Environmental Justice and Physical Activity:

Examining Disparities in Park Availability and Features Across Kansas City, Missouri

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Background

- The obesity epidemic disproportionately affects low socioeconomic status (SES) populations (Babey et al., 2007; Brennan et al., 2010; Coogan et al., 2010; Zhang & Wang, 2004)
- People from minority backgrounds are more likely to be overweight or obese (AHA, 2003; Kumanyika, 1994; WHO, 2000; Zhang & Wang, 2004)
- Low SES and minority populations are less likely to meet physical activity recommendations than high income populations (August & Sorkin, 2011; Parks, Housemannn & Brownson, 2003)

Background

- **Proximity** to parkland is positively associated with physical activity participation (Cohen et al., 2007; Kaczynski & Henderson, 2007; Roemmich et al., 2006)
- Presence of certain **facilities** (e.g., playgrounds, trails) and **amenities** (e.g., drinking fountains, restrooms) promote park use and physical activity (Cohen et al., 2006; Kaczynski et al., 2008; Timperio et al., 2008)
- Neighborhoods of a lower SES and higher minority population often contain significantly **fewer parks** and recreational resources (Gordon-Larsen et al., 2006; Moore et al., 2008; Talen, 1997; Wolch et al., 2005)

Background

Not all of the literature is consistent with the aforementioned findings …

- Lower SES populations had better access to some recreational resources but worse access to others (Giles-Corti & Donovan, 2002)
- Differences in the types of resources found in neighborhoods of lower SES versus higher SES (Macintyre et al., 2008)
- Number and size of public parks not significantly different across income or minority groups (Abercrombie et al., 2008)

Background

- **Environmental justice:** the fair treatment and meaningful involvement of all people in the development, implementation and enforcement of environmental laws, regulations and policies (Taylor et al., 2007)
    - Wave I – Environmental injustices such as locally unwanted land uses, lead in homes, as well as other pollutants
    - Wave II – Centered on urban design, public health, and access to and quality of outdoor recreation facilities
- **Deprivation amplification:** fewer personal resources compounded by fewer neighborhood resources and environmental supports (Macintyre, 2000)

Both frameworks are key for examining resource disparities in low income and racial and ethnic minority communities (Floyd, Taylor, & Whitt-Glover, 2009)

Purpose

This study was part of the broader Kansas City Parks and Physical Activity Project.

Purpose: To **examine disparities** in park **availability** and **features** across socioeconomically and racially diverse census tracts.

It is necessary to investigate any such disparities so that they can be identified and steps taken to **eliminate them**.

Study Area

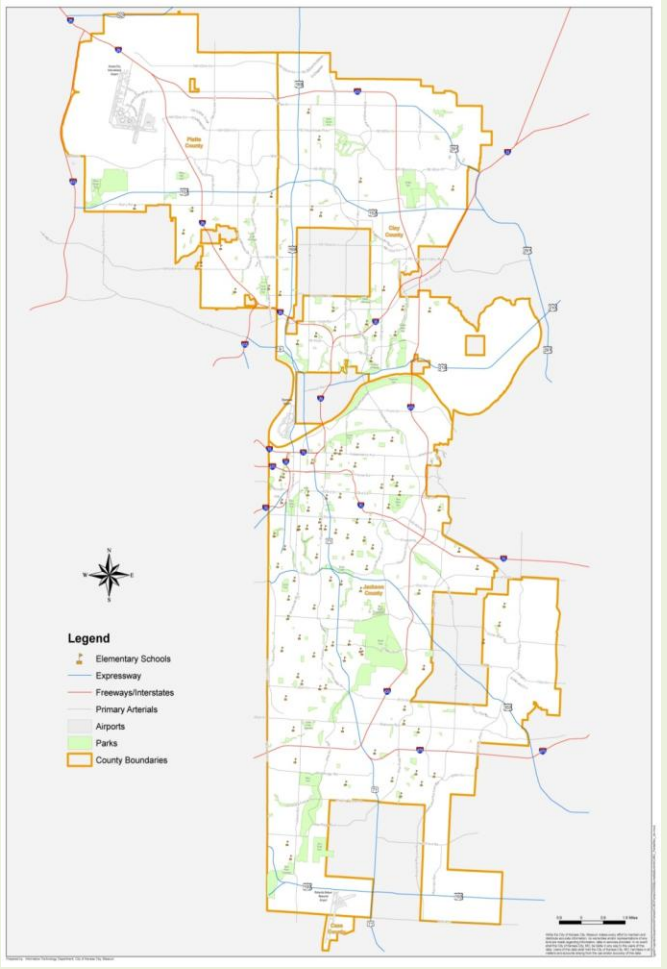
Kansas City, Missouri (KCMO)

- 318 square miles
- 475,830 residents
- Racial diversity
  - 61% White
  - 31% Black
  - 7% Hispanic
  - 1% Other
- Median household income: $39,230
  - Tract range: $9,219 - $173,750

Study Area

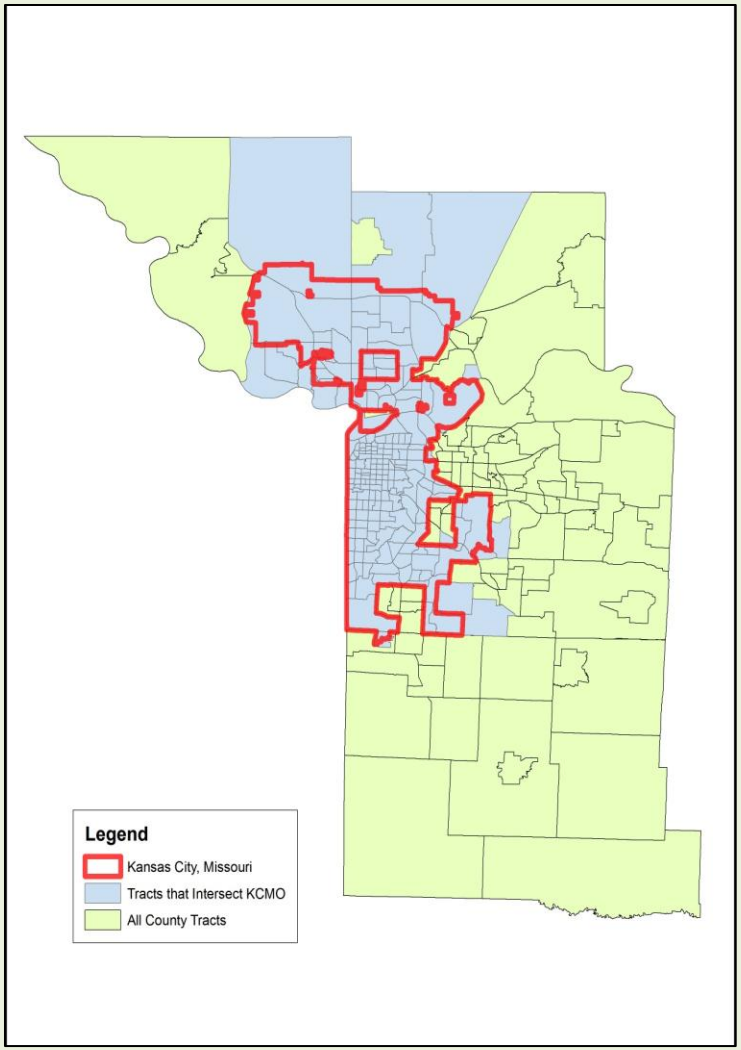
KCMO Parks

- 3 regions (North, Central, South)
- 219 parks
- About 12,000 acres of parkland
- Variance in features, quality, and location



Study Area

- Unit of analysis = census tracts
- Study area = 174 tracts with a majority of their area in KCMO



Measures

Census tract income and race/ethnicity data acquired from the U.S. Census Bureau's American Community Survey (ACS)

- Median household income
  - Available as a dollar figure for each census tract
  - Tracts divided into tertiles (low, medium, high)

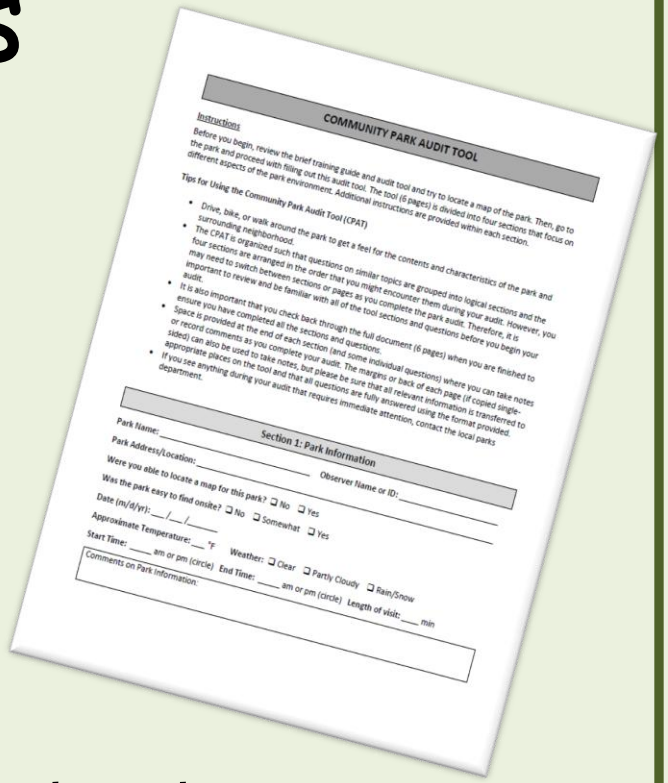
- Percent minority population
  - Percent non-White and Hispanic White within tract
  - Tracts divided into tertiles (low, medium, high)

Measures

Park Availability

- Parks were first enumerated and located using GIS shape files from the City of KCMO
- Parks were included in an edited file after an in-person audit to determine if they were publicly accessible and useable for physical activity and/or recreation
- Availability measured in 2 ways:
  - Number of parks that intersected each census tract
  - Total area of parks that intersected the tract

Measures


COMMUNITY PARK AUDIT TOOL

Instructions

Before you begin, review the brief training guide and audit tool and try to locate a map of the park. Then, go to the park and proceed with filling out this audit tool. The tool (6 pages) is divided into four sections that focus on different aspects of the park environment. Additional instructions are provided within each section.

Tips for Using the Community Park Audit Tool (CPAT)

- Drive, bike, or walk around the park to get a feel for the contents and characteristics of the park and surrounding neighborhood.
- The CPAT is organized such that questions on similar topics are grouped into logical sections and the four sections are arranged in the order that you might encounter them during your audit. However, you may need to switch between sections or pages as you complete the park audit. Therefore, it is important to review and be familiar with all of the tool sections and questions before you begin your audit.
- It is also important that you check back through the full document (6 pages) when you are finished to ensure you have completed all the sections and questions.
- Space is provided at the end of each section (and some individual questions) where you can take notes or record comments as you complete your audit. The margins or back of each page (if copied single-sided) can also be used to take notes, but please be sure that all relevant information is transferred to appropriate places on the tool and that all questions are fully answered using the format provided.
- If you see anything during your audit that requires immediate attention, contact the local parks department.

Section 1: Park Information

Park Name: _____ Observer Name or ID: _____

Park Address/Location: _____

Were you able to locate a map for this park? ❑ No ❑ Yes

Was the park easy to find onsite? ❑ No ❑ Somewhat ❑ Yes

Date (m/d/yr): ___/___/_____

Approximate Temperature: ___ °F Weather: ❑ Clear ❑ Partly Cloudy ❑ Rain/Snow

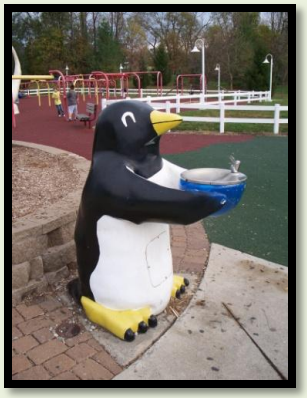
Start Time: _____ am or pm (circle) End Time: _____ am or pm (circle) Length of visit: _____ min

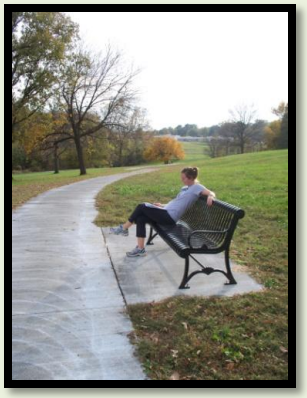
Comments on Park Information:

Park Features and Amenities

- All parks audited using the newly-developed Community Park Audit Tool
  - 6 pages
  - 4 sections
    - Park information
    - Access and surrounding neighborhood
    - Park activity areas
    - Park quality and safety
  - Strong inter-rater reliability (Kaczynski et al., 2012)

Measures





Park Features

- Park facilities
  - 8 facilities – park activity areas (out of 15 total facilities in the CPAT)
  - Calculated the proportion of parks in each tract with each type of facility
- Park Amenities
  - 21 amenities – neighborhood (5), quality (10), safety (6) (out of 25 total amenities included in the CPAT)
  - Calculated the proportion of parks in each tract with each type of amenity

Analyses

- MANCOVAs to compare across income and race tertiles:
  - number of parks
  - amount of park space
  - proportion of parks with individual facilities
  - proportion of parks with individual amenities

- Analyses controlled for:
  - tract land area
  - total tract population
  - percentage of the tract population under 18 years old
  - tract income or percent minority

Park Availability

Number of Parks and Total Park Acres by Income					
Tract Characteristic	N	Number of Parks		Total Park Acres	
		Mean	SD	Mean	SD
Income					
Low	57	1.46[a]	1.25	154.30	420.75
Medium	56	1.25[b]	1.00	246.82	544.54
High	57	1.00[b]	1.10	66.93	188.41
F		6.28		3.09	
df		2, 163		2, 163	
p		<.01		0.05	

[a,b] Any two means not sharing the same superscript are significantly different at p<.05

- Significantly greater number of parks in low income tracts than in high or medium income tracts
- No differences across race/ethnicity tertiles

Park Facilities

Proportion of Parks with Individual Facilities Per Census Tract by Income								
Tract Characteristic	Playground	Sports Field	Baseball Field	Swimming Pool	Basketball Court	Tennis Court	Trail	Lake
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Income								
Low	0.62[a] (0.40)	0.18 (0.34)	0.47 (0.43)	0.12 (0.27)	0.51 (0.44)	0.28 (0.39)	0.49 (0.41)	0.15 (0.29)
Medium	0.52[a] (0.41)	0.19 (0.32)	0.42 (0.42)	0.12 (0.29)	0.33 (0.42)	0.27 (0.39)	0.50 (0.43)	0.22 (0.36)
High	0.69[b] (0.38)	0.19 (0.36)	0.36 (0.40)	0.06 (0.15)	0.15 (0.32)	0.23 (0.33)	0.54 (0.41)	0.11 (0.25)
F	4.88	0.95	0.36	0.57	0.08	0.76	0.38	1.52
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.01	0.39	0.70	0.57	0.93	0.47	0.69	0.22

[a,b] Any two means not sharing the same superscript are significantly different at p<.05

- Greater proportion of parks with playgrounds in high income census tracts than in low or medium income tracts

Park Facilities

Proportion of Parks with Individual Facilities Per Census Tract by Percent Minority								
Tract Characteristic	Playground	Sports Field	Baseball Field	Swimming Pool	Basketball Court	Tennis Court	Trail	Lake
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Percent Minority								
High	0.67 (0.39)	0.15 (0.31)	0.49 (0.42)	0.12 (0.27)	0.59[a] (0.43)	0.33 (0.41)	0.39[a] (0.41)	0.18 (0.32)
Medium	0.57 (0.39)	0.24 (0.33)	0.34 (0.38)	0.11 (0.27)	0.30[b] (0.40)	0.27 (0.38)	0.55[b] (0.41)	0.21 (0.33)
Low	0.55 (0.42)	0.18 (0.36)	0.43 (0.43)	0.08 (0.21)	0.13[b] (0.29)	0.17 (0.32)	0.60[b] (0.41)	0.10 (0.27)
F	2.98	0.77	1.36	0.04	5.18	1.59	5.61	0.56
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.06	0.47	0.26	0.96	0.01	0.21	0.01	0.58

[a,b] Any two means not sharing the same superscript are significantly different at p<.05

- Greater proportion of parks with basketball courts in high percent minority tracts than in medium or low minority tracts

Park Facilities

Proportion of Parks with Individual Facilities Per Census Tract by Percent Minority								
Tract Characteristic	Playground	Sports Field	Baseball Field	Swimming Pool	Basketball Court	Tennis Court	Trail	Lake
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Percent Minority								
High	0.67 (0.39)	0.15 (0.31)	0.49 (0.42)	0.12 (0.27)	0.59[a] (0.43)	0.33 (0.41)	0.39[a] (0.41)	0.18 (0.32)
Medium	0.57 (0.39)	0.24 (0.33)	0.34 (0.38)	0.11 (0.27)	0.30[b] (0.40)	0.27 (0.38)	0.55[b] (0.41)	0.21 (0.33)
Low	0.55 (0.42)	0.18 (0.36)	0.43 (0.43)	0.08 (0.21)	0.13[b] (0.29)	0.17 (0.32)	0.60[b] (0.41)	0.10 (0.27)
F	2.98	0.77	1.36	0.04	5.18	1.59	5.61	0.56
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.06	0.47	0.26	0.96	0.01	0.21	0.01	0.58

[a,b] Any two means not sharing the same superscript are significantly different at p<.05

- Greater proportion of parks with trails in low and medium percent minority census tracts than in high minority tracts

Park Neighborhood Amenities

Proportion of Parks with Individual Neighborhood Amenities Per Census Tract by Income					
Tract Characteristic	Transit	Car Parking	Sidewalk	External Trail	Traffic Signal
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Income					
Low	0.70 (0.42)	0.90 (0.27)	0.87[a] (0.28)	0.07 (0.20)	0.86 (0.26)
Medium	0.54 (0.46)	0.91 (0.22)	0.61[b] (0.43)	0.08 (0.22)	0.74 (0.39)
High	0.29 (0.43)	0.87 (0.27)	0.74[a] (0.38)	0.12 (0.22)	0.63 (0.43)
F	0.68	0.13	5.13	0.65	2.46
df	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.51	0.88	0.01	0.53	0.09

[a,b] Any two means not sharing the same superscript are significantly different at p<.05

- Greater proportion of parks with sidewalks in low and high income census tracts than in medium income tracts

Park Quality/Safety Amenities

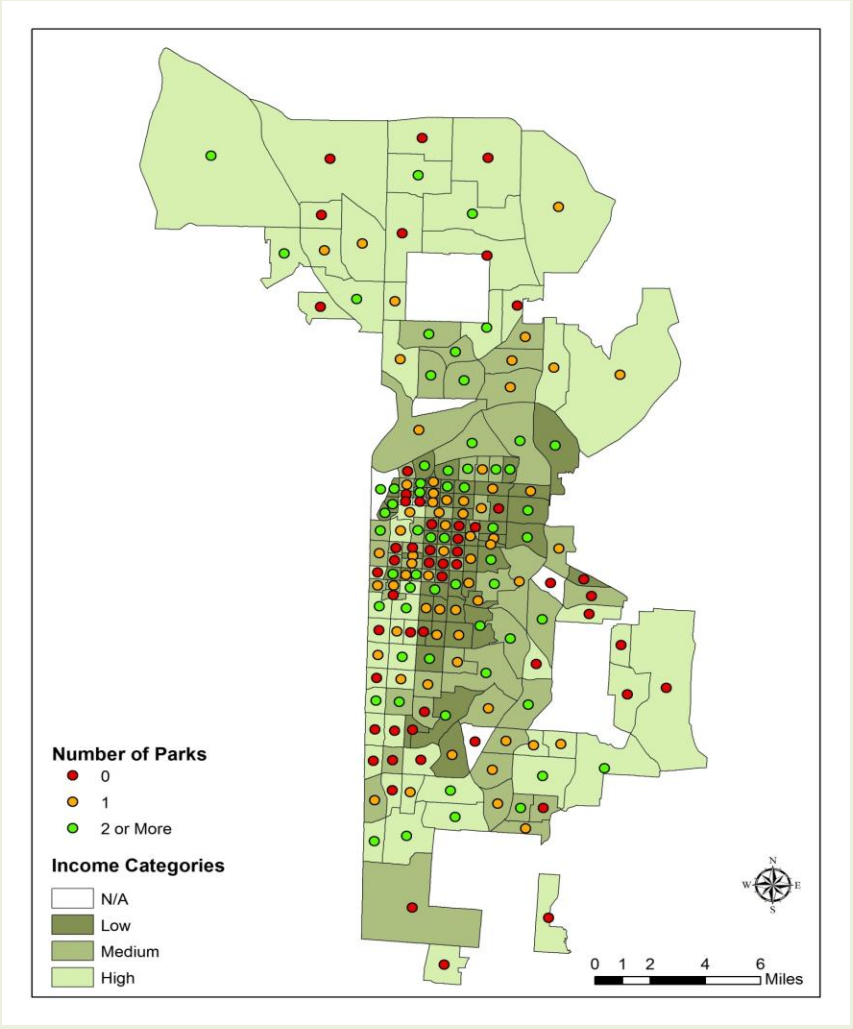
- 10 park quality amenities were included in the analysis (e.g., restrooms, drinking fountains)
- 6 park safety amenities were examined (e.g., lights, neighborhood visibility)
- Proportion of parks with each individual park quality amenity or park safety amenity was not significantly different across low, medium, and high income or percent minority census tracts

Discussion – Park Availability

- In KCMO, overall park availability was greater in low income areas
- This study provides additional evidence that park availability is rarely balanced in communities, and may actually be skewed often in favor of low SES neighborhoods

Discussion – Park Availability

- The majority of low income tracts in KCMO are concentrated in the urban core of the city
- May be a function of greater mixed land use planning that is more common in older developments



Discussion – Park Facilities

- **High income** tracts had significantly **more playgrounds** per park
  - playgrounds are an essential feature in parks to promote and facilitate children's physical activity behaviors (Timperio et al., 2008; Veitch, Bagley, Ball, & Salmon, 2006)

- Proportion of parks with **basketball courts** was significantly **greater in high minority** census tracts
  - basketball courts are among the top activity areas for higher levels of energy expenditure among park users (Floyd et al., 2008)

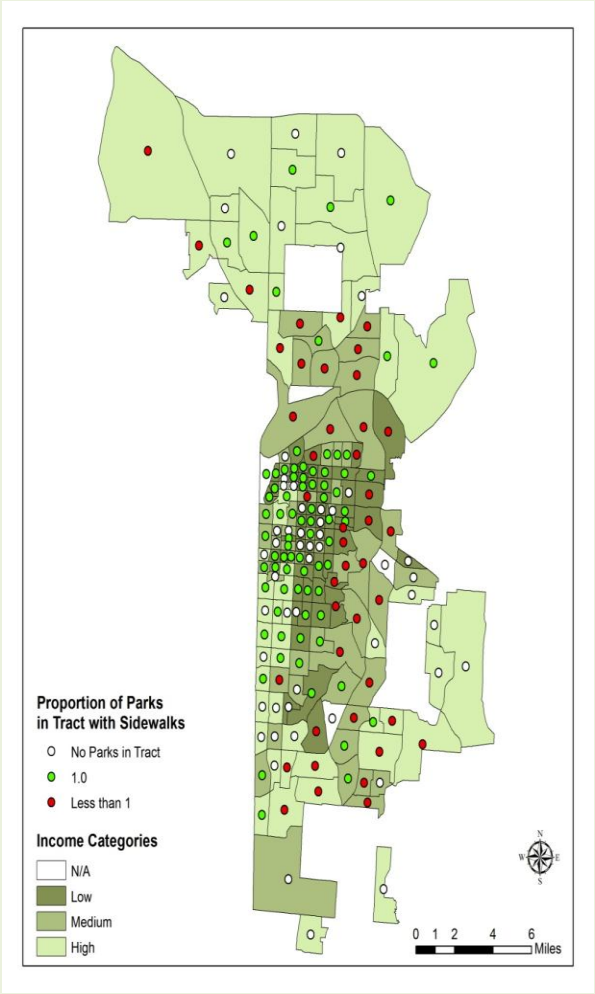
- Proportion of parks with **trails** was **lower in high percent minority** tracts
  - presence of a walking trail encourages engagement in physical activity (Kaczynski et al., 2008; Paxton et al., 2005)

Discussion – Park Facilities

- Providing higher use, higher intensity activity areas such as playgrounds, trails, and basketball courts may be critical to have a public health impact on energy expenditure and obesity levels among at-risk population groups

Discussion - Neighborhood Amenities

- Higher proportion of parks with sidewalks in low and high income compared to medium income census tracts
- Sidewalks an important environmental support and predictor of physical activity (Christensen et al., 2010)
- Low income areas – more central
- High income areas – more tax revenue?
- Additionally, should consider sidewalk condition in disadvantaged areas (Kelly et al., 2007)



Discussion – Park Safety Amenities

- Park safety amenities were equally distributed by tract income and percent minority
- This is encouraging because safety influences park use and physical activity
  - People who perceive parks as safe, especially in low or medium SES neighborhoods, are more likely to use them and be active overall (Babey et al., 2008)

Limitations

- Other units of analysis may be just as or more useful
- Accessibility not measured, just availability of parks in the census tract
- Not all of the park facilities and amenities that were accounted for in the audits were included in the analyses
  - Some resources too scarce or too prevalent
  - Little variance in the condition of park facilities and amenities
  - Should also examine types of land uses around the park (Coen et al., 2006; Crawford et al., 2008)

Future Research

- Characterize park availability and characteristics in even more detail:
  - Population-weighted estimates of park accessibility within tracts
  - Quality/condition of park facilities and amenities
  - Overall park quality concerns and aesthetic features
  - Composition of neighborhoods around parks (e.g., land uses, quality and safety concerns)
- Examine disparities in park availability and features across diverse racial groups
- Explore policies that contribute to and that might rectify disparities in access to safe and attractive parks and open spaces
- Are disparities in access to quality park environments associated with differences in physical activity levels and health outcomes?

Conclusion

- Several differences in availability or features across the census tracts that should not go overlooked

- Leveling the playing field through providing quality park environments in low income and high minority areas can have a public health impact which will help to address the obesity crisis through the provision of environmental supports for physical activity

Acknowledgments

- Kansas State University
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