

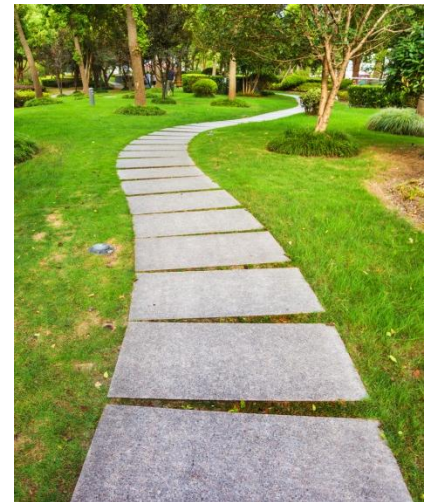
Methods for Evaluating Natural Experiments in Parks: *Impact on Physical Activity*

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Common Scenarios

- A park is renovated, adding new equipment or sprucing up facilities
- A new pocket park is developed in a previously vacant lot
- A new exercise program is being offered in the community



How Effective are Park Interventions?

- Are there more park users?
- Are the park users more active?
- Do already active people just shift to a new location, or is there a net increase in physical activity?
- What is the return on investment?



Decisions when designing and conducting evaluations

- **Goals**
 - General change in # of park users vs. specific target groups? (Age, gender, race/ethnicity)
 - Importance of MVPA vs. Sedentary behavior
- **Budget limits on data collection**
 - How much observation is necessary?
 - What about self-reports/surveys?
 - Park Users? Local residents?

Observational Methods

- SOPARC
 - Ability to disaggregate by age group and activity level
 - Assessment over long/short time periods
 - Number of observers
 - Seasonality

Measurement Instrument: System of Observing Play and Recreation in Communities (SOPARC)*

The SOPARC is a protocol to conduct direct observation of physical activity in built environment. Key steps of the SOPARC include

- Mapping a park and dividing into numbered target areas
- A full-park observation consists of scans of all target areas in order.
- Scan each target area (usually by two observers) to record the use by gender, age, physical activity level, and race/ethnicity.
- Park-level observation: environment and atmosphere
- Static pictures

* Details of the SOPARC protocol and observation protocol were reported in

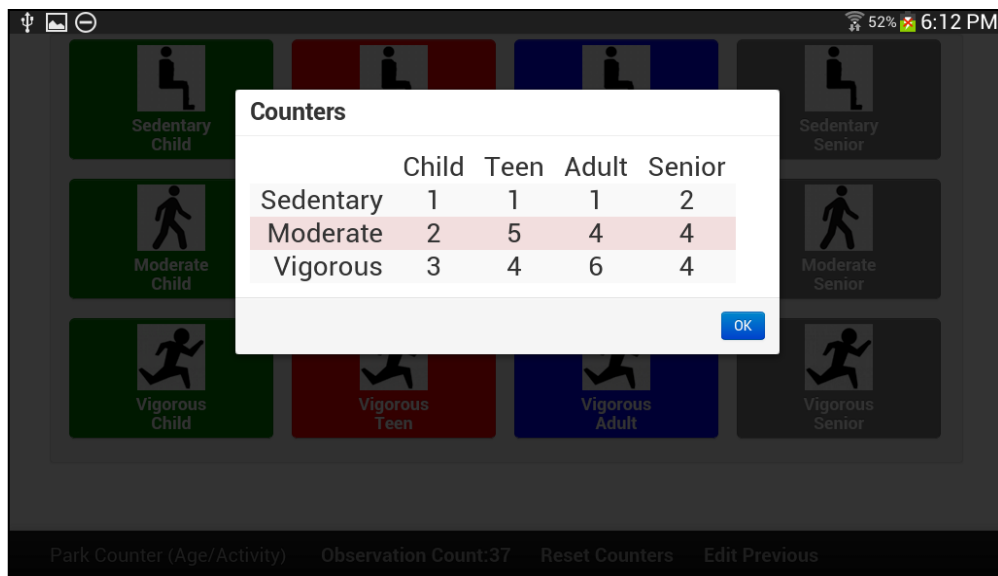
1. McKenzie TL, Cohen DA., Sehgal A, et al. (2006). System for Observing Play and Recreation in Communities (SOPARC): reliability and feasibility measures. *J. Physical Activity & Health*, 3, S208.

2. Han B, Cohen D, Derose, KP, et al. (2015) Validation of a new counter for direct observation of physical activity in parks. *J. Physical Activity & Health*. Forthcoming.

Example of mapped park



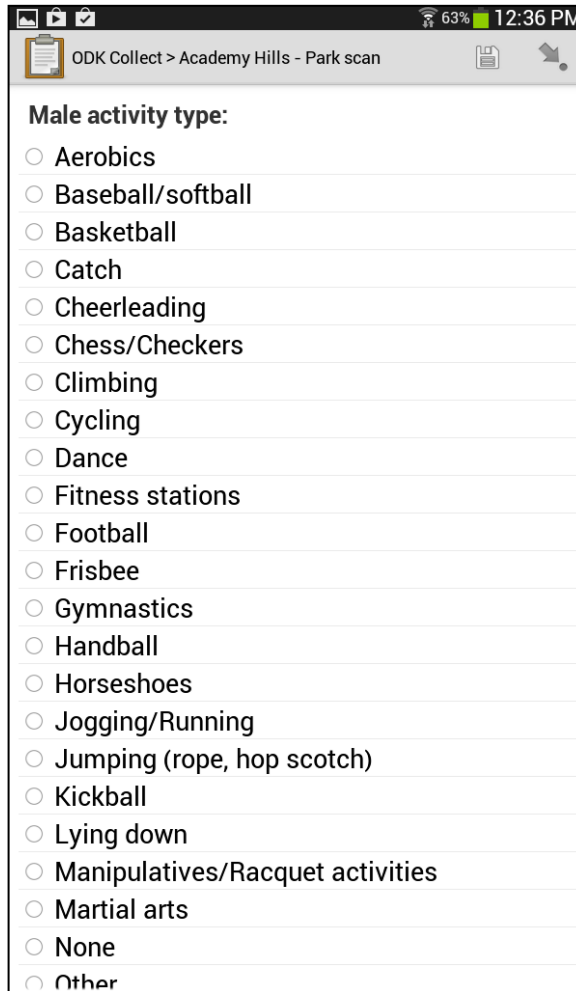
Tablet-based Counter for Recording Park Use and Physical Activity by Gender



Electronic Forms For Storing Data

We used the Open Data Kit (ODK) to store and transfer data collected in the field.

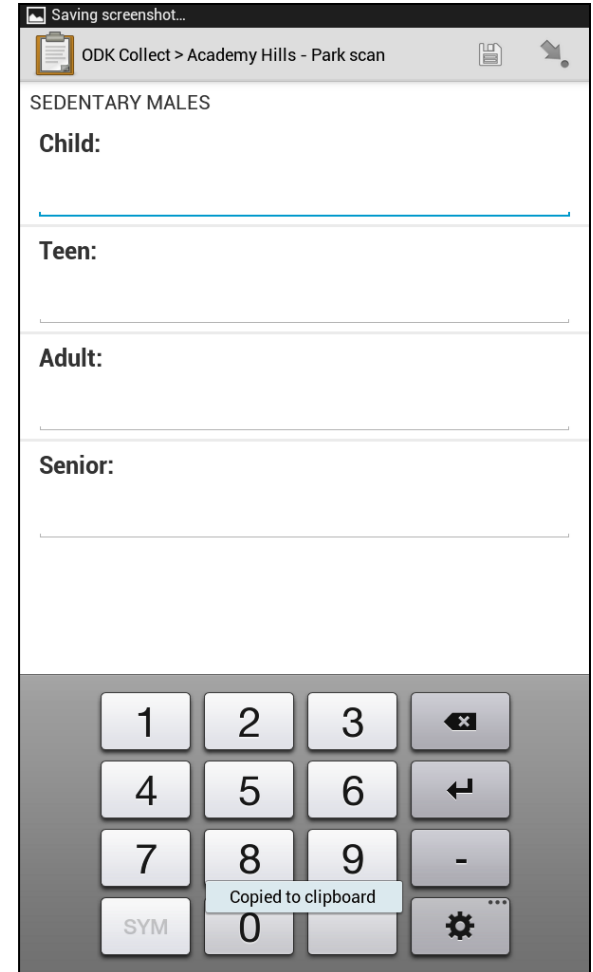
- Front end: standard apps on tablet computers
- Back end: Google cloud computing services



ODK Collect > Academy Hills - Park scan

Male activity type:

- Aerobics
- Baseball/softball
- Basketball
- Catch
- Cheerleading
- Chess/Checkers
- Climbing
- Cycling
- Dance
- Fitness stations
- Football
- Frisbee
- Gymnastics
- Handball
- Horseshoes
- Jogging/Running
- Jumping (rope, hop scotch)
- Kickball
- Lying down
- Manipulatives/Racquet activities
- Martial arts
- None
- Other



Saving screenshot...

ODK Collect > Academy Hills - Park scan

SEDENTARY MALES

Child:

Teen:

Adult:

Senior:

1 2 3 [X]

4 5 6 [←]

7 8 9 [-]

SYM 0 [⚙]

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Environmental Scans

- Park conditions can influence/explain use:
 - Litter
 - Graffiti
 - Noise
 - Weather
 - Food vendors
 - Stray dogs
 - Homeless
 - Gangs, threatening behaviors
 - Major events
 - Construction



Pre-Post Design

- Controlled design (difference-in-differences)
- Consider duration between pre and post
 - Seasonal factor (usually 1 year minimum)
 - Time after intervention in place (more response right away due to novelty, and may drop off)
- Consider small number of parks vs. large number of repeated measures per park

Analytic Issues

- Small number of parks
- Many observations (usually 12-16)
 - Provides statistical power to detect differences
 - Captures intra-day and inter-day variation in park use

Verification

- Tools have time-stamps, so it is possible to verify accurate data collection
- Tablets have cameras, so can check reliability of observations
- We usually take 1 picture per park assessment.

Full-park Observation Schedule

Tuesday	Thursday	Saturday	Sunday
8am	12pm	9am	11am
11am	3pm	12pm	2pm
2pm	6pm	3pm	5pm

Training

- 2 days
- Practice in the field
- Meet reliability standard (80% agreement)
 - Do full park rotation,
 - Observe at least 3 complex target areas (>5 people in MVPA)

Decision to Survey

- Park Users vs. Local Residents
 - Park users easier to do
 - Depends on how busy park is
 - Convenience (80%) vs. quota (42%) or systematic sampling (higher refusal rates among sedentary than active)

Implementation Challenges

- Safety concerns
- Access problems in community
- Household surveys requires more time, multiple visits (83% response rate with up to 4 visits)

Survey Items

- Assess:
 - Self-reported park use and PA, distance/mode travel
 - Exposure to the intervention
 - Facilitators and barriers to park use
- Other research questions/outcomes
 - Mental health, social capital, isolation
- Usually serial cross-sectional, rather than longitudinal cohort

Concerns

- Sample size:
 - For small exposure, need larger sample sizes
 - Very difficult to capture change from surveys
- Identify exposure to intervention or outreach
- Substitution or change– need to include non-park users

Return on Investment

- Calculate the cost of the investment/net gain in METS
 - Sedentary= 1.5 METS
 - Moderate PA= 3 METS
 - Vigorous PA= 6 METS
 - Consider only MVPA (or also include sedentary, assuming people engaged in moderate PA to get to the park)

Fitness Zone Evaluation

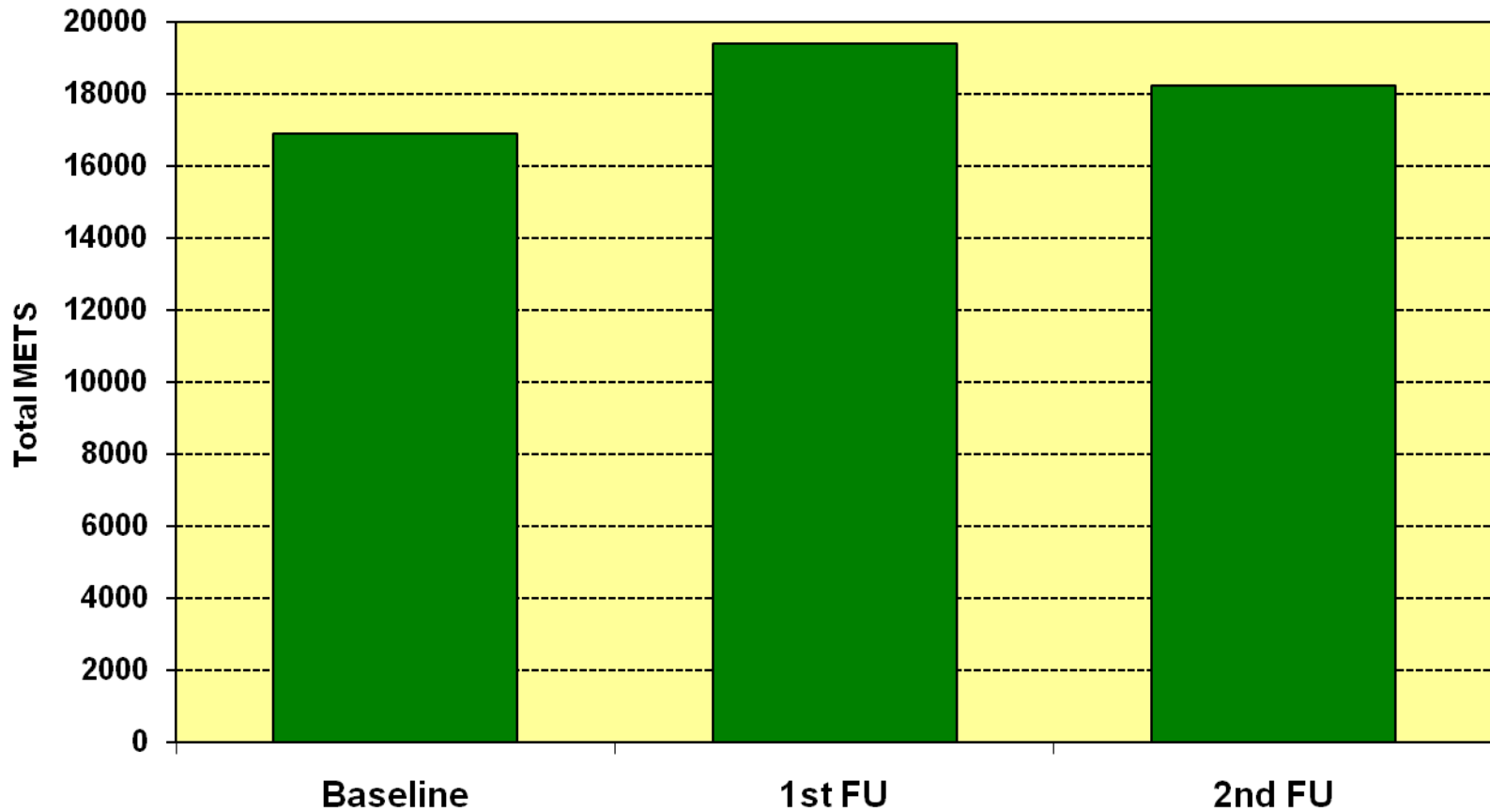
(pre-post design, post-hoc controls)



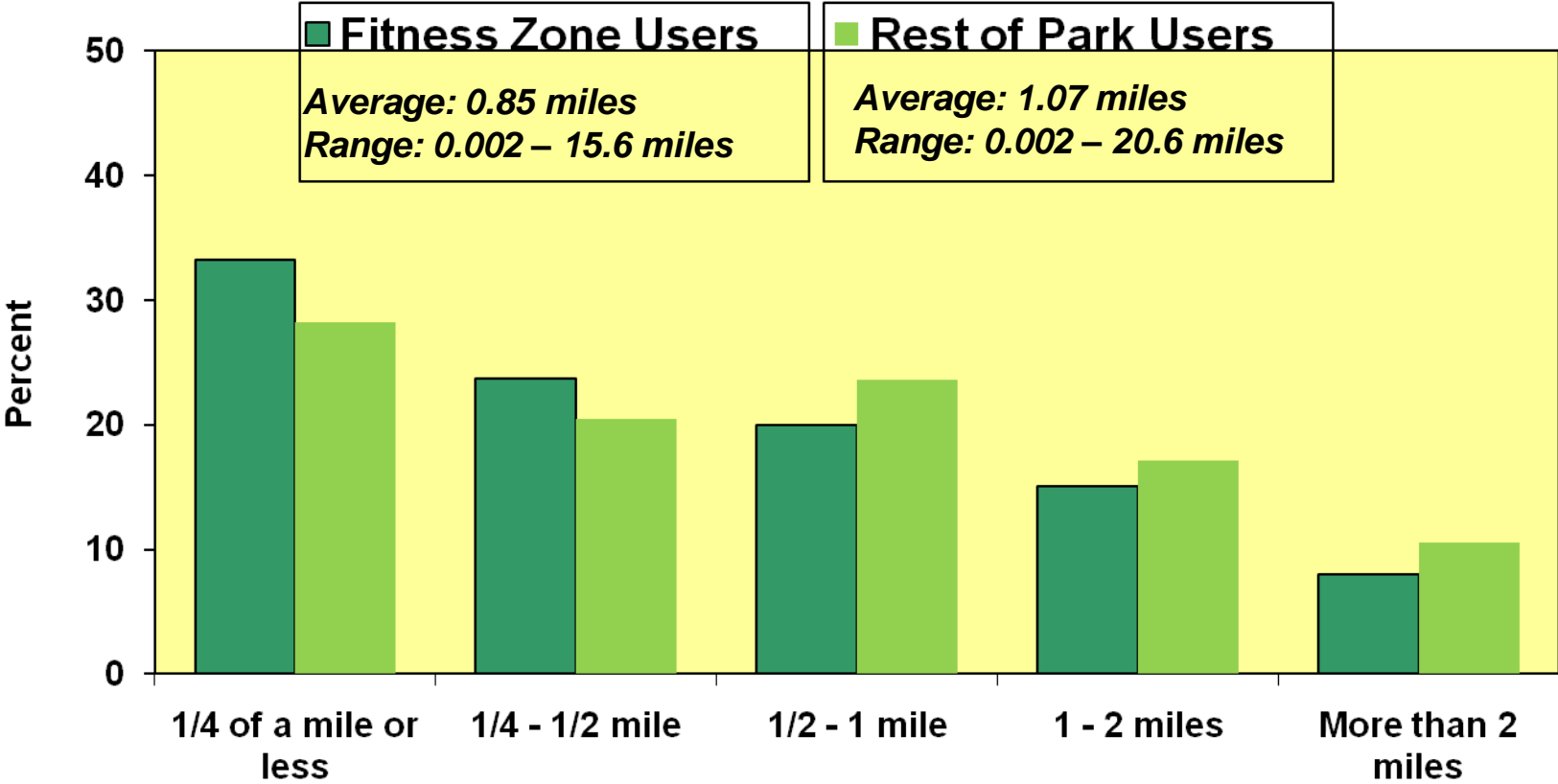
- How well is the TPL fitness equipment used after installation?
 - Which age, gender, race/ethnic groups use it?
 - How often do they use it?
 - Do they use it correctly?
- Do more people use the park (Fitness Zones plus other activity areas)?
 - Are they more physically active than when the equipment was not available?

Total METs (12 Parks)

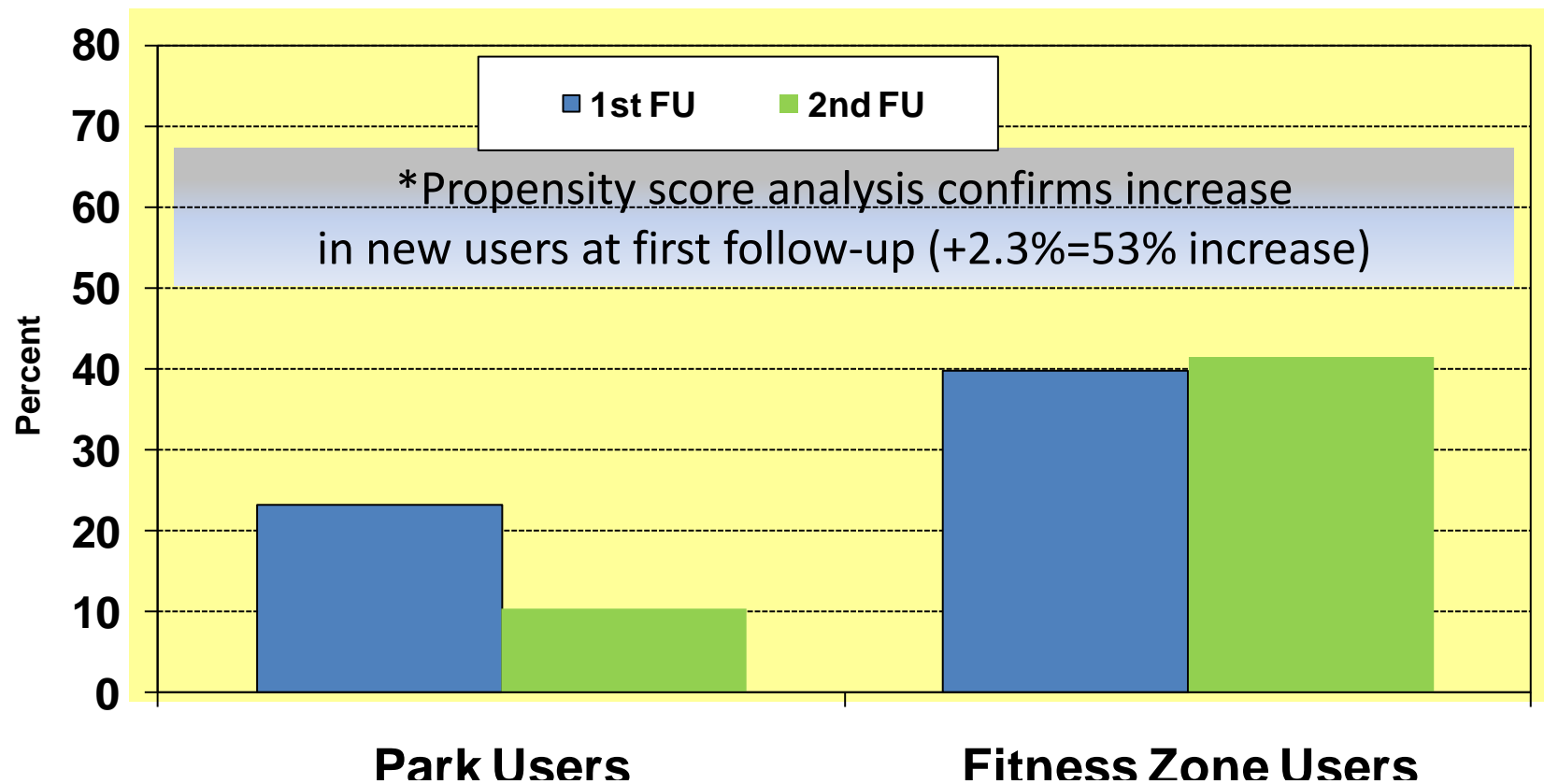
***1 MET = Energy at rest for 1 hour
1.5 = Sedentary, 3.0 = Walking, 6.0 = Vigorous***



Distance Fitness Zone Users Live from Park (1st and 2nd Follow-up Combined)



Percentage Coming to the Park Solely to Use Fitness Zone Equipment



**controls for age, race, gender, ethnicity, distance from the park, participation in park activities, physical activity at work*

Cost-Effectiveness is Favorable

Assumptions:

- \$45,000 per zone for 15 years or \$3000/year
- If maintenance is \$2000 per year, annual cost is \$5000
- Assume that average METs expended between time 1 and 2 holds for 12 hours/day, 7 days/week, 48 weeks/ year
- Cost per MET is \$0.09/MET per FZ
- For adults, less than \$0.50/MET is considered cost-effective; thus FZ more cost-effective than many other evaluated physical activity interventions



Lessons Learned

- Be prepared for delays
 - Renovations are often not on schedule
 - Park staff don't even know when things will happen
- Factors outside of park control/domain can affect success of projects
 - Budget changes, sports league changes
 - Violence/gangs
 - Uncooperative staff
 - Weather
 - Controls are contaminated (become interventions)

Recommendations

- Allow extra time to complete project
- Be persistent
- Watch out for observer drift/shortcuts/missing data
- Review data to assess fidelity to protocols and allow for makeups when data are missing

Stay on top of it!