Neighborhood Land Use, Walking, and Cardiorespiratory Fitness among Cooper Clinic Participants in Travis County (Austin), Texas (N=1,063)

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Purpose

To test for associations of neighborhood land use with clinically measured cardiorespiratory fitness.

To extend previous research on built environment influences that has relied mostly on self-reported physical activity.

Background

Mix of neighborhood land use has been associated with self-reported walking and total physical activity in previous research.[1-7]

Hypothesis : People living near retail destinations walk more than those living in residential-only neighborhoods.

Methods: Participants

- Source: Cooper Clinic visit data from 2000-2005
- Participants living in Dallas-Fort Worth area or Travis County (Austin)
- To define neighborhoods, 400-meter (.248 miles) straight line buffer zones were drawn around each previously geocoded home street address
- Walking was self-reported
- Fitness was tested with a maximal treadmill test[8]

Methods: Land Use

Source: City of Austin Long Range Planning Group 2003 land use inventory codes, with 289,783 parcels in Travis County[9]

A parcel is a small unit, the land area of a single property's building and grounds. Parcels vary in geographic area.

Land use codes were condensed and matched with those from the Dallas-Forth Worth area.

Analyses were conducted using ArcGIS 9.3.2 and SAS 9.2.

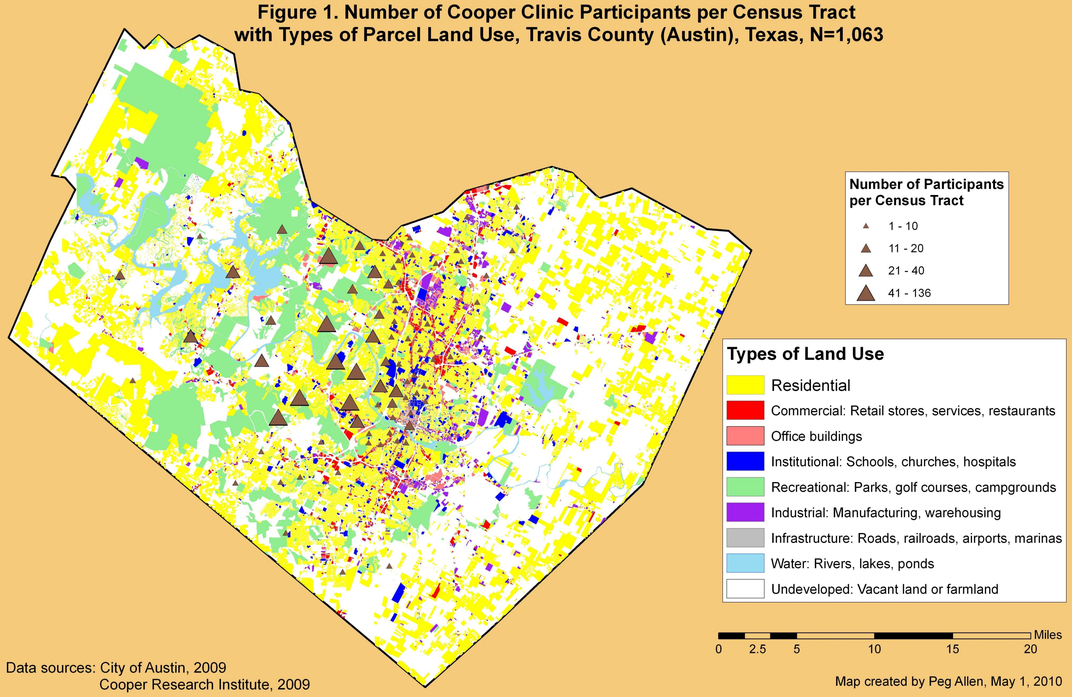
Results: Participants

Table 1 .Characteristics of Travis County Cooper Clinic participants, N=1,063.

Characteristics	Men (n=646)	Women (n=417)
Non-Hispanic white, %	91.4%	91.1%
Body mass index (BMI) Obese (BMI ≥ 30.0), % Overweight (25.0 ≤ BMI < 30.0), % Normal or underweight (BMI < 25.0), %	 15.8% 48.9% 35.3%	 7.2% 16.3% 76.5%
Age in years, range, mean ± sd	46.3 ± 8.9 yrs 21 to 78 yrs	44.5 ± 8.4 yrs 20 to 75 yrs
Minutes walked per week, n=442, median, range	90.0 min 15 to 900 min	90.0 min 15 to 700 min
Cardiorespiratory fitness level, metabolic equivalents (METs), mean ± sd	12.1 ± 1.8 METs	7.6 ± 1.6 METs

Results: Land Use

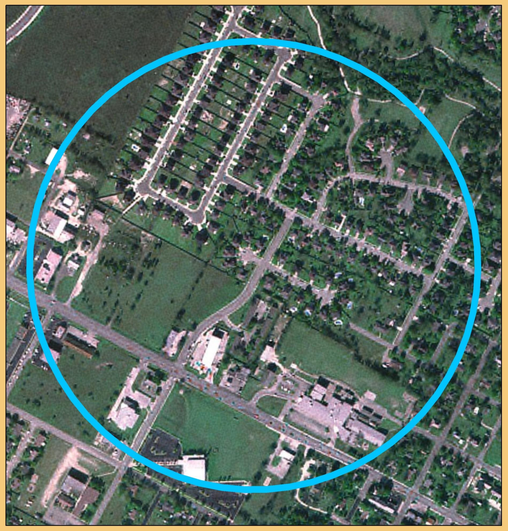
Figure 1. Number of Cooper Clinic Participants per Census Tract with Types of Parcel Land Use, Travis County (Austin), Texas, N=1,063

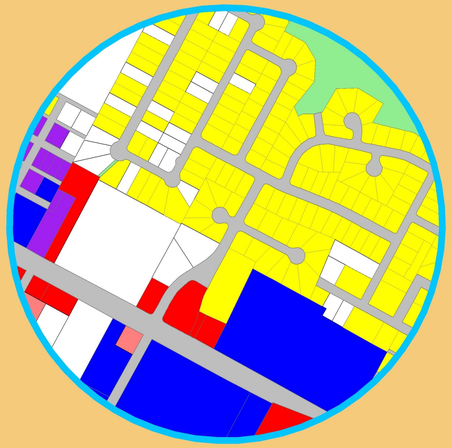


Data sources: City of Austin, 2009
Cooper Research Institute, 2009

Map created by Peg Allen, May 1, 2010

Figure 2. Land Use in a Sample 400 Meter Buffer Zone in Travis County





Commercial land use is 4.6% of the sample buffer's area.

Map created by Peg Allen, May 4, 2010

Parcel data from the City of Austin, 2009

Results: Percent Commercial Land use

- 22.1% of participants had any commercial land use within 400 meters of home
- Multiple regression analyses showed no significant associations of commercial land use with fitness, walking or BMI after controlling for gender and age

Table 2. Amounts of commercial land use within 400 meters of participants' homes.

Commercial Land Use (% of buffer area)	Participants (N=1,063) %
None	77.9
0.1 – 2.9%	10.0
3.0 – 5.9%	6.6
6.0 – 41.6%	5.6

View of Austin, TX, courtesy of Pedestrian and Biking Information Center.

Summary

This project shows work in progress for application in a larger study. Commercial land use is not a stand-alone measure, but rather is a step towards testing combination measures of the built environment for hypothesized associations with cardiorespiratory fitness.

Photos of Austin , TX courtesy of Pedestrian and Biking Information Center.

Next Steps

Use ArcGIS Model Builder to include all 12,274 Cooper Clinic participants and land parcels from all 12 counties in analyses.

Test different measures of neighborhood walkability.

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