Street Crossing by Blind and Sighted Pedestrians at Modern Roundabouts: An Overview of Research

- Richard Long, Daniel Ashmead, Nagui Rouphail, David Guth, Ron Hughes, Paul Ponchillia, Robert Wall, and a host of others

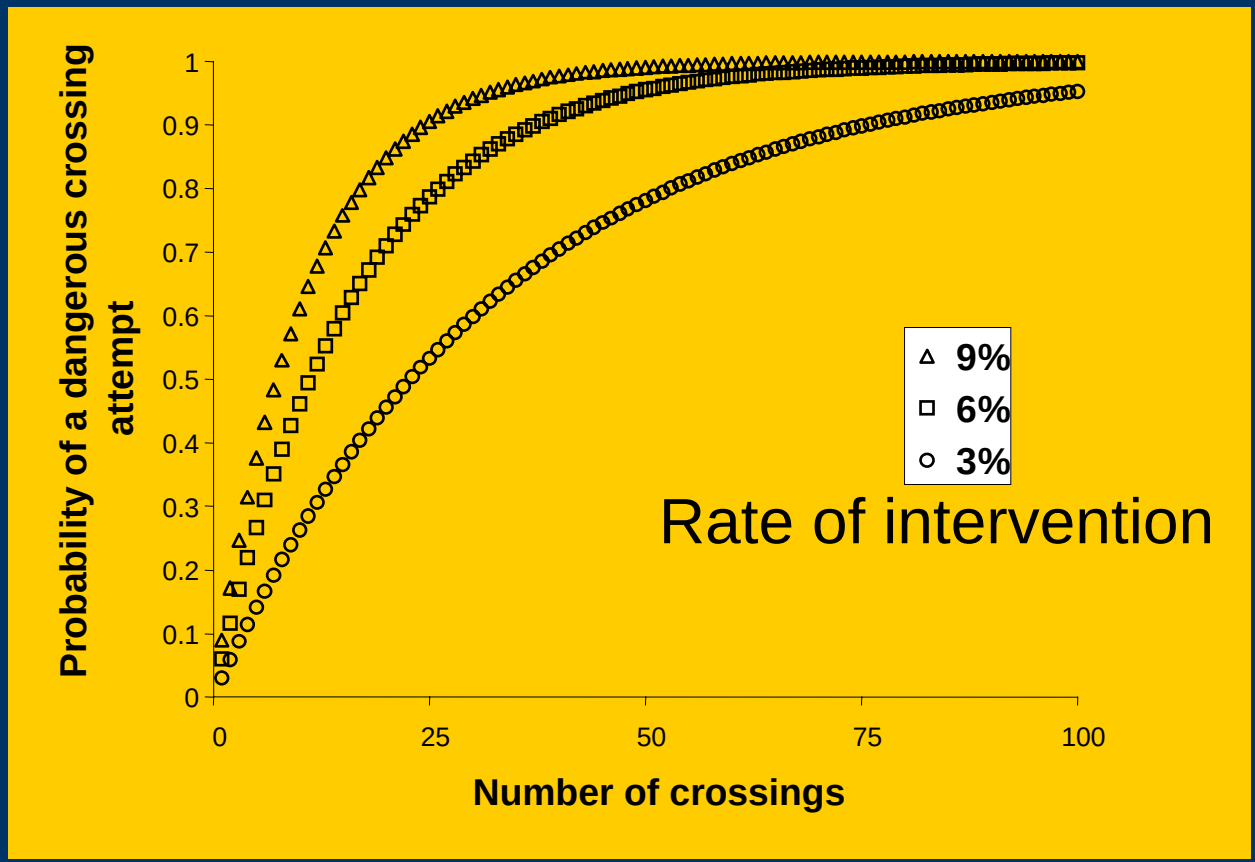
- Western Michigan University, Vanderbilt University, The University of North Carolina, North Carolina State University

Background

- Baltimore and Tampa judgment studies
  - Measures
  - Findings

- Nashville and Raleigh crossing studies
  - Effect of judging position and yield detection system

Implication of finding on interventions for cumulative risk of dangerous crossings



Where do we go from here?

- Enhancing detection of gaps and yielded vehicles
- Signal strategies
- Other technologies
- Training and education of drivers and pedestrians

Roundabout Yield Detection

Blind Pedestrians

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- Approach speed= 35 mph, Circulating speed= 18mph
- Inscribed diameter= 88 ft, Central Island diameter= 52 ft
- Peak Hour Volume ~ 1400 veh, 160 peds

Credit: www.skysiteaerial.com

Yield detect system

- One induction loop in crosswalk and one upstream of crosswalk
- If a vehicle was over the upstream loop for 2 seconds without the crosswalk loop being activated, the message “vehicle is yielding” was broadcast from a speaker – until the crosswalk loop was activated

General procedures

- 13 blind and 6 sighted subjects crossed entry and exit lanes 16 times with yield system on and 16 times with yield system off
- Measures included:
  - wait time
  - what traffic was doing when crossing was initiated
  - when the O&M instructor (or the ped) halted a crossing


PLAY
National Roundabout Conference 2005 DRAFT

General Results

- Blind peds tended to wait for cars to stop instead of taking rolling yields or crossing in gaps in traffic
- Blind peds missed crossable gaps at 3X the rate of sighted peds (325/832 vs. 51/382)

Yield detect system did not affect the number of stopped cars blind pedestrians missed

$\chi^2_{(2)} = 0.12$	Entry lane	Exit lane
System on	21	10
System off	21	12

Yield detect system decreased the number of crossable gaps blind pedestrians missed
(but not significantly)

$\chi^2_{(2)} = 0.55$	Entry lane	Exit lane
System on	75	71
System off	82	91

- Blind pedestrians had 36 interventions in 832 crossings (4.3%)
- Interventions reflect “bad judgments” on the part of the pedestrian

$\chi^2_{(2)} = 1.65$	Entry lane	Exit lane
System on	6	5
System off	7	18

In Summary

- Auditory yield detection is promising
  - Appears to improve crossing efficiency
- Position of loops is critical and site specific

Thank you