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A Longitudinal Study:

The Impact of a Signalized Crosswalk on Crossing Behaviors in a Low-Income Minority Neighborhood

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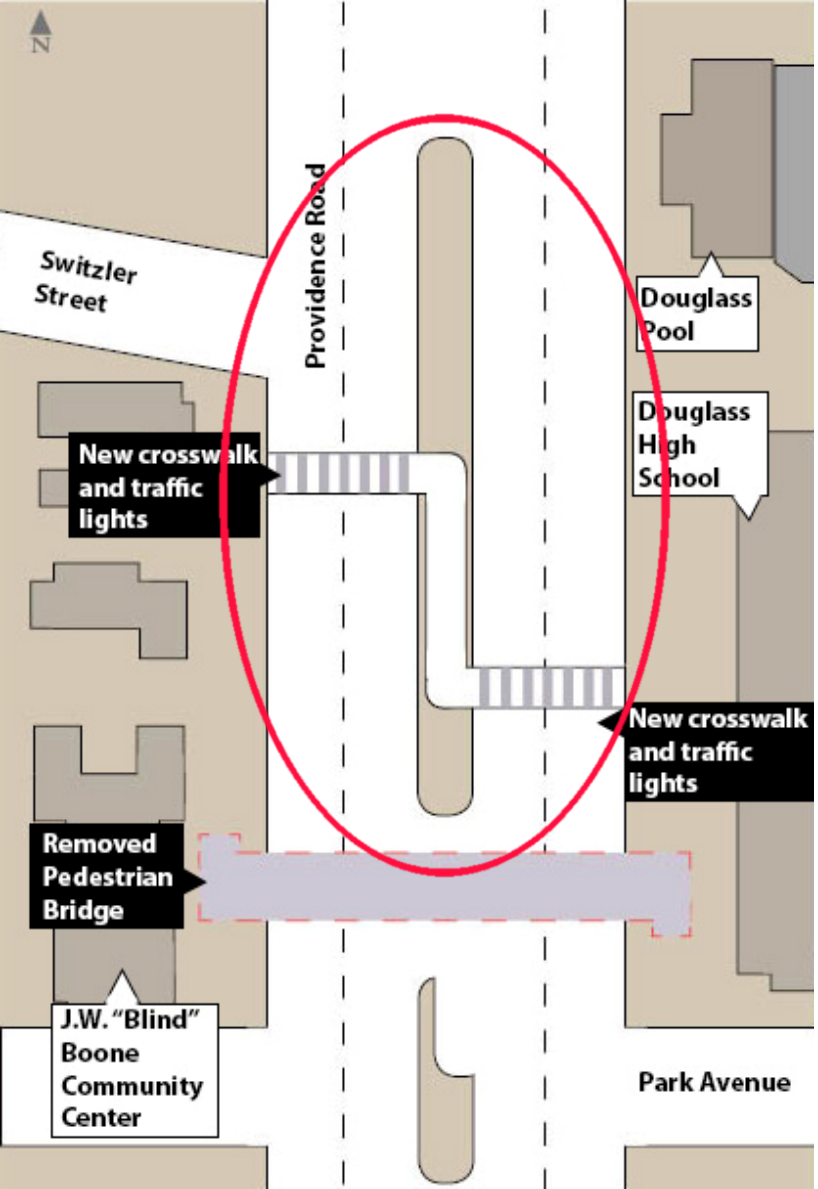
Pedestrian Crossings

Safe access to physical activity opportunities has been positively linked to active lifestyle behaviors.

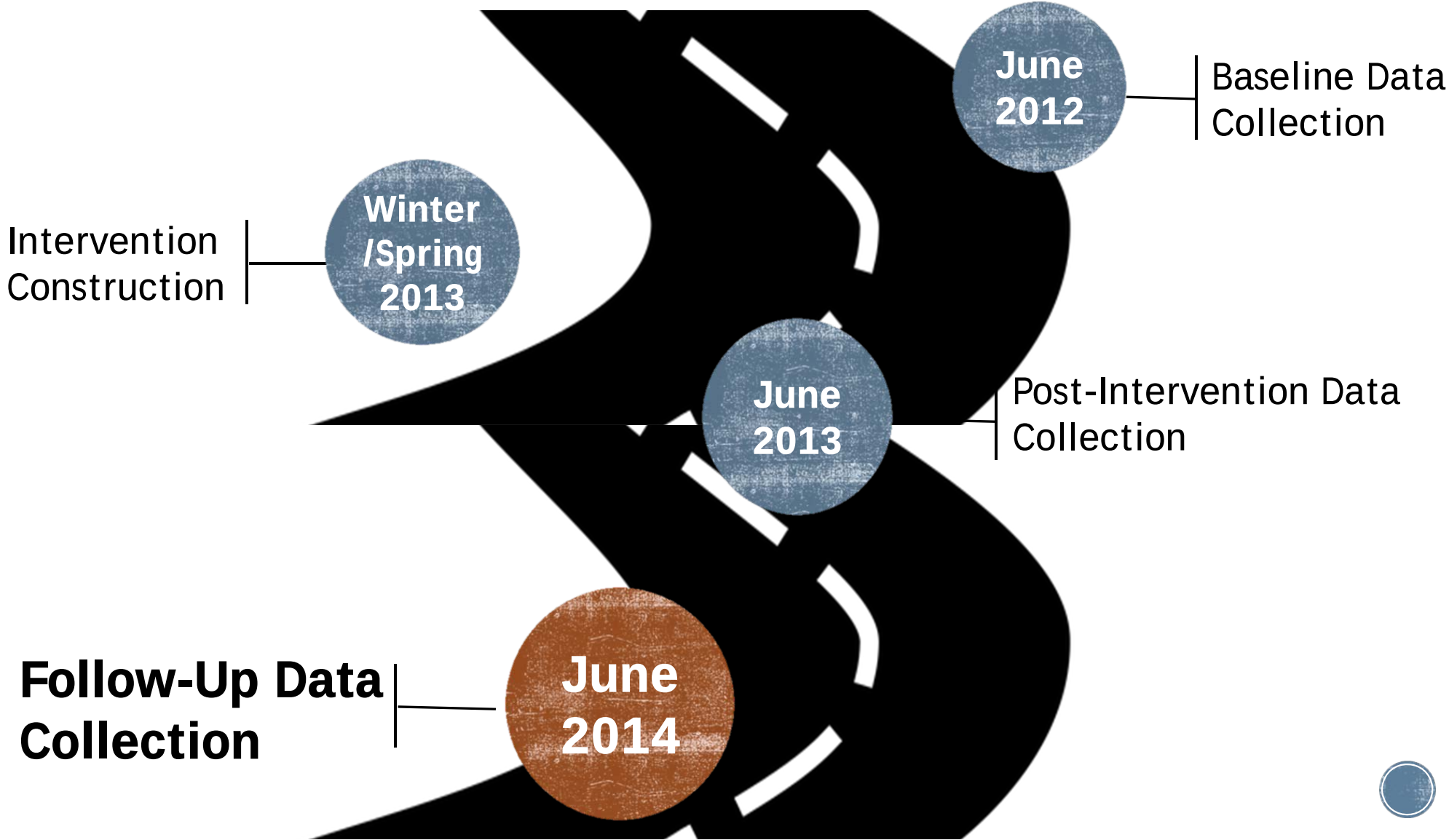
Traffic calming measures and infrastructure improvements (e.g., signalized crosswalks) have been shown to encourage active lifestyle behaviors.

Little research has examined the longitudinal impact of crosswalk improvements on pedestrian crossing behaviors.

A Natural Experiment



- **Columbia, Missouri**
  - 2012-2014
- **Removal of pedestrian bridge**
  - Fears about crime and personal safety
  - Poorly designed (non-ADA compliant)
- **Installation of a signalized pedestrian crosswalk system**
  - 400-feet long landscaped median

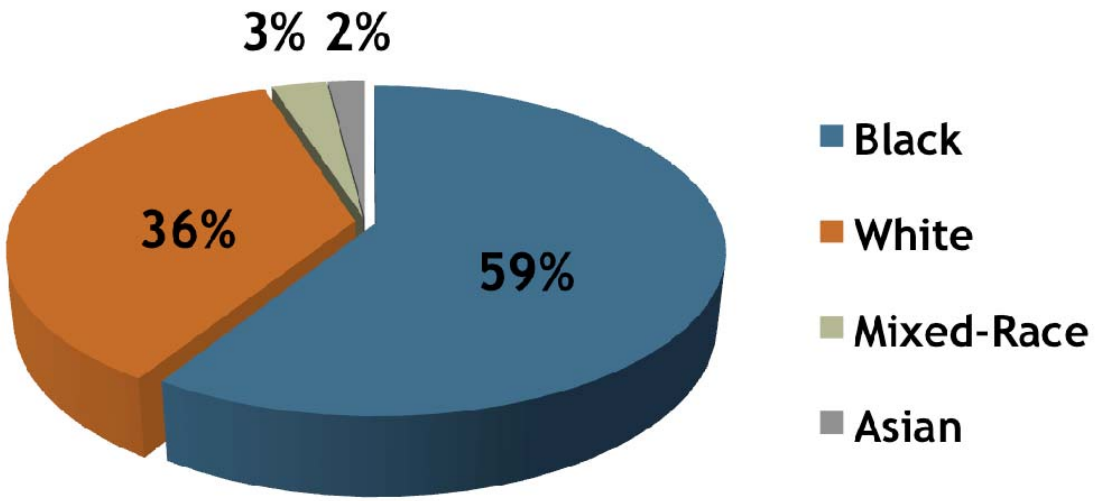

June 2012
Baseline Data Collection
Winter /Spring 2013
Intervention Construction
June 2013
Post-Intervention Data Collection
Follow-Up Data Collection
June 2014

Intervention Population

Neighborhood Demographics

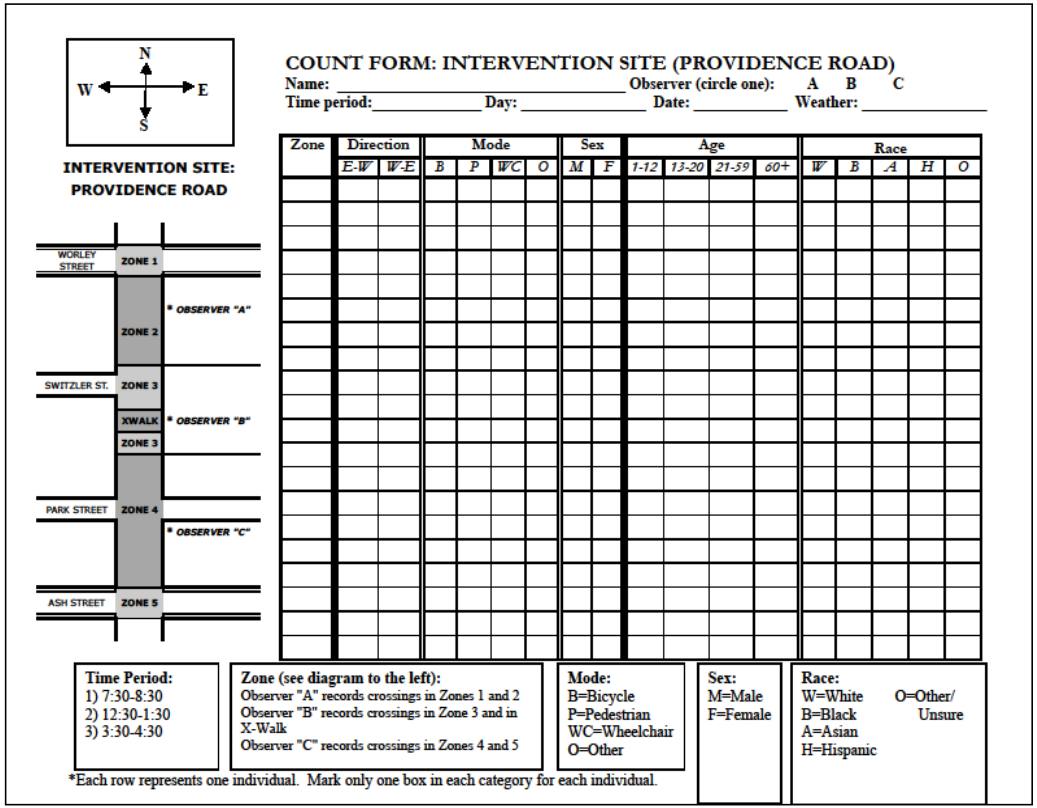
- **57%** of families live below poverty level
- Median household income **$8,359** per year

Race/Ethnicity



Methods-Crossing

- **Data Collection**
  - Direct Observation
- **Collection Period**
  - June 2012, June 2013 & June 2014
  - 21 observational shifts over two weeks
  - Three daily times (7:30a-8:30a,12:30p-1:30p, & 3:30p-4:30p)
- **Crossing Zones**
  - Non-Designated
  - Designated at Intersections
  - Designated at Intervention Location (bridge & crosswalk)



Methods-Study Design

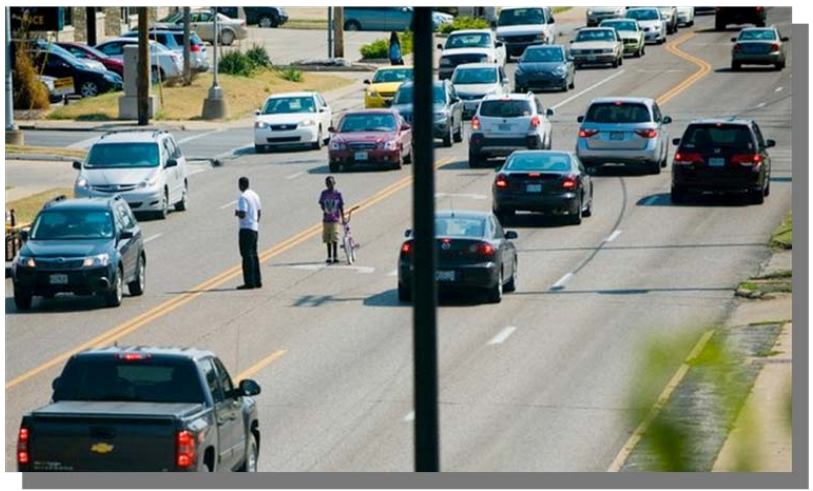
- **Control Site**
  - Neighborhood (e.g., size, income level, demographic profile)
  - Corresponding street (e.g., number of lanes, typical traffic volumes/speeds, pedestrian crossing facilities)

Methods-Traffic

- **Data Collection**
  - Nu-metrics Hi-Star traffic detectors embedded into the four travel lanes at both the Intervention site and the Control site
  - 150 consecutive hours during study period
  - Recorded the speed of every vehicle and stored both speed and volume data in one-hour time bins
  - 2014 Control traffic data unavailable due to construction on a side street.

Initial Impacts of the Crosswalk

2012-2013 Results



Crossing behaviors witnessed at the Intervention site in 2012, prior to the crosswalk installation.

- **Pedestrian Safe Access**
  - Reduction in pedestrians moving between traffic
  - Significant increase of safe crossings
- **Traffic Calming Effects**
  - Traffic volume significantly decreased
  - Traffic speeding significantly decreased

Study Objectives

2012-2014 Results

Primary Objective: To explore if previously observed built environmental influences on street crossing behaviors have been sustained.

Secondary Objective: To determine whether previously observed traffic speed reductions have been sustained.

Data Analysis

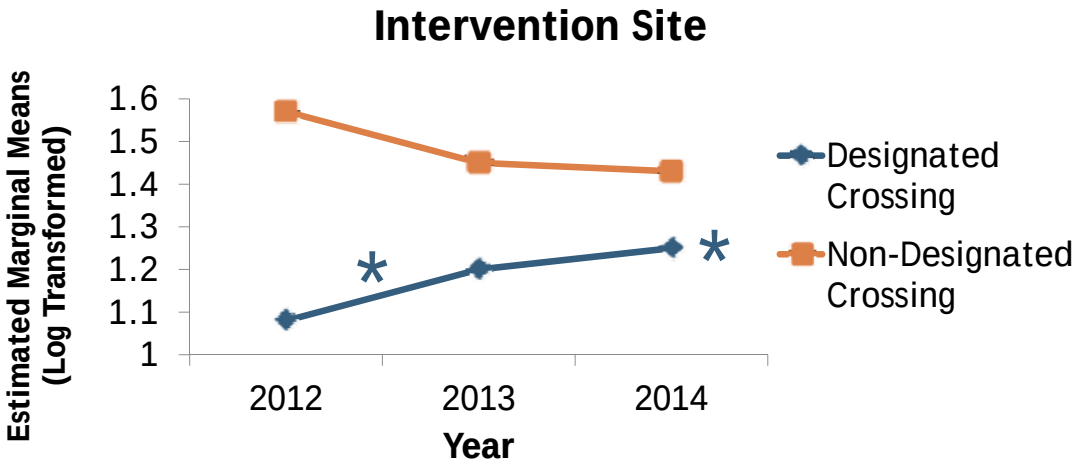
- **Crossing Data**
  - Checked for assumptions of normality
  - Log transformation applied to counts
  - ANCOVA
    - Dependent variable=Count
    - Independent variables=Year, Designated Zone, Site Location, & Interactions
    - Control variable=Temperature
  - Used Sidak post-hoc to examine differences between years for both overall counts and by age

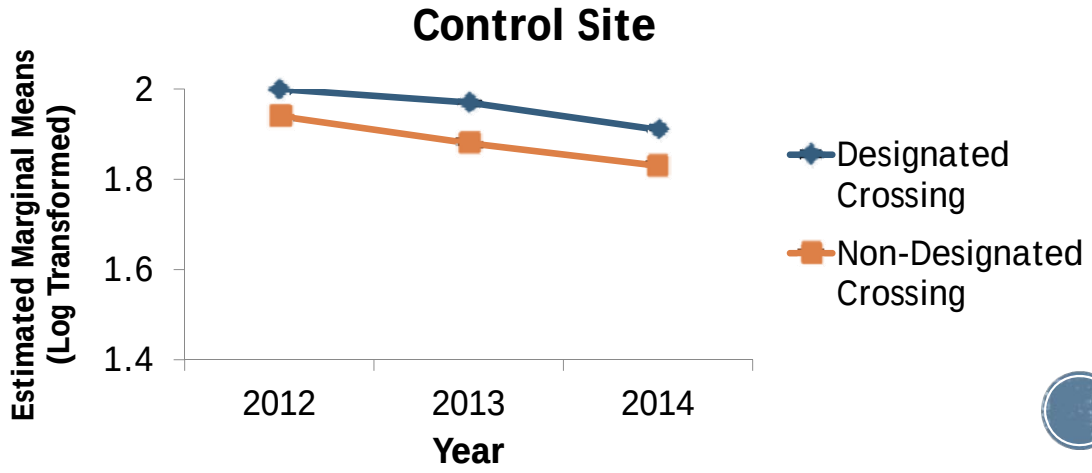
- **Traffic Data**
  - x^2 and Descriptive Statistics
  - Examined total volumes
  - Examined speeds (dichotomized as speeding >35mph)

Overall Site Comparison

Site Location	2012	2013	2014
Intervention	1,408	1,352	1,380
Control	4,330	3,848	3,329

- **3-way Interaction**
  - Year*SiteLocation* DesignatedZone
    p<0.001
- **2-way Interaction by Site**
  - Year*DesignatedZone
  - **Intervention Site:**
    p=0.018
  - **Control Site**
    p=0.988

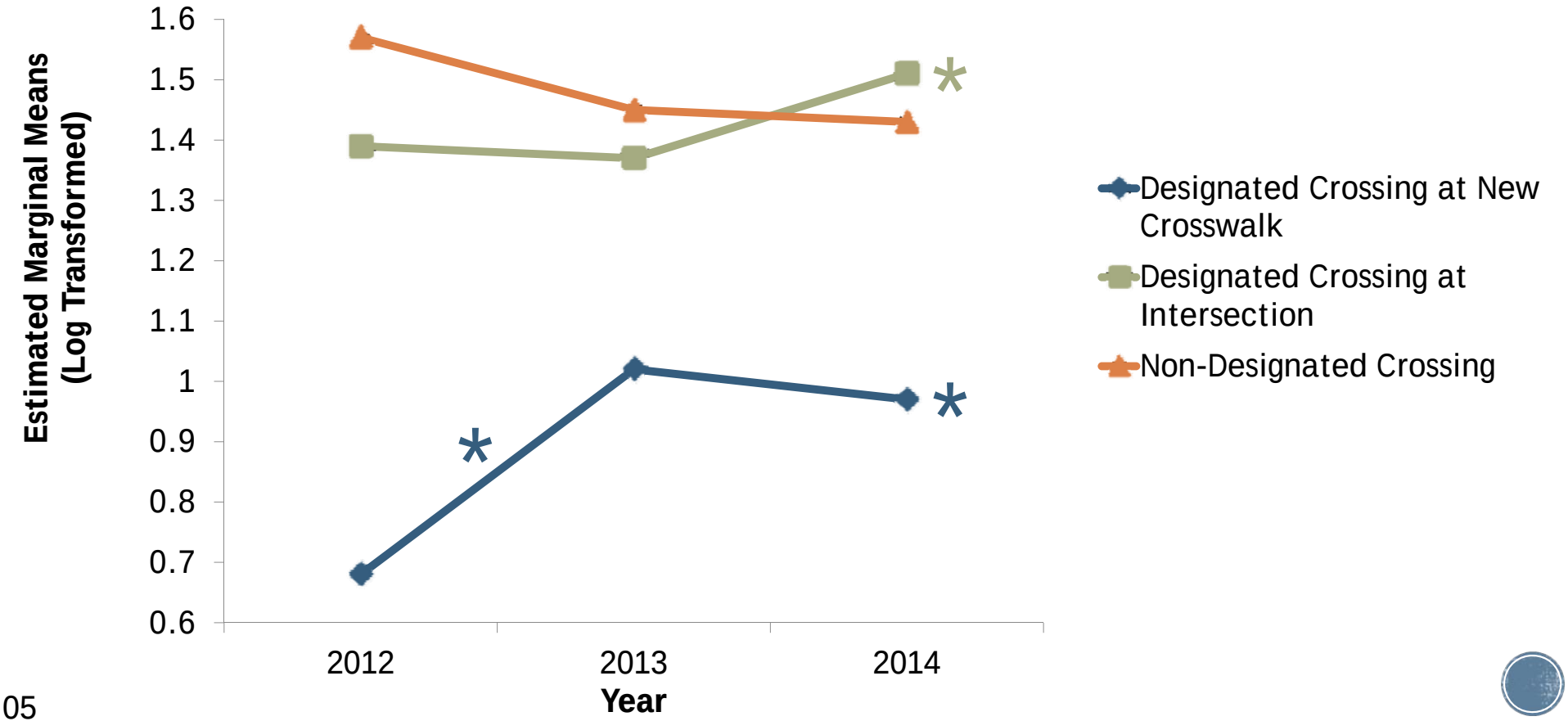




*p<0.05

Total Counts at the Intervention Site

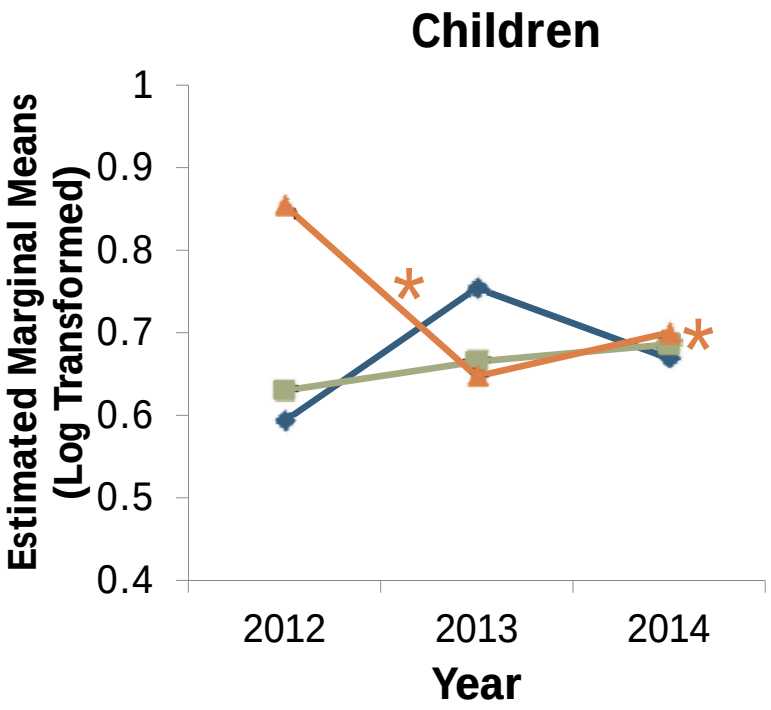
Year*DesignatedZone p<0.001

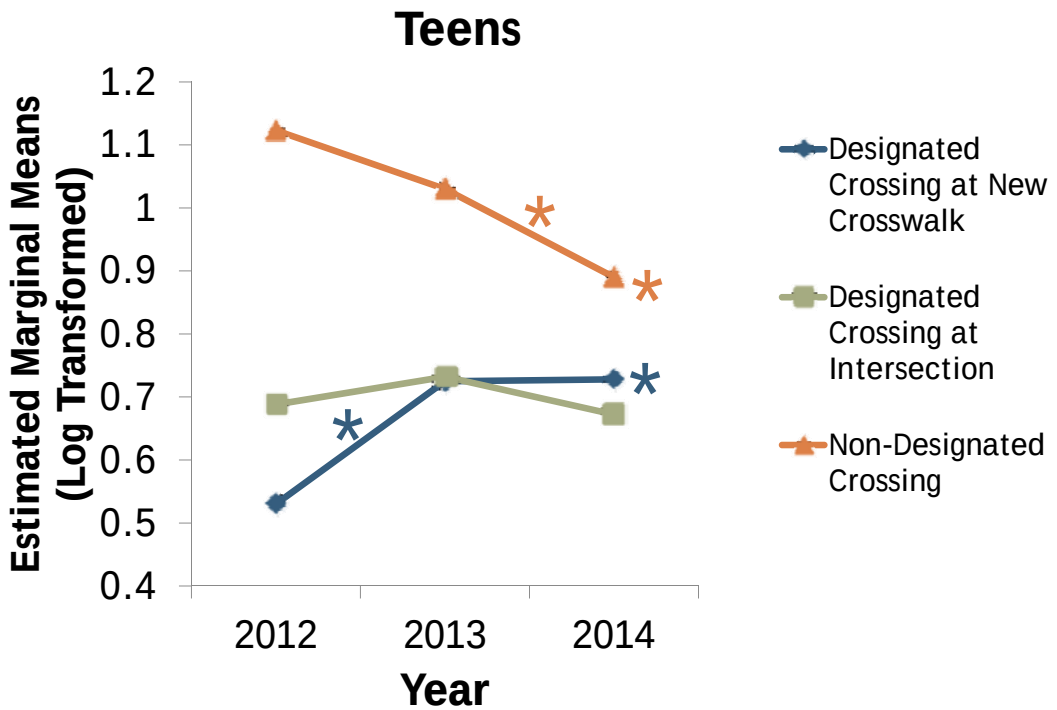


*p<0.05

Age at the Intervention Site

Year*DesignatedZone*Age p<0.001





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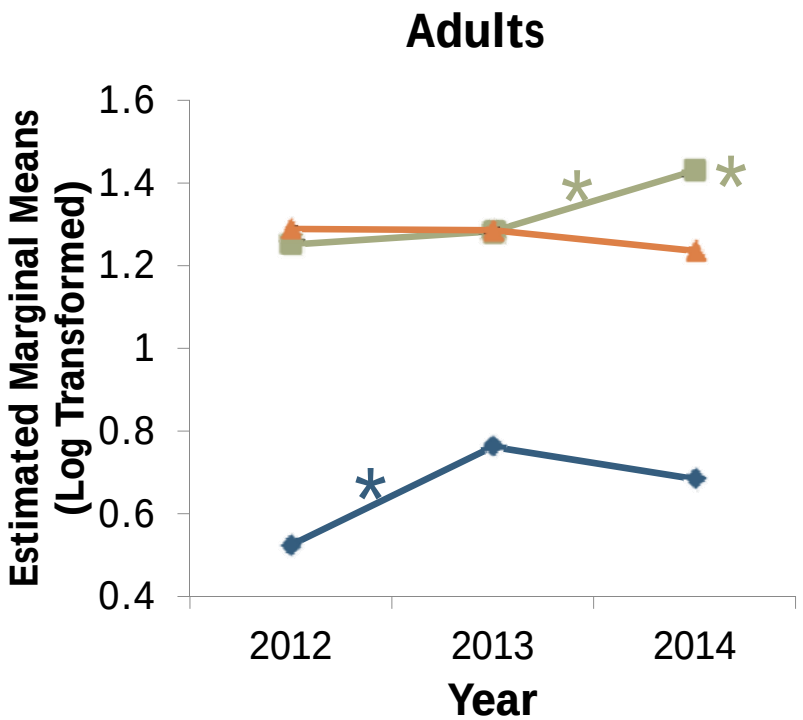
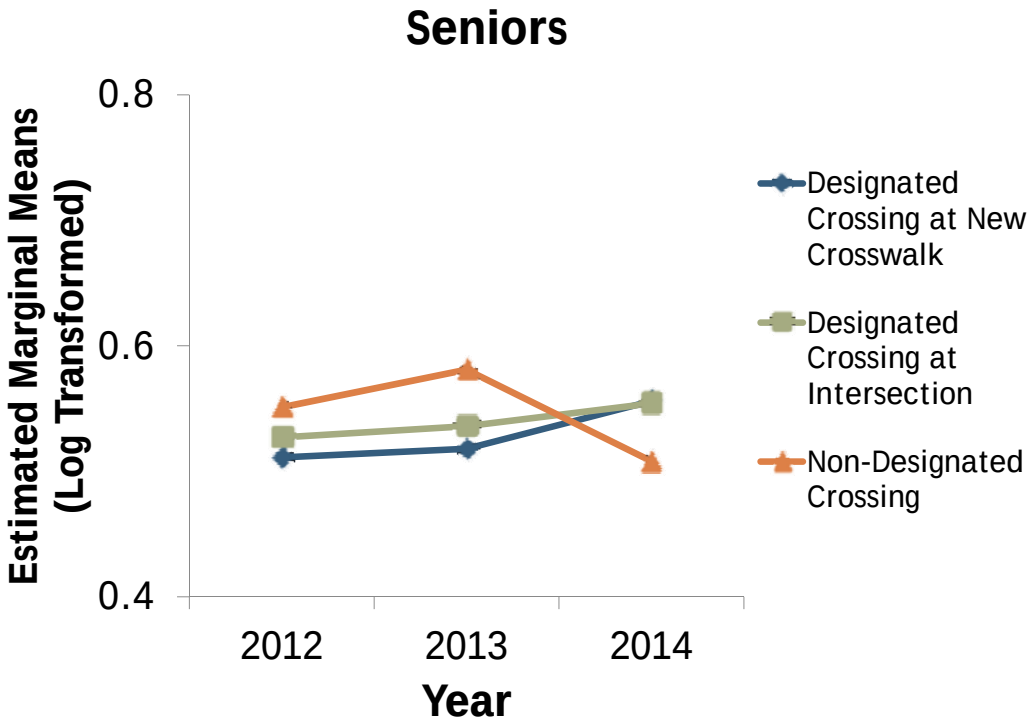
Age at the Intervention Site

Year*DesignatedZone*Age p<0.001





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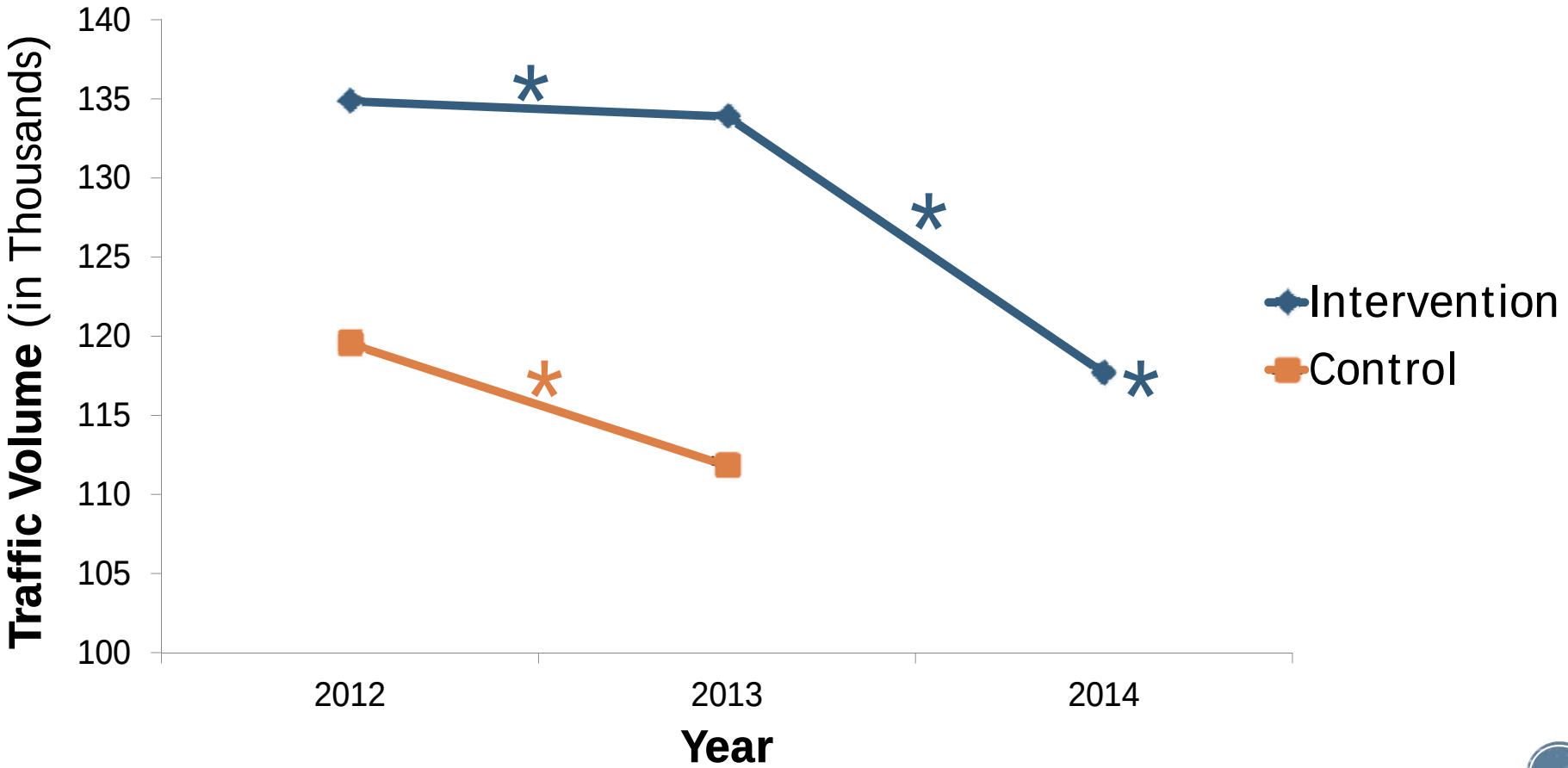
Traffic Data-Volume



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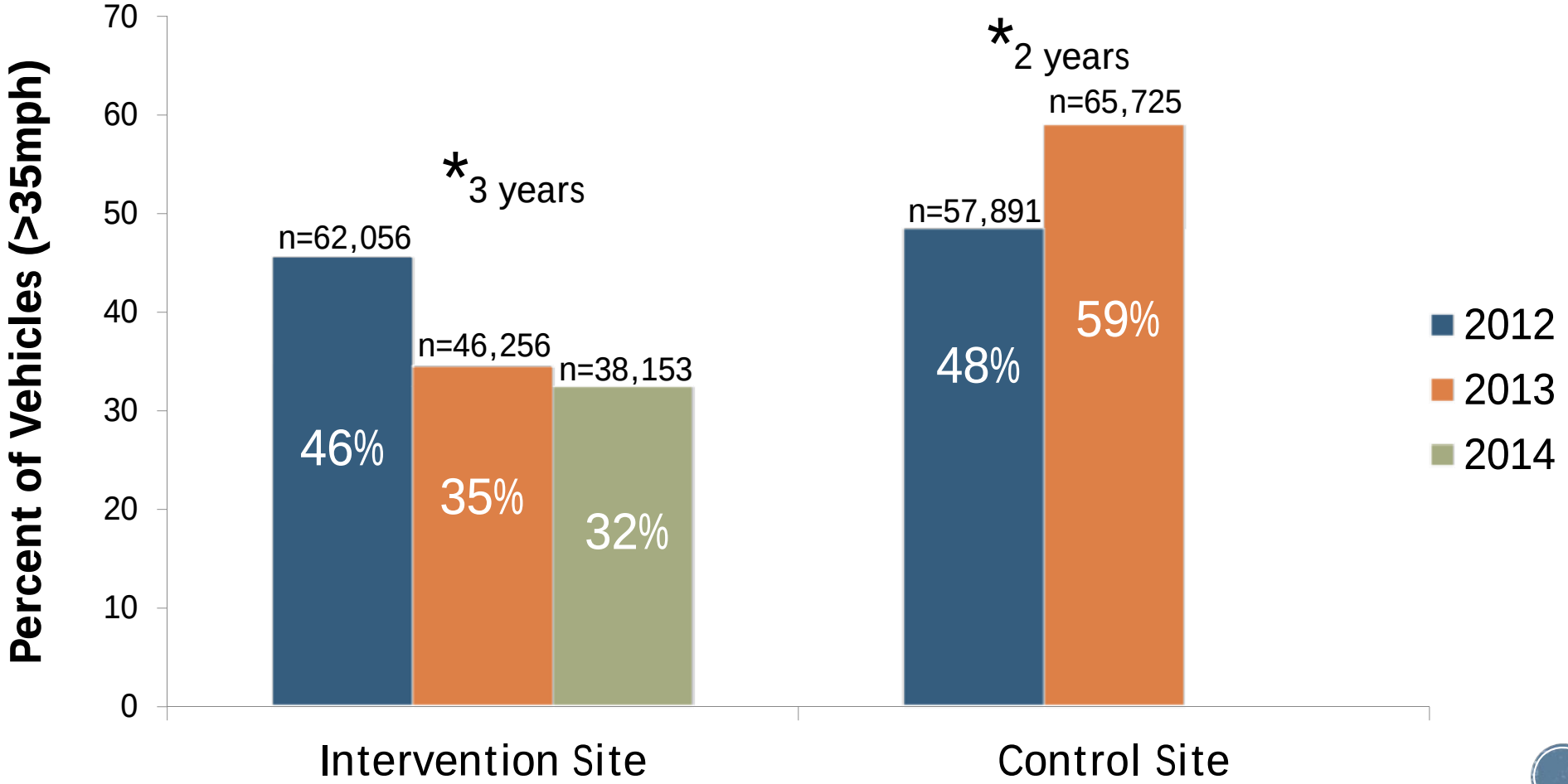
Traffic Data-Speed



*p<0.05

Major Findings

- Overall, safe crossings at the crosswalk show a maintained improvement while non-safe crossings have maintained a downward trend
  - Non-designated crossings for Children have maintained a decrease while for Teens non-designated crossings show a continued decrease
  - Use of the crosswalk has shown continued improvement amongst Teens
- Traffic volume and speeding (>35mph) have continued to significantly decrease at the intervention site

Implications for Practice and Policy

- This study showed improvements in safe access to neighborhood resources
- Modification of the built environment can be used to increase pedestrian safety and traffic calming in underserved neighborhoods.
- Some of the impacts of the intervention continued while for others the initial changes were maintained.
- Longitudinal increase of active living behaviors support the validity of advocacy efforts to promote safe pedestrian accessibility.

THANK YOU!

Questions?

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Special thanks to our partnering agencies:

PedNet

Douglass Park Neighborhood Association