

# Impact of a Pilot Walking School Bus Intervention on Children's Pedestrian Safety Behaviors

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# Background

- Active commuting to school (ACS): appears promising to improve physical activity (Davison 2008; Lee 2008; Lubans 2011)
- More child pedestrians increases exposure to risk of pedestrian injuries
  - Injuries are the leading cause of mortality in children and adolescents (NCIPC, 2010)
- Walking School Bus (WSB)
  - Pedestrian safety taught and modeled
  - No previous WSB studies on pedestrian safety



# Hypothesis

- A pilot walking school bus intervention will be associated with improvements to children's pedestrian safety behaviors

# Methods

- Houston Independent School District
- Clustered RCT: 4 intervention + 4 control schools
  - Fourth grade children
  - Schools matched on race/ethnicity and SES, baseline assessments on children, then randomized



# Intervention

- March-May: WSB program (4-5 weeks)
  - Trained staff led students up to 5 days/week
    - Students & parents decided when to use WSB
  - ~0.8 miles total, 8-12 students per 2 WSB staff
- Control schools: “usual information” on walking to school
- Time 1 (prior to WSB) and Time 2 measure (during weeks 4-5 of WSB)

# Outcomes

- Primary outcome of RCT:
  - Rate of ACS among 4<sup>th</sup> grade sample
- Secondary outcomes of RCT:
  - MVPA among 4<sup>th</sup> grade sample
  - Pedestrian safety behaviors among all child pedestrians walking to school at Time 1 & Time 2
    - Proxy for child pedestrian injuries, which are relatively rare (65/100,000) and require large samples

# Pedestrian Safety Outcomes

- Outcome: change pedestrian safety behaviors
  - Unobtrusively observed child pedestrians of any grade at major school intersections
    - No individual-level data collected (name, age, etc.) to reduce influence of observers on child behaviors
    - “Real world” pedestrian safety behaviors
    - At Time 2, WSB students wore bright safety vests
    - Cross-sectional, school-level variable at Time 1 and 2

# Pedestrian Safety Outcomes

- Five pedestrian safety behaviors & composite (summed) score:
  - Crossed at a corner/crosswalk
  - Crossed with an adult/safety patrol
  - Stopped at curb or corner (not mid-intersection)
  - Looked left-right-left
  - Walked (did not run) across street
- % Agreement (91%); sensitivity (85%); and specificity (83%)
- Moderate overall correlation ( $ICC=0.48 - 0.65$ ) to expert's score (Mendoza et al, *BMC Public Health* 2010)

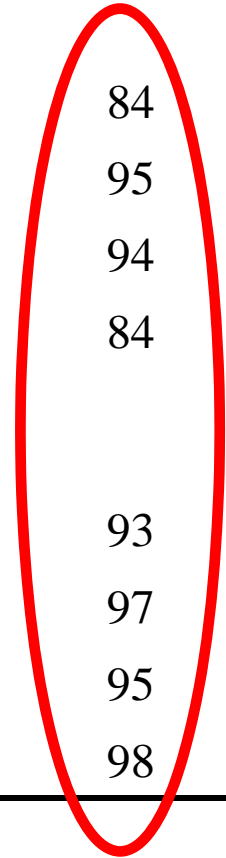


# Covariates (school-level)

- Parents' perceptions of neighborhood safety
  - Disorder subscale: safety, violence, drug traffic, child victimization (Coulton 1996)
  - 4<sup>th</sup> grade parents at intervention & control schools
- Number of lanes of traffic at each intersection
  - Weighted average for each school

# Table 1: School Demographics

	Enrollment, #	Hispanic, %	African-American, %	Free/Red Lunch, %	Academic Rating
<u>Intervention Schools</u>					
A	701	78	13	84	Exemplary
B	935	94	4	95	Recognized
C	471	8	92	94	Recognized
D	580	43	50	84	Exemplary
<u>Control Schools</u>					
A	490	92	8	93	Exemplary
B	506	93	5	97	Exemplary
C	492	7	92	95	Recognized
D	521	59	41	98	Exemplary



# Results: Correlation & Prevalence

	Correlation to Neighborhood Safety
	Time 1 (n=1252)
Composite Score	-0.01
Crossed at a corner/crosswalk	0.08*
Crossed with an adult/safety patrol	0.08*
Stopped at the curb	-0.09*
Looked left-right-left	-0.04
Walked across the street	-0.03

\*Significant correlation at Time 1 at  $p < 0.01$

# Results: Mixed Model Analyses

	Model Fit	Group	Time	Group X Time
Composite Score	NA	0.31	0.30*	-0.05
Crossed at a corner/crosswalk	1.01	2.45	1.55*	5.0*
Crossed with an adult/safety patrol	1.15	1.30	0.32*	1.77
Stopped at the curb	0.99	4.06	3.21*	0.21*
Looked left-right-left	0.99	1.86	5.15*	1.21
Walked across the street	1.00	0.67	1.22	1.47

\*Significant Odds Ratio,  $p < 0.01$

Neighborhood safety and traffic lanes were not significantly associated (all  $p > 0.05$ )

# Discussion

- Most children at all schools crossed with an adult/safety patrol and walked across the street
- WSB schools had a 5-fold increase in crossing at a corner/crosswalk (intersection)
  - ~75% of child pedestrian fatalities occurred at non-intersection locations (NCSA, 2011)
- WSB schools had a 5-fold decrease in stopping at curb
  - Impractical for all children to stop at the curb if in a group
  - Adult or safety patrol may have been directing the children to cross the street without stopping at the curb

# Implications



- WSB is a promising intervention to improve children's pedestrian safety behaviors
  - Additional benefit besides improving ACS and physical activity
- Further studies necessary
  - Long-term
  - Longitudinal, separate WSB students from others
  - Built environment
  - Monitor school-related pedestrian injuries

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# Questions?



# Limitations



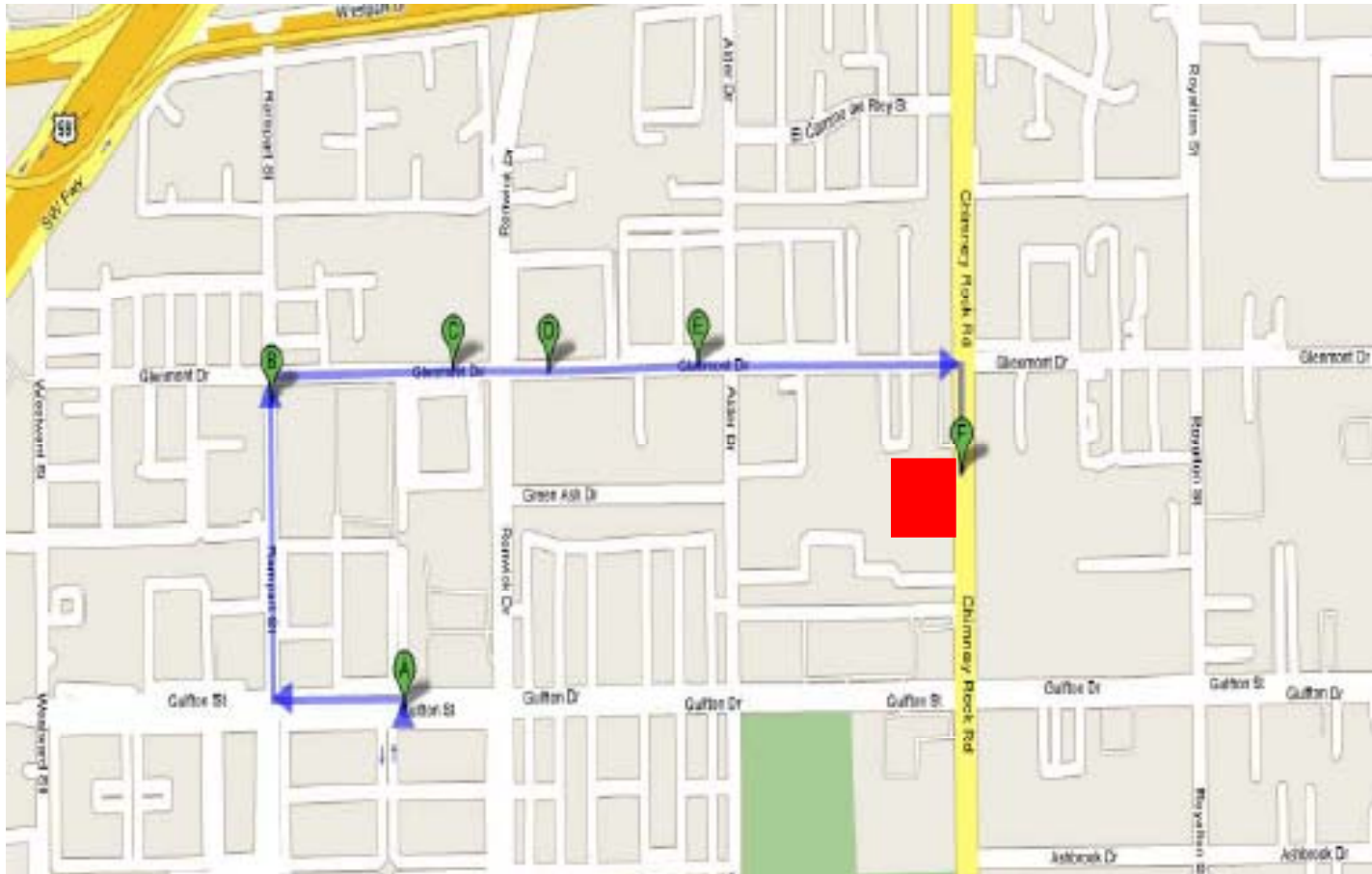
- Cross-sectional school-level data not longitudinal data on WSB participants
  - Dilute intervention effects
- Generalizability limited
- Brief intervention (4-5 weeks)
- No data on built environment

# Strengths

- Among first to use RCT design for WSB
- Among first WSB study to evaluate pedestrian safety
- Validated instrument for pedestrian safety
- Low income, ethnic minority sample



# WSB route



- 20 students, 5 WSB stops
- Total distance 1.1 miles

# Walking School Bus Partners

HISD Elementary Health & PE

HISD Safe/Drug Free Schools Office

HISD Transportation Department

HISD Police Department

Houston Trauma Link Coalition

Trauma Services Outreach, Ben Taub General Hospital

Texas Children's Center for Childhood Injury Prevention

Safe Kids of Greater Houston

Mayor's Wellness Council

Houston City Council Members

- Carol Alvarado and Adrian Garcia