Effectiveness of Rectangular Rapid Flashing Beacons (RRFBs) at Mid-Block Crosswalks

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Introduction

Rectangular Rapid Flashing Beacons (RRFBs) are designed to improve safety by increasing drivers' awareness of pedestrians in mid-block crossings using a pedestrian-activated signal. However, little is known about their effectiveness in rural contexts, and it has been suggested that they may increase risky crossing behavior by pedestrians who assume that motorists are responsive to the beacon. This study evaluates the effects of RRFBs on driver and pedestrian compliance and risky behaviors compared with traditional mid-block crossings without RRFBs. We evaluate these outcomes in Vermont's rural context, including small cities, villages, and town centers and rural/urban transition zones.

Figure 1. Example of RRFB location and treatment (left). A camera set up for data collection (right).

Methodology

We use a controlled before-after study design to evaluate RRFBs' effectiveness in rural contexts at six locations across Vermont. For each RRFB installation, we also evaluate a similar "control" location that does not change over the study period. This ensures that the differences that we observe are attributable to the RRFB installation rather than to extraneous factors such as seasonal changes. We evaluate RRFB effectiveness for pedestrian crossing events using video recordings collected over 4 to 10 days (Figure 1) in terms of the following observed outcomes:

- Compliance:
  - Driver yielding (rate and location)
  - Pedestrians crossing out of the crosswalk
- Risky behaviors:
  - Vehicles stopping suddenly
  - Pedestrians stepping into the roadway before drivers yield

Preliminary results

Our preliminary analysis of observed changes suggests that installing RRFBs in small and rural locations may lead to compliance improvements in terms of the rate of out-of-crosswalk pedestrian crossing. Preliminary analysis of other observed changes in compliance and safety outcomes are mixed, including driver yielding behavior, pedestrian wait times, and the rate at which pedestrians cross before vehicles yield. Differences may arise at different types of locations and for different treatment designs.

Figure 2 highlights preliminary results for out-of-crosswalk crossings at five of the six study locations. The counterfactual path shows the trend expected at the treatment location if no RRFB had been installed based on the trend observed at the control location.

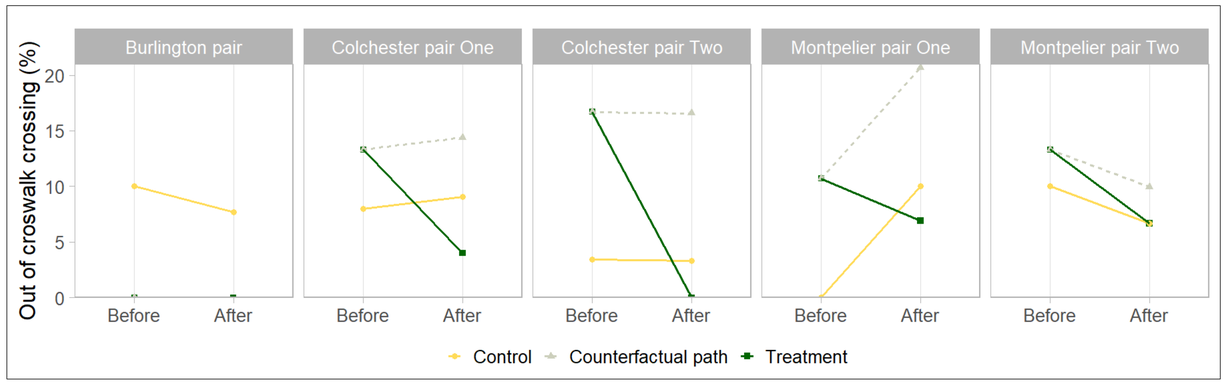

Figure 2. Changes in out of crosswalk crossings at treatment locations and paired control locations. Out of crosswalk crossings decreased at all treatment locations relative to the control location.

Next Steps

The research will be completed at the end of December 2022. Results can inform updated guidelines for the decision to use RRFBs to ensure that they are installed where they will be effective and that their potential benefits are realized.

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