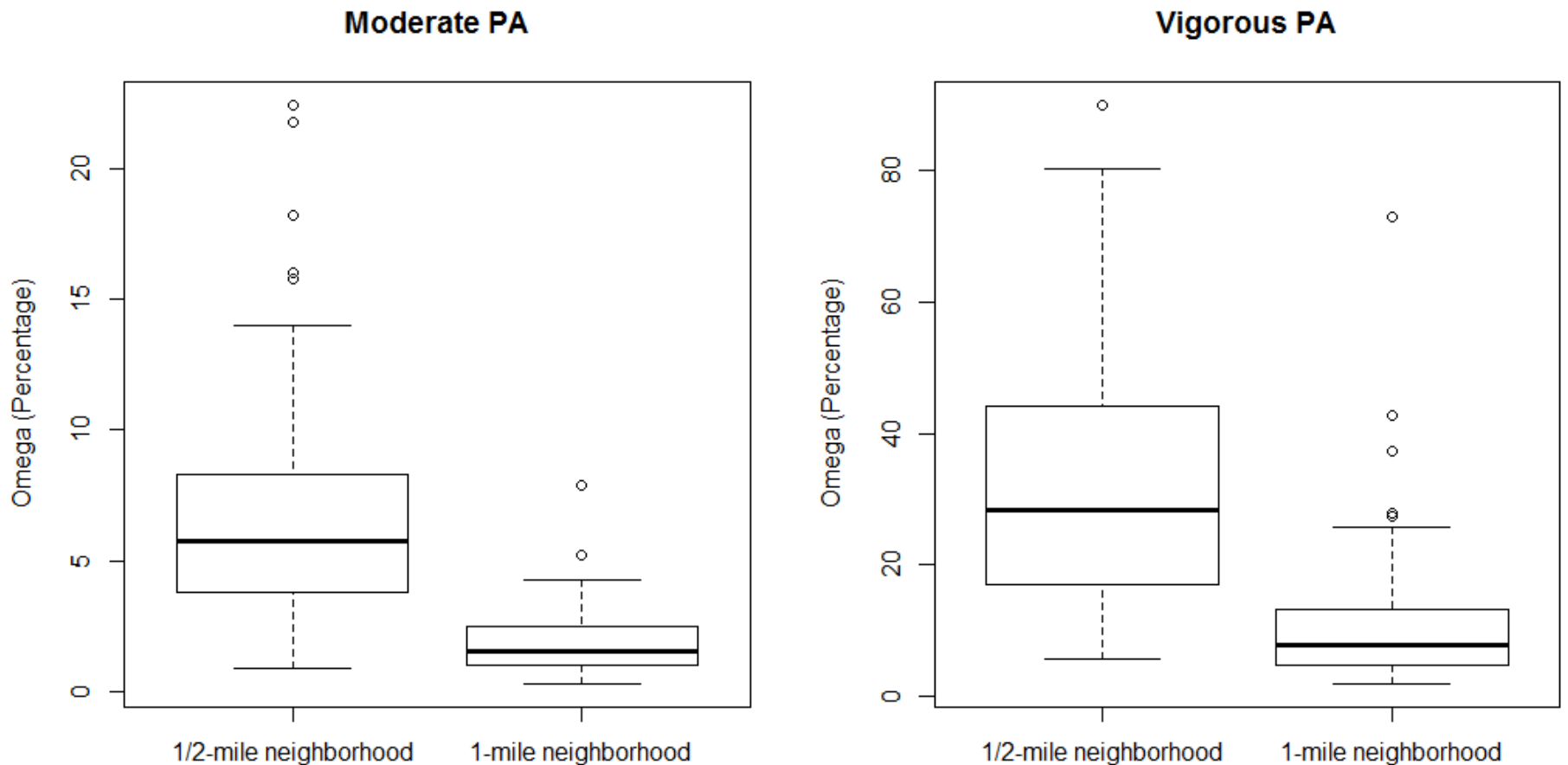


* By-age results were based on a subset of all study parks (n=48) where we used the latest observational protocol.

Remarkable Variation in MVPA among parks: 10.7-fold difference between extremes



Parks' Contribution to Local Population's MVPA



On average, parks provide a small proportion of moderate PA (7.0% vs 1.9% for residents in ½- and 1-mile radiuses, respectively), and a relatively large proportion of vigorous PA (36.3% vs 11.5% for ½- and 1-mile radiuses, respectively).

Estimates for the Neighborhood Park System of LA

- Great potential untapped:
 - On average, each acre of park land in LA has only 1.9 users engaging in MVPA and 3.5 sedentary users at a randomly chosen time between 7am and 9pm.
 - Peak hours (6-8 pm during weekdays; late AM and early PM on weekends) have 1.5 to 4 times more users than average.
 - Many parks have been nearly empty for most time of a day.
- Popular parks during peak hours are perhaps close to saturation
 - Great locations/safe neighborhoods
 - Variety of programs
 - Great reputation/marketing
 - Good facilities/maintenance/conditions



40x40 grid= 1 acre
Each square is
25 sq ft

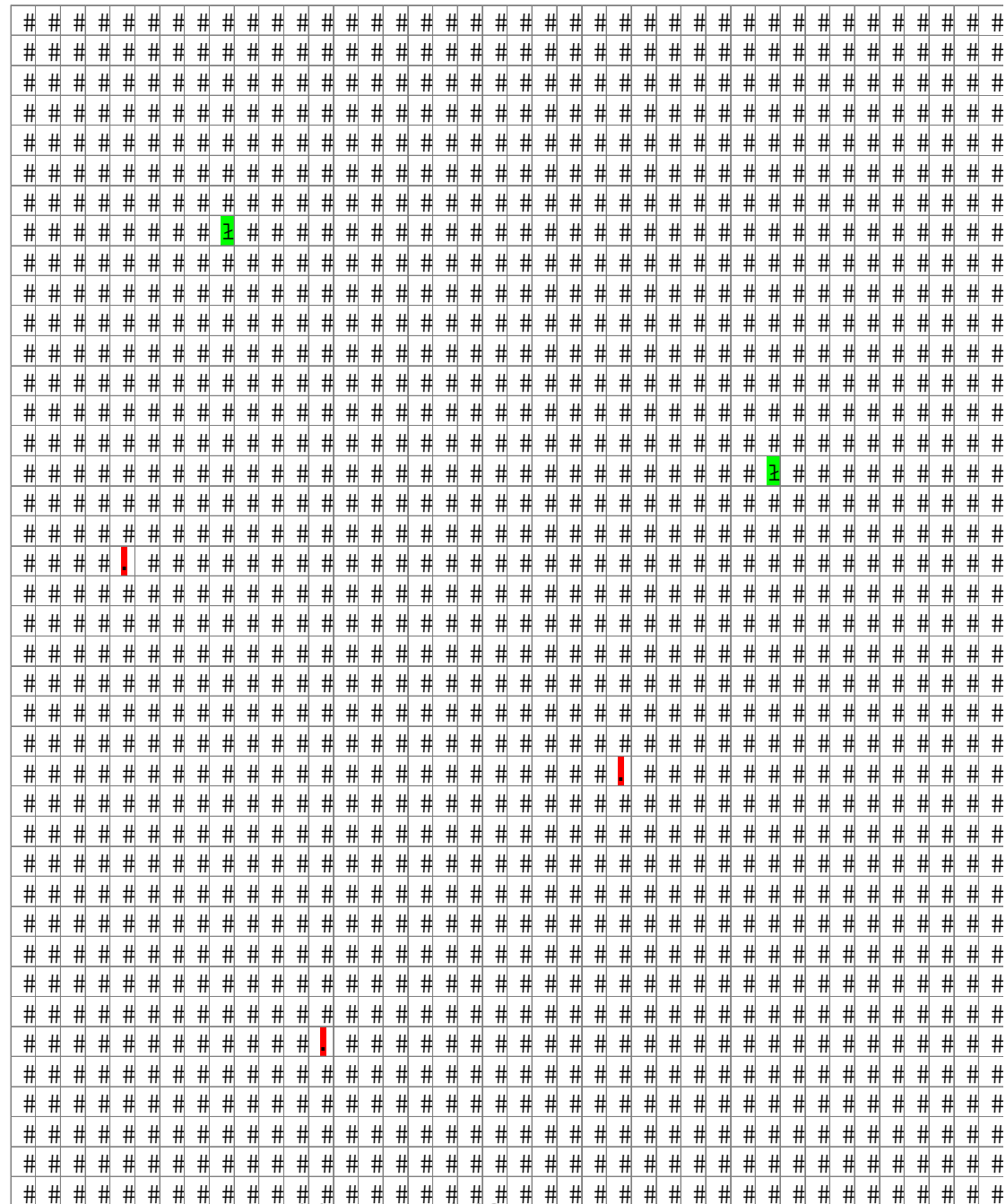
This is the typical
occupancy of one
acre of a neigh-
borhood park.

Green=1 person

In MVPA

Red=1.2 sedentary
Persons

Theoretical Capacity:
>200-400/acre
(100-200sq ft/person)



Estimates for the Weekly Neighborhood Park Use in LA City

- Approximately, the entire neighborhood park system in LA receives the following during a typical week
 - 1.1 million hours of use (SE \approx 242,000)
 - 660,000 visits (SE \approx 133,000)
 - 404,000 visitors (SE \approx 86,000)
 - 378,000 hours or park use time spent in MVPA within the park boundaries (SE \approx 83,000)



Summary

- Neighborhood parks in LA play a significant role in supporting MVPA for the local residents, in particular, vigorous PA.
- Great heterogeneity implies substantial room for improvement.
- It is likely that substantial investments in programming and marketing are necessary to optimize park use and population physical activity.