

The Effects on Safety of In-Roadway Warning Lights at Crosswalks



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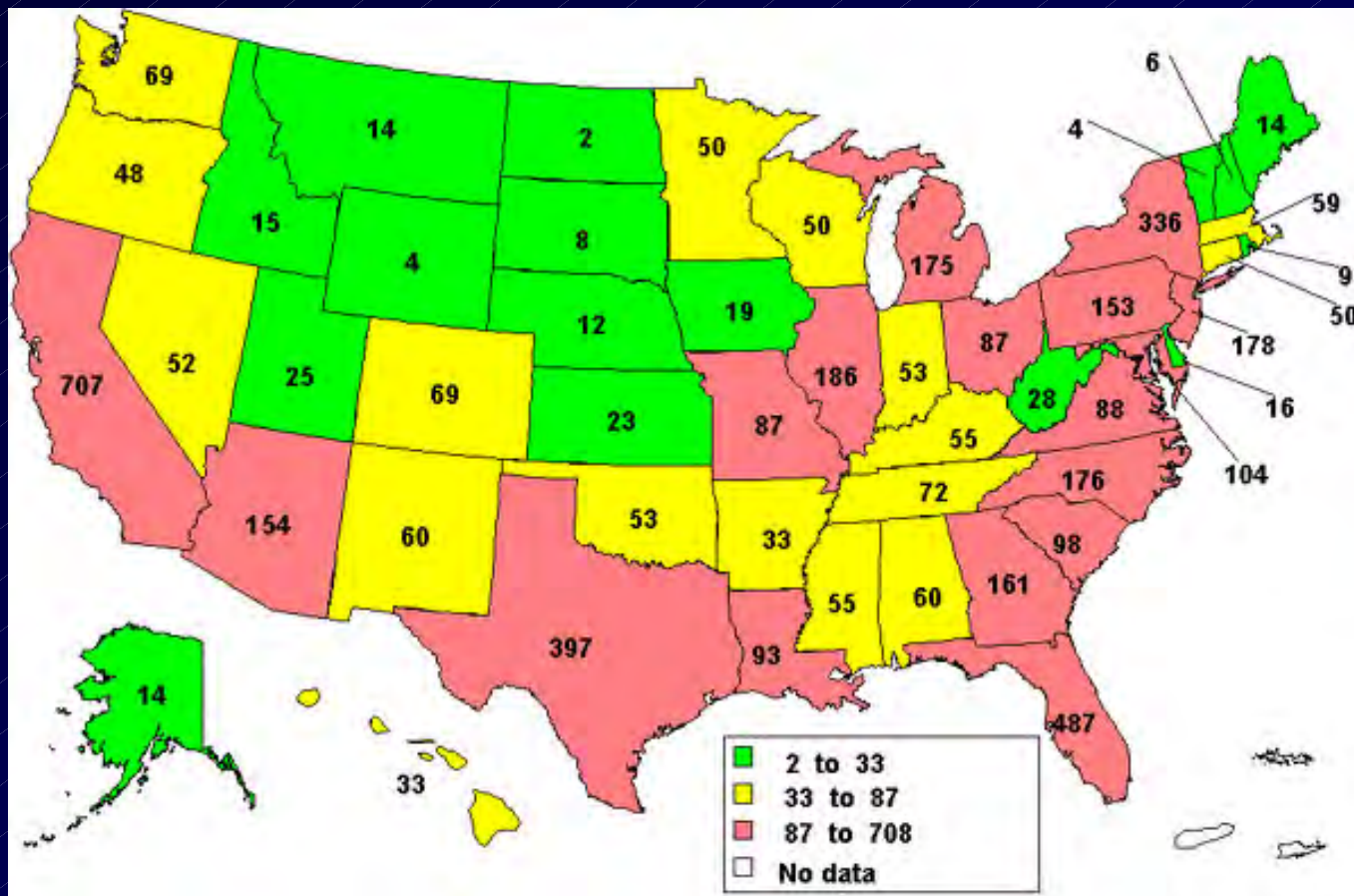


The Pedestrian Safety Problem

- 2002 Fatality Statistics:
 - 42,815 total roadway fatalities
 - 4,808 pedestrians (11.2% of all fatalities)
 - ~13 *pedestrians are killed every day*
- Pedestrian injury—the *leading cause of death* for children ages 5 to 14



National Pedestrian Fatalities



The Pedestrian Safety Problem

- **Safety Problem at:**
 - Urban roadways
 - Non-intersection locations
 - Posted speeds under 40 mph
- How can we improve pedestrian safety in these locations?
- Does in-roadway lighting improve safety?



In-Roadway Warning Lights At Crosswalks

- MUTCD guidelines (Section 4L.02):
 - Shall be used only at marked crossings without Yield or Stop signs or traffic control signals
 - Shall display a flashing yellow signal
 - A minimum of one light per travel lane



In-Roadway Warning Lights

- Research Focus:
 - Do in-roadway warning lights improve pedestrian safety at a crossing without stop control?
- Study Location:
 - Rockville, MD
- Timeline:
 - Rockville: Before/After data complete



Research on In-Roadway Warning Lights

- General findings from previous research:
 - May increase driver yielding
 - May reduce vehicle speeds
 - The lights may not affect pedestrian crossing location choices
 - Pushbutton actuation is often neglected

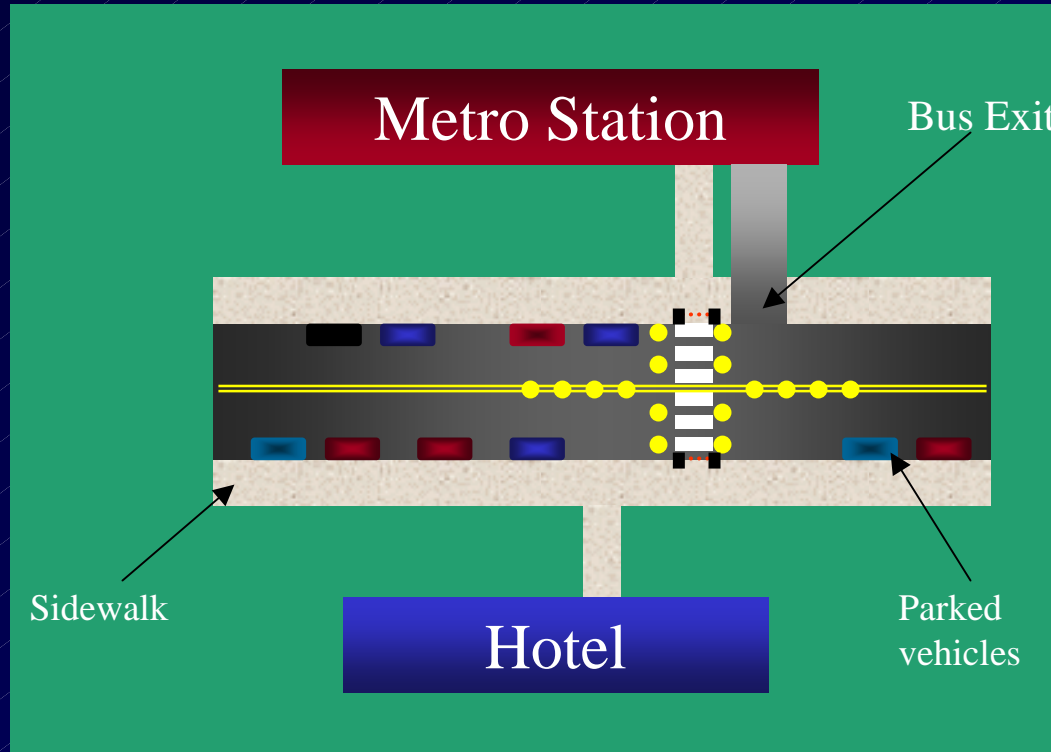
Research Questions

- Do in-roadway warning lights affect:
 - Driver yielding?
 - Pedestrian crossing opportunities?
 - Pedestrian crossing locations?
 - Pedestrian crossing behavior?



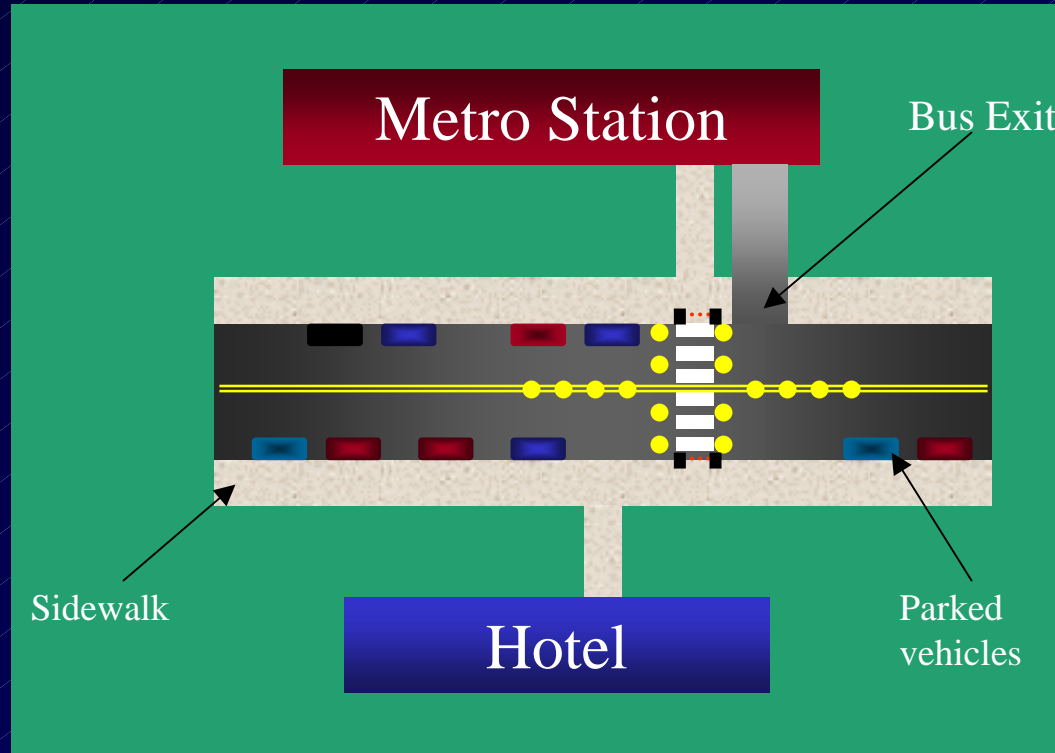
Research Location

- Rockville, Maryland—Twinbrook Metro station



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Passive Detection Malfunction

- System malfunction during After period
 - Temporary detection failure for pedestrians going from Metro side to Hotel side (No lights came on)
 - The system worked for the other direction (Lights on)
- Opportunity to compare whether the lights really affect pedestrian/driver behavior

Results—Overview

- Driver yielding
 - Increased driving yielding rates by ~30%
- Pedestrian crossing locations
 - The lights did not reduce jaywalking
- Pedestrian wait times
 - Reduced pedestrian wait times at curb



Results—Driver Yielding

- More drivers yielded to pedestrians when lights were on

Percent of Pedestrians Who Had a Yielding Vehicle

	Before	After	After (malfunction—no lights)
1 st lane crossed	36.0%	70.7%	41.4%
2 nd lane crossed	64.9%	98.1%	74.4%

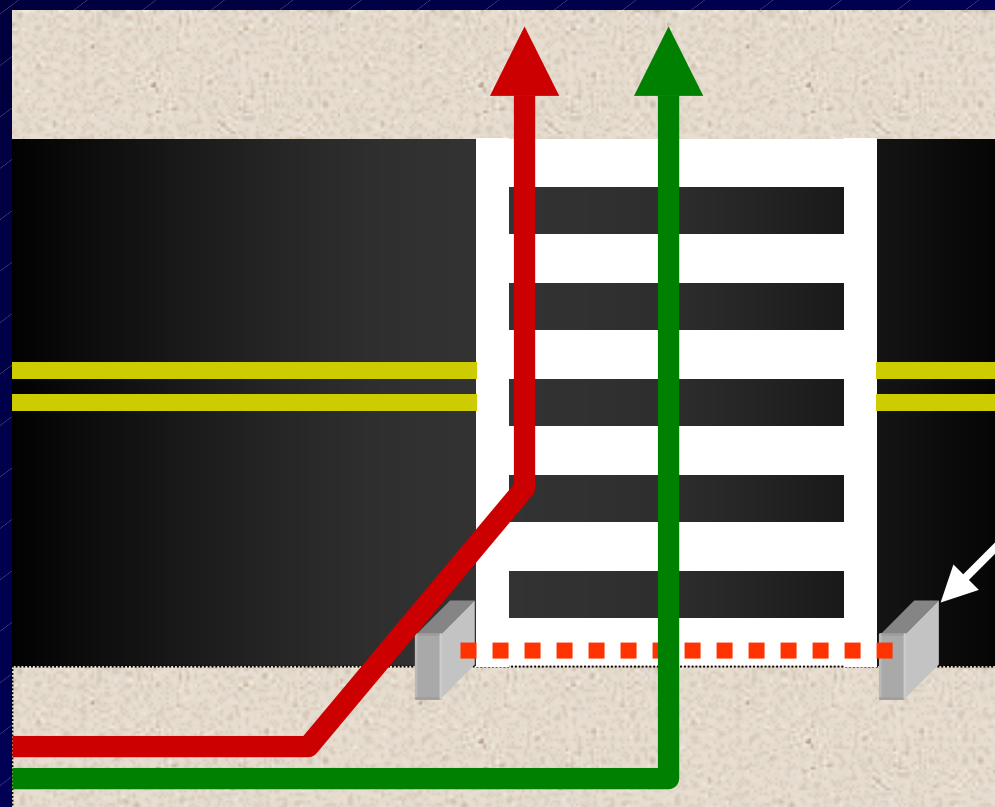
Results—Pedestrian Crossings

- Lights did not make pedestrians more likely to use the crosswalk
- Pedestrians had shorter wait times on curb
- No increase in assertive crossings due to the lights



Limitation of Passive Detection

- Many pedestrians take the shortest path and are not detected



Detection
Bollards

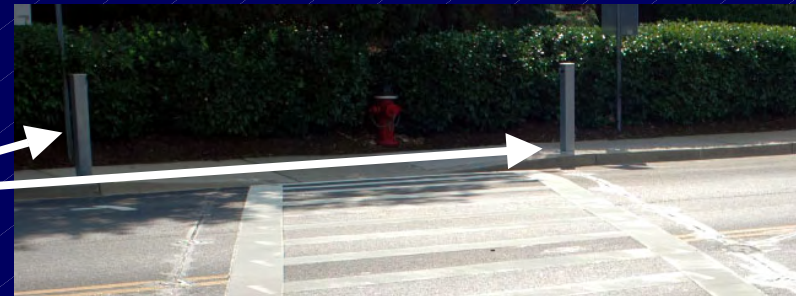


Recommendations

- Increase pedestrian awareness of how the warning lights work
- Increase conspicuity of the passive actuation system
- Provide a backup actuation method when passive actuation fails



Detectors may not be obvious to pedestrians



Next Steps

- This research is part of a larger project examining:
 - Long-term effects
 - Do the results hold 1 year after installation?
 - Actuation methods
 - Does a pushbutton or passive detection work better (or a combination)?

....Results to follow in 2005

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