Physical Activity Resource Accessibility in Boston

## Are you getting enough exercise?

Daily physical activity reduces the risks of dangerous diseases like diabetes and coronary heart disease and other cardiovascular risks. It can strengthen bones, joints and muscles. It is recommended that adults get at least 30 minutes of moderate intensity aerobic activity per day and do muscle strength exercise 2 or more days per week. Despite all the benefits of exercise more than 75% of Americans get insufficient or no exercise at all.

There are a number of factors that influence people's level of physical activity including both physical and social environmental factors. For the purpose of this study I examine the physical environment to assess the walkability of exercise facilities for people living in the city of Boston.

Purpose

The goal of my project was to assess the Boston communities accessibility to indoor physical activity resources including gyms, personal trainers, physical activity classes, pools, etc. and how this differes by neighborhoods of different socioeconomic status. I chose to only assess indoor facilities because these are resources that can be used year-round despite seasonal changes in weather.

Types of Facilities
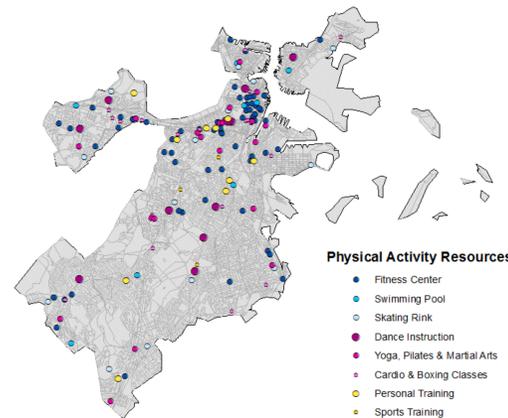
First I assessed the types of physical activity resources available. I created a map of Boston that included all the roads and the physical activity facilities as points on the map. I separated these by categories depending on the types of services offered.

Physical Activity Resources
- Fitness Center
- Swimming Pool
- Skating Rink
- Dance Instruction
- Yoga, Pilates & Martial Arts
- Cardio & Boxing Classes
- Personal Training
- Sports Training

Walkability to Facilities

To assess walkability to these different resources I first separated the facilities into three categories according to services provided including fitness centers, pools & skating facilities; Yoga, Pilates, martial arts & cardio/boxing classes; and personal & sports training.

Next I created ½ mile buffer around each facility and then created a raster from these buffer shapes. Raster creates a grid of cells over the map and assigns a value to every single cell on the grid. I assigned cells within buffer zones a value of 1 and any cells that were outside the buffer was 0.
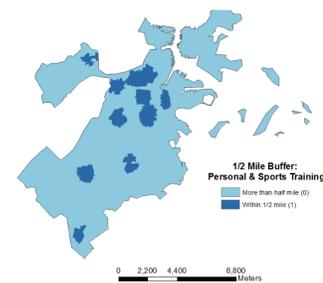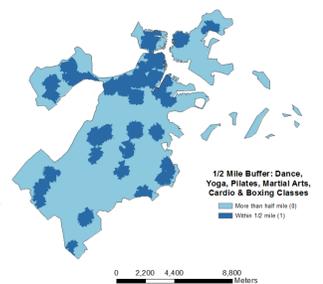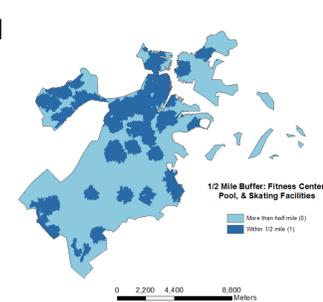
In order to assess overall walkability to facilities I combined these three raster maps into one using the raster calculator. This calculator adds the value of the overlapping cells. If a cell lied within a buffer on all three maps it was assigned a value of 3, but if the cell was in a buffer on only two of the maps it was assigned a value of 2, and so on.

½ Mile Buffer: Fitness Center, Pool, & Skating Facilities

½ Mile Buffer: Dance, Yoga, Pilates, Martial Arts, Cardio & Boxing Classes

½ Mile Buffer: Personal & Sports Training

Walkability Score
- Not Walkable
- Low (0-.25)
- Medium (.26-.5)
- High (.55-.75)
- Very High (.76-1.4)
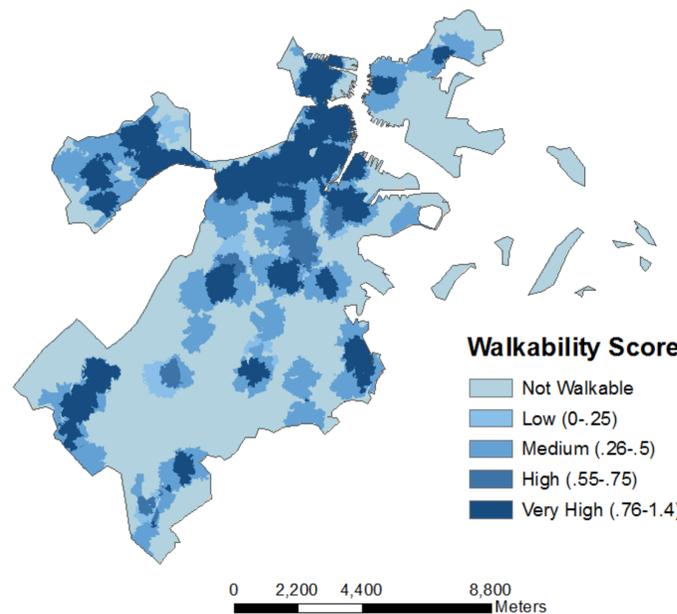
Differences by Socioeconomic Status

Past research has shown that people of lower socioeconomic status reportedly exercise less and are often deprived of resources like healthy food, parks and physical activity resources. To assess how availability of resources varied by neighborhoods of different socioeconomic status I used medium household income data from the Census 2000 data and mapped this according to census tracts.

Next I used the statistics calculator to summarize the percent of total population and the average household median income in each category of walkability. I found that the majority of people live in neighborhoods that have either low or medium walkability to physical activity resources.

Census Tract Median Household Income
- 0 - 20,000
- 20,001 - 40,000
- 40,001 - 60,000
- 60,001 - 80,000
- 80,001 - 98,906
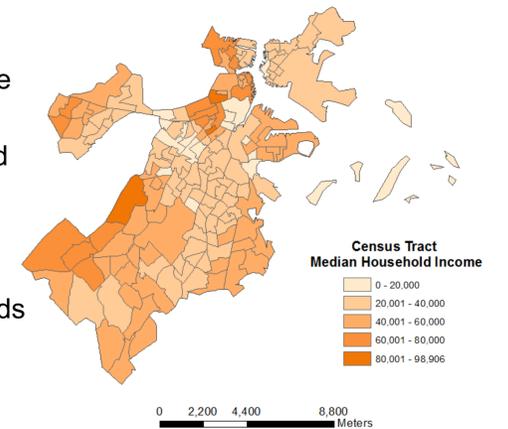
Census Tract by walkability score	Percent of Total Population	Average Household Median Income
Not walkable	4.28	37,291
Low	36.1	40,688
Medium	26.7	33,984
High	22.8	42,117
Very High	10.1	48,035
Total	100	39,683

I also found that the average household median income was highest for people living in areas that are highly walkable and the income was lowest for people who lived in non walkable areas to physical activity resources. This study was limited in that it only took into account people's average household income but it would be interesting to assess a number of other factors including demographics about the population like age, education and ethnicity.

Tufts UNIVERSITY