Wayne State University Pedestrian Safety Projects

Michigan Traffic Safety Summit

Lansing, MI
March 23, 2011

WAYNE STATE UNIVERSITY
TRANSPORTATION RESEARCH GROUP

Agenda

- Introduction
- NHTSA Project
  - Detroit Area Pedestrian Safety Action Plan
  - Educational Programs
  - Enforcement Programs
  - Transferable Pedestrian Safety Model
  - Safety Program Impacts and Conclusions
- On-Campus Initiatives
- Safe Routes to School

Introduction

- Detroit – FHWA Focus City, 2004

YEAR	TOTAL PEDESTRIAN CRASHES	TOTAL PEDESTRIAN INJURIES	TOTAL PEDESTRIAN FATALITIES
2005	638	509	37
2006	570	454	29
2007	581	473	29
2008	467	368	27
2009	478	373	32

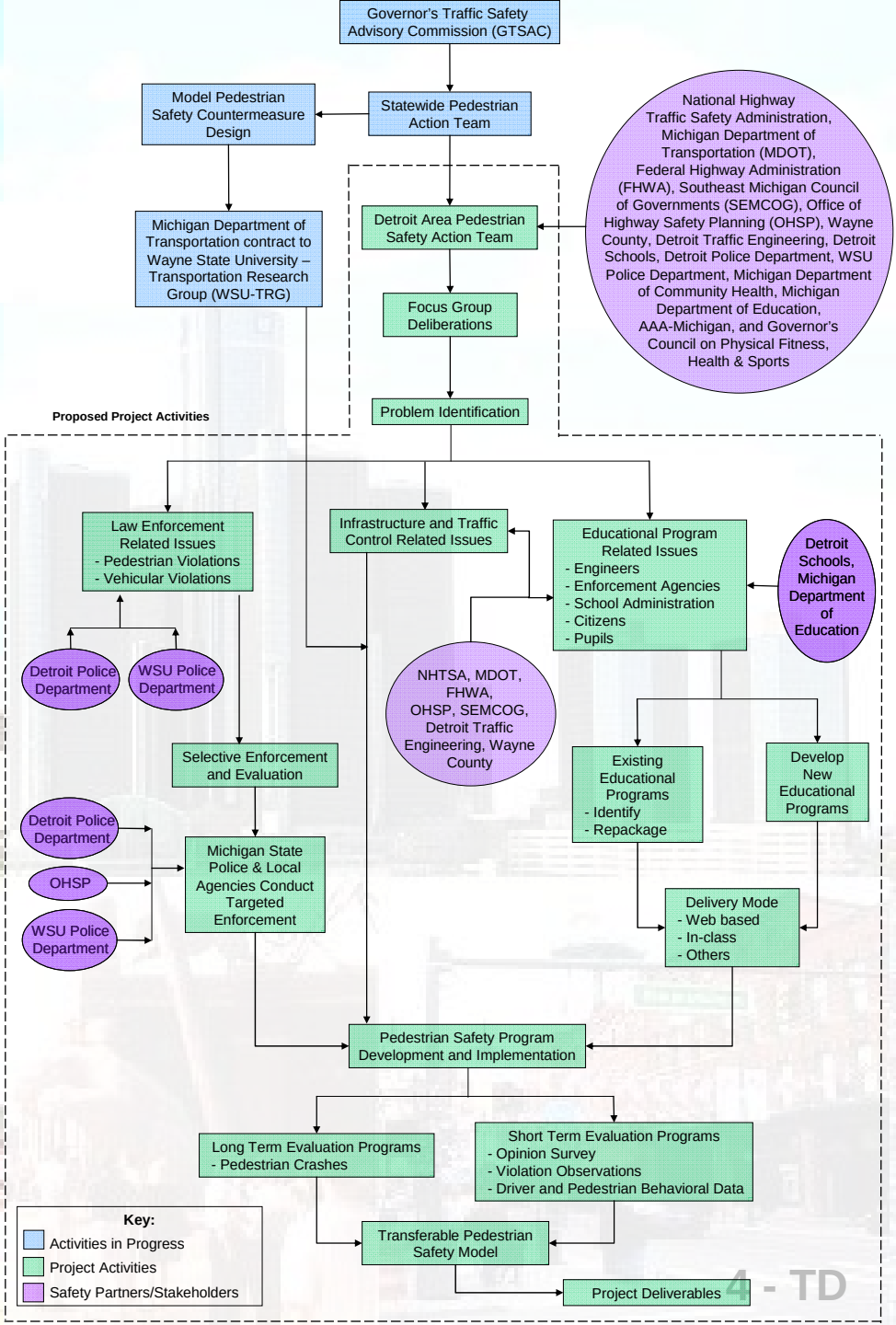
- Comparison of Pedestrian Fatality Rates in Major Cities

CITY	FATALITIES 2008*	POPULATION 2008**	FATALITY RATE PER 100,000 POPULATION
Phoenix, AZ	49	1,567,924	3.13
Detroit, MI	27	912,062	2.96
Los Angeles, CA	104	3,833,995	2.71
Chicago, IL	62	2,853,114	2.17
New York, NY	150	8,363,710	1.79

** Fatality Analysis Reporting System (http://www-fars.nhtsa.dot.gov/)* [11]
*** U.S. Census Estimate (http://www.census.gov/popest/cities/SUB-EST2008.html)* [12]

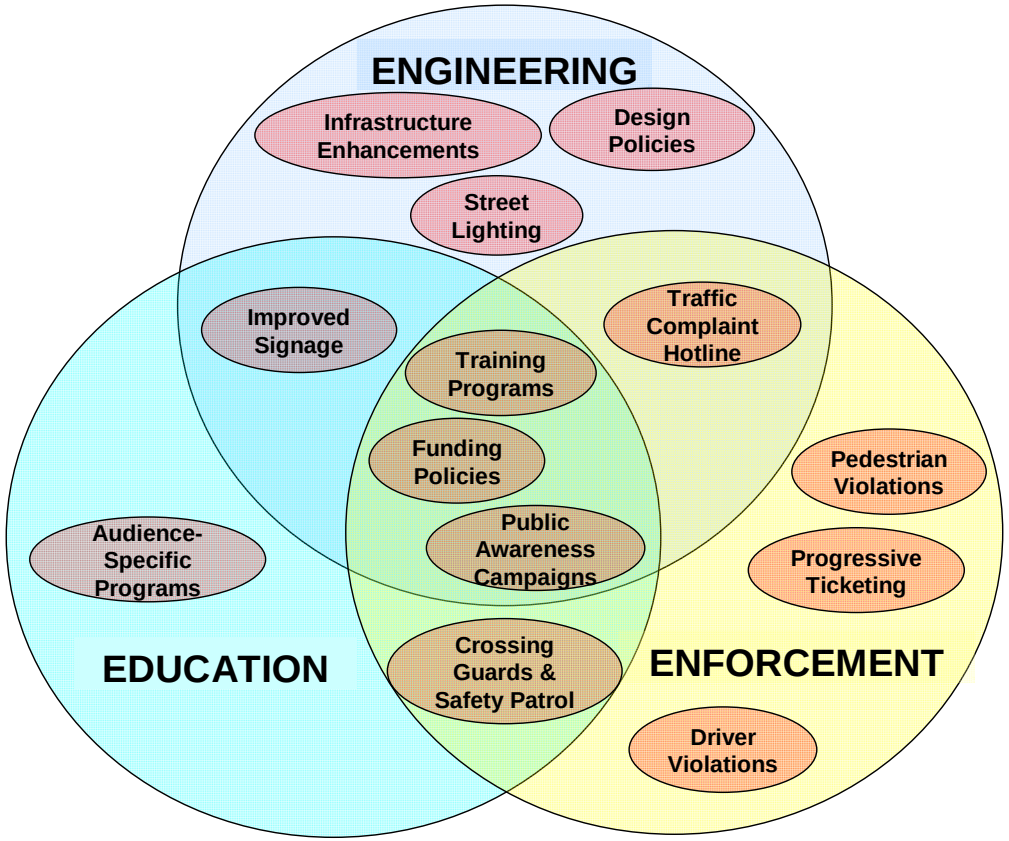
Project Methodology

- Formation of Detroit Area Pedestrian Safety Action Team
- Development of Detroit Area Pedestrian Safety Action Plan
- Development, implementation, and evaluation of pilot educational and enforcement programs
- Creation of a Transferable Pedestrian Safety Model



Detroit Area Pedestrian Safety Action Team (DAPSAT)

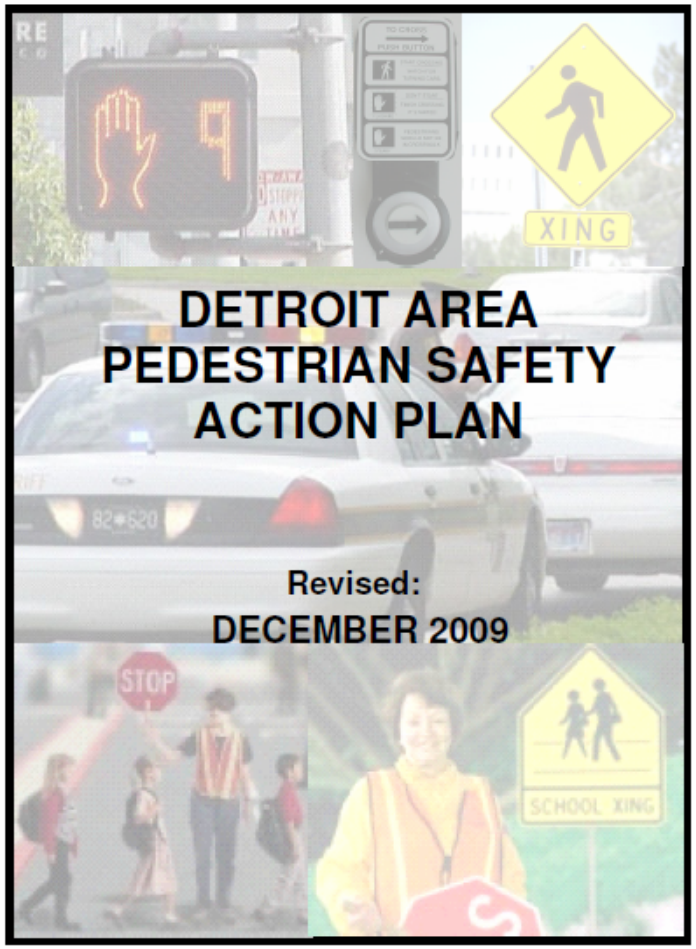
- Coalition of safety professionals
- Provide leadership and facilitate communication, collaboration, and coordination among public and private agencies
- Integrate engineering, education, and enforcement programs



DAPSAT Agencies

- Local
  - Wayne State University
  - City of Detroit
  - SEMCOG
- State
  - MDOT
  - OHSP
  - Dept. of Community Health
  - Secretary of State
- Federal
  - NHTSA
  - FHWA
- Others
  - Michigan Fitness Foundation
  - MADD

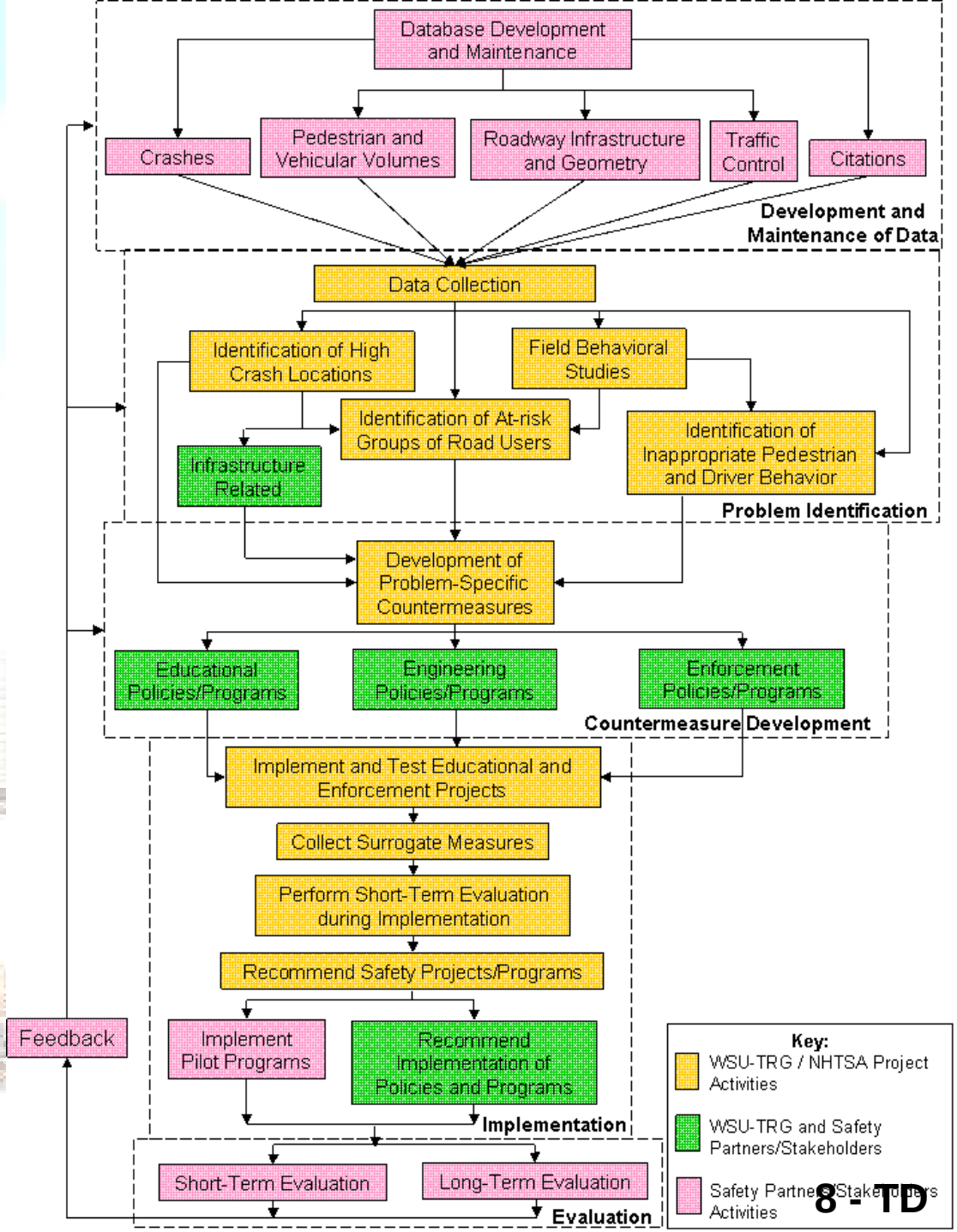
Detroit Area Pedestrian Safety Action Plan (DAPSAP)



- Goals
  - Reduce the total number of pedestrian crashes from 570 in 2006 to 450 by year 2011.
  - Reduce the number of pedestrian injury crashes from 479 in 2006 to 350 by year 2011.
  - Reduce the number of pedestrian fatalities from 29 in 2006 to 20 by year 2011.

DAPSAP

- Development and maintenance of data
- Problem identification
- Countermeasure development
- Implementation
- Evaluation



WSU's Ped Program Toolbox

- Enforcement
  - Walk Safely to Wayne State
  - Share the Road
  - Traveling Trashed is Trouble (3T)
- Education
  - K-8 Training Program
  - Walk Safely to Wayne State
  - Additions to Secretary of State Driver's License Informational Booklet and Driver Test
  - Drive Safely to WSU campaign

Enforcement Programs

- Goal – to reduce frequency of pedestrian and driver behaviors contributing to crashes
- Three specific programs were tested:
  - “Walk Safely to Wayne State”
  - “Share the Road”
  - “Traveling Trashed is Trouble”

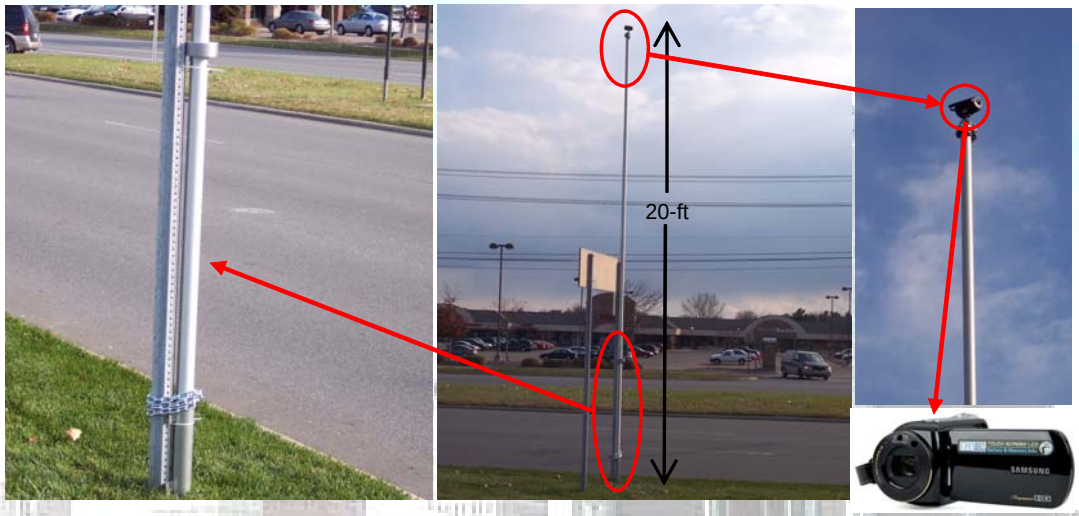
Enforcement Programs

- Walk Safely to Wayne State (WS2WS) and Share the Road (STR) are similar programs, aimed at:
  - Reducing pedestrians traffic signal violations
  - Reducing jaywalking
- WS2WS conducted by Wayne State University Police Department – WSU campus
- STR conducted by Detroit Police Department – Major City

Enforcement Programs

- Traveling Trashed is Trouble (3T) Program
  - Aimed at reducing the opportunity for alcohol-involved pedestrian crashes
- Targeted enforcement of driving under the influence
- High-intensity public awareness campaign

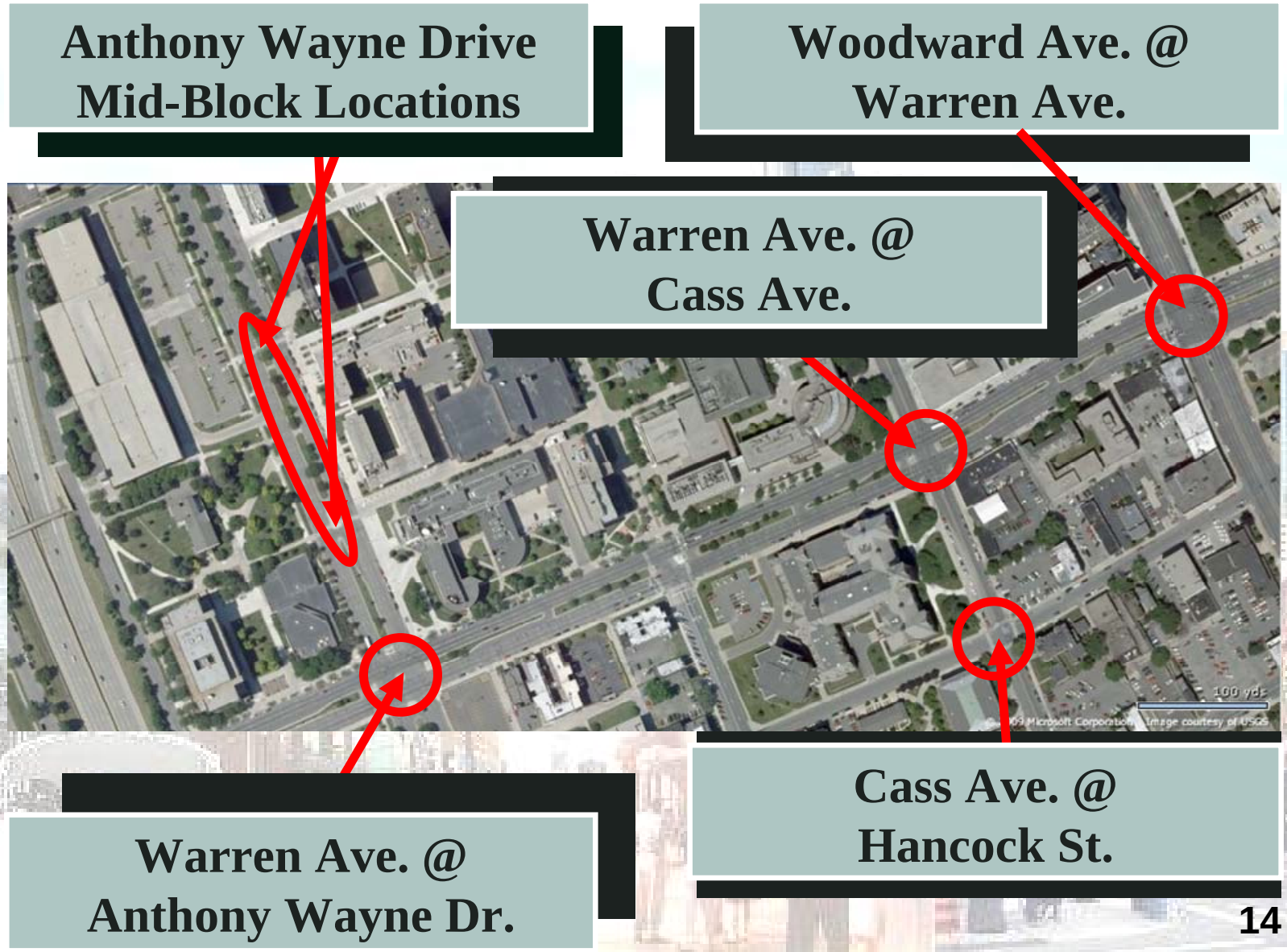
Field Studies of Pedestrian Behavior



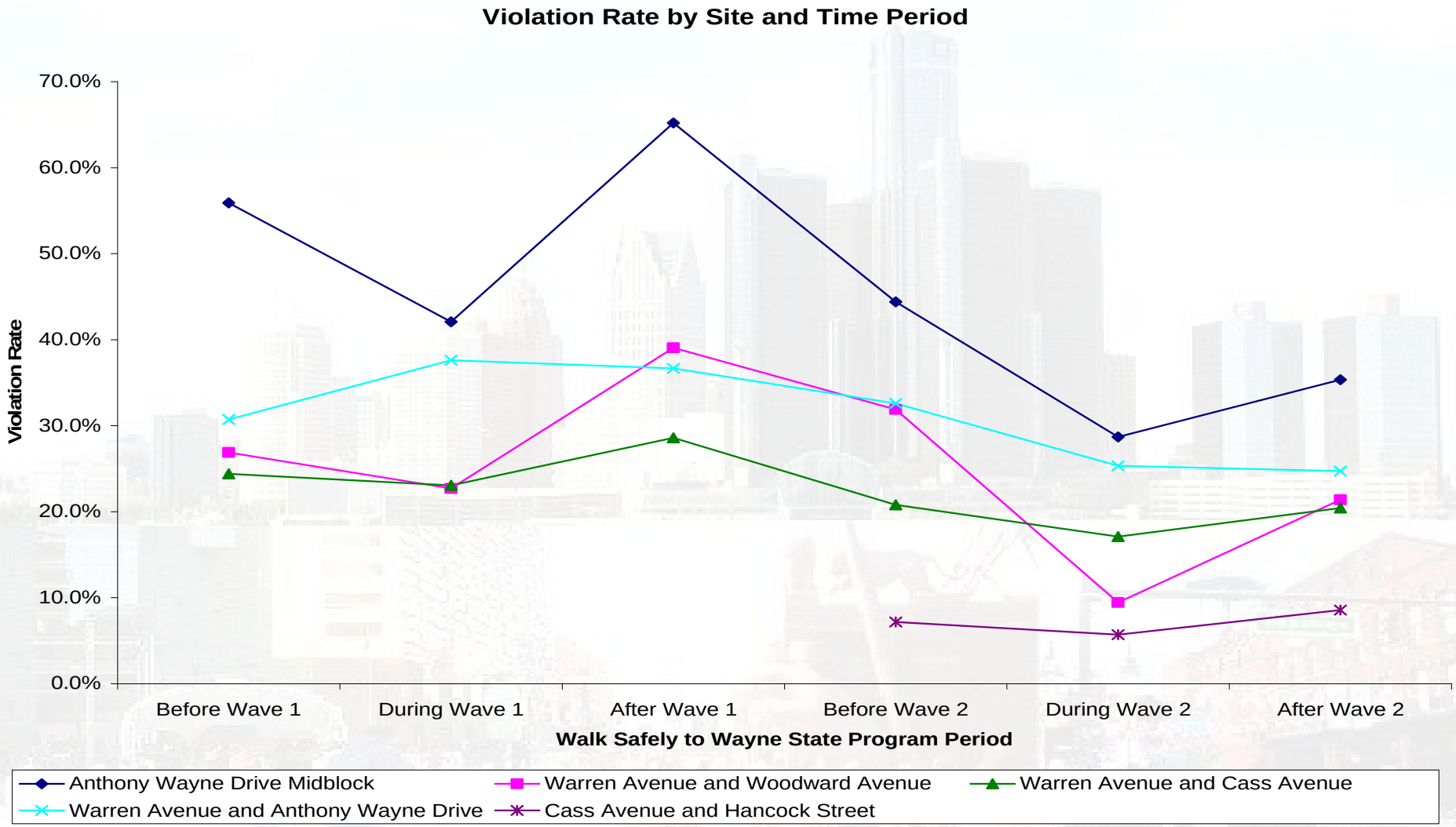
Field Setup for Elevated Video Recording System

Synchronized Pedestrian Behavioral Videos

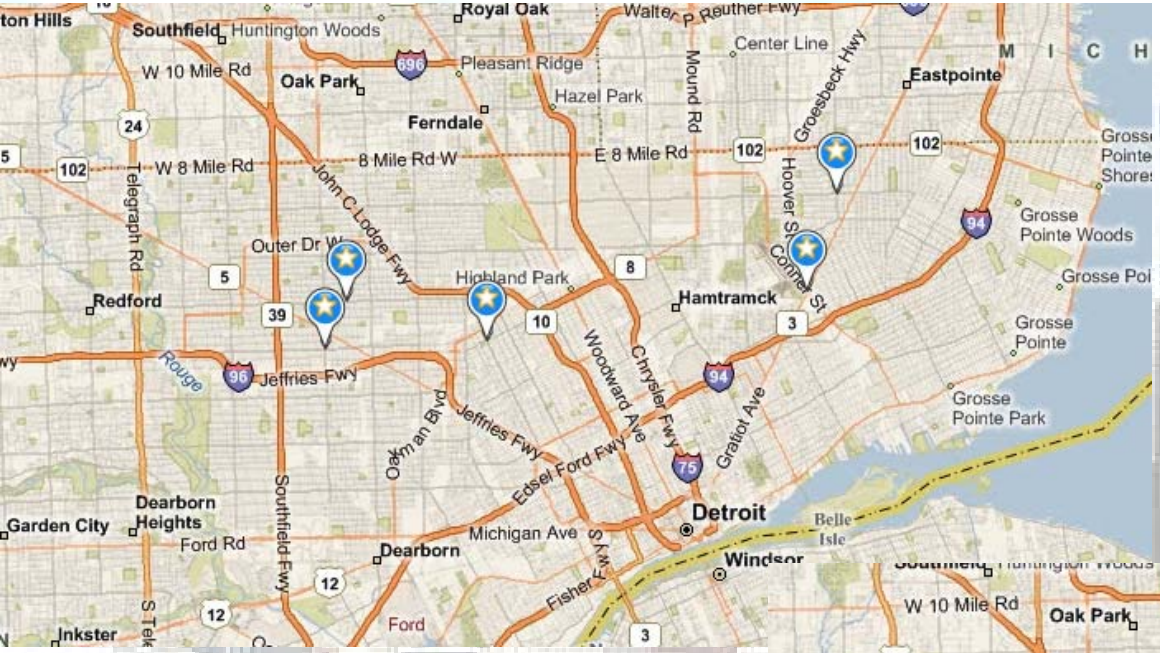
Enforcement Programs: Walk Safely to Wayne State



Enforcement Programs: Walk Safely to Wayne State



Enforcement Programs
Share the Road



Phase I:

5 intersections

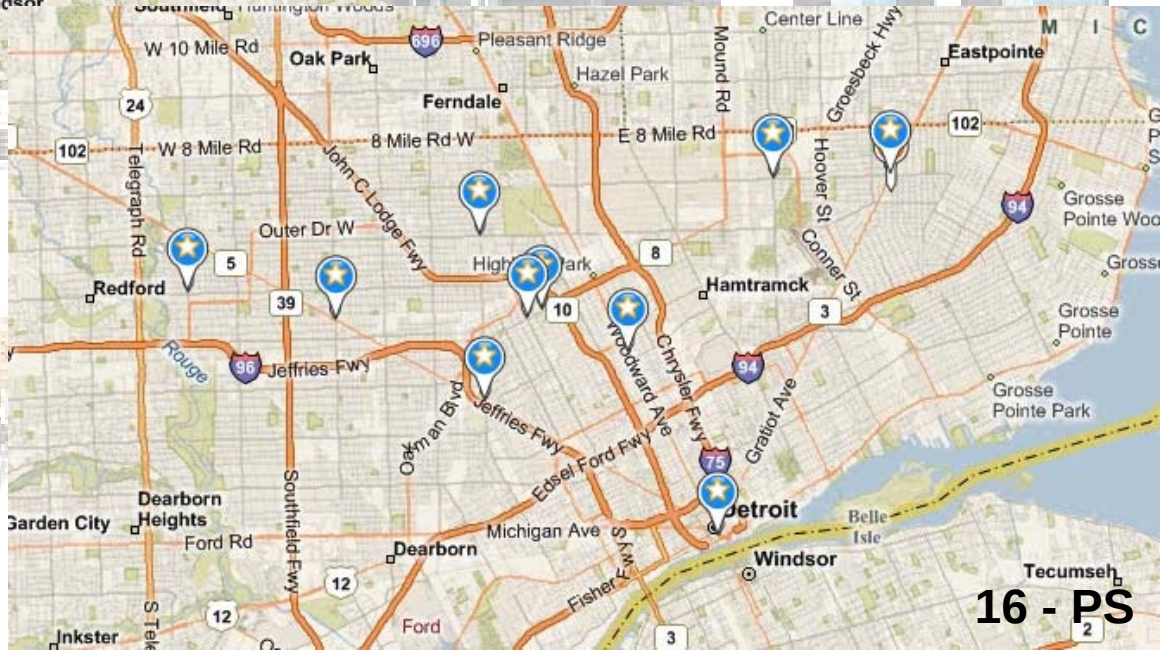
Enforcement during fall of 2008

Phase 2:

10 intersections

Enforcement during fall of 2009

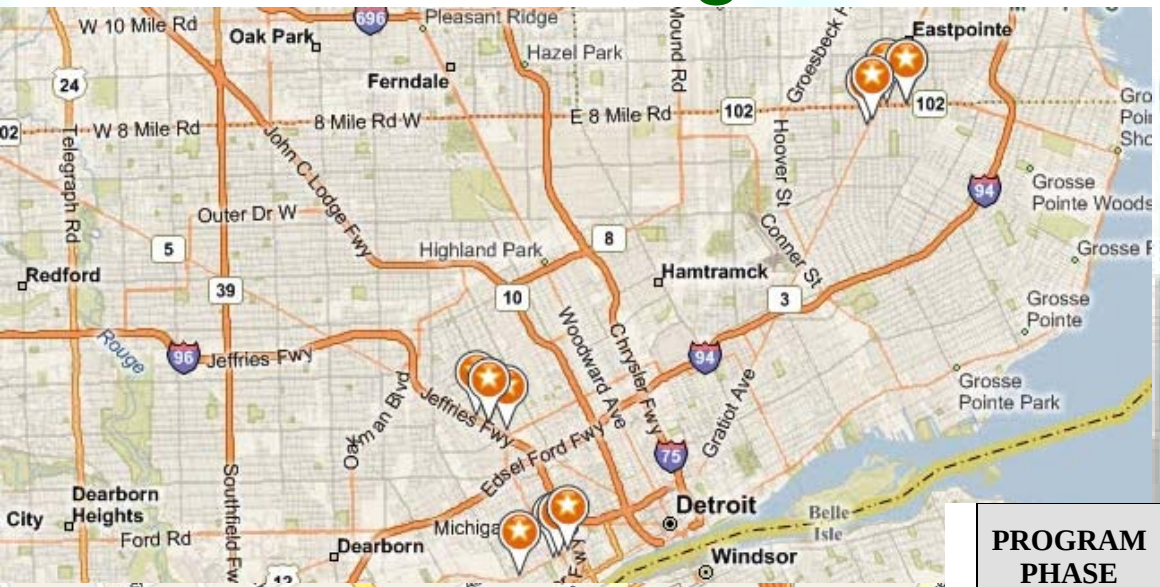
Additional video collected in June 2010



Enforcement Programs: Share the Road

LOCATION	VIOLATION RATE BY PERIOD		
	BEFORE	DURING	AFTER
Hubbell and Fenkell	53.6%	36.5%	46.5%
7 Mile and Schoenherr	42.1%	41.5%	30.1%
Dexter and Davison	30.5%	37.4%	49.2%
Conner and Gratiot	32.3%	31.8%	41.2%
Greenfield and Schoolcraft	34.2%	30.8%	20.7%
Phase 1 Total	**38.1%**	**35.7%**	**35.9%**
Grand River and Greenfield	49.7%	41.0%	47.7%
Grand River and Livernois	40.8%	36.5%	43.1%
Griswold and Larned	33.8%	29.3%	37.9%
McNichols and Livernois	41.7%	37.4%	41.2%
Woodward and Clairmount	48.4%	38.3%	35.9%
7 Mile and Gratiot	35.4%	32.3%	35.2%
7 Mile and Van Dyke	40.4%	36.0%	39.2%
Davison and Linwood	52.0%	40.7%	41.3%
Davison and 14th	44.5%	31.0%	44.4%
Lahser and Fenkell	50.4%	38.2%	43.4%
Phase 2 Total	**42.1%**	**34.9%**	**38.8%**

Enforcement Programs: Traveling Trashed is Trouble

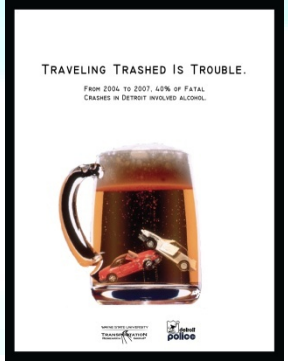


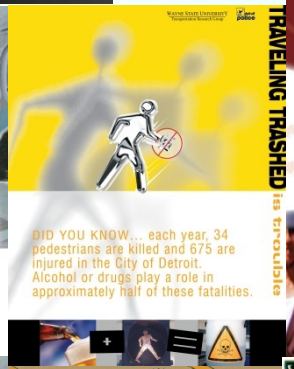
Phase I:
8 Mile/Gratiot
Grand River/Grand Blvd
Vernor Highway

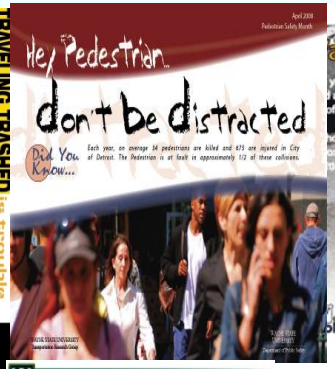
Phase 2:
Stadium Area
Greektown

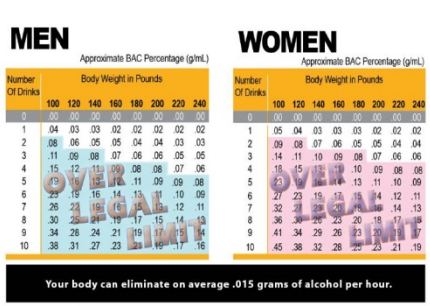
PROGRAM PHASE	CITATIONS	
	TYPE	NUMBERS ISSUED
1	DUI/Open Intoxication	14
	Expired Plates	15
	Speeding	19
	Red Light/Stop Sign Violations	11
	Safety Belt Violations	2
	Other (e.g., no insurance/license)	109
	Total	**170**
2	DUI/Open Intoxication	76
	Expired Plates	54
	Speeding	94
	Red Light/Stop Sign Violations	110
	Prohibited Turn	83
	Safety Belt Violations	53
	Total	**470**

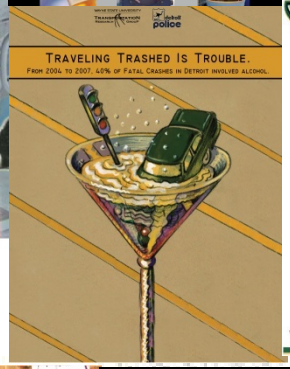
Public Awareness Materials

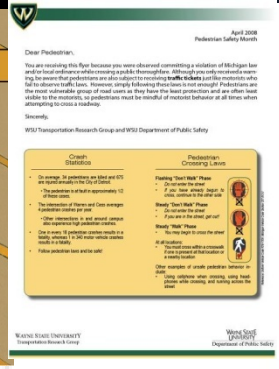


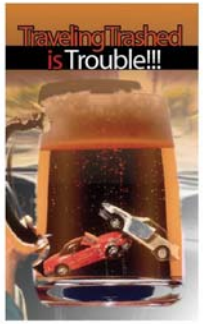


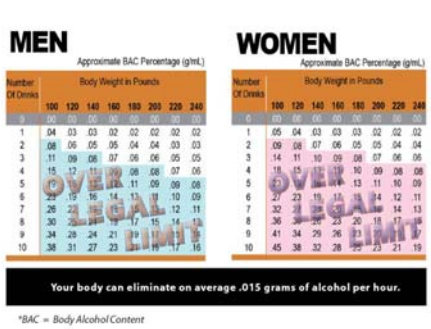


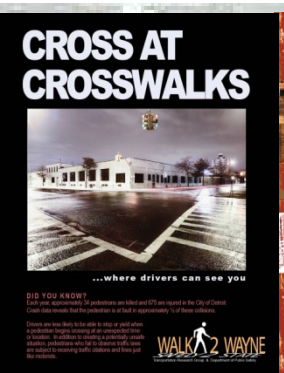


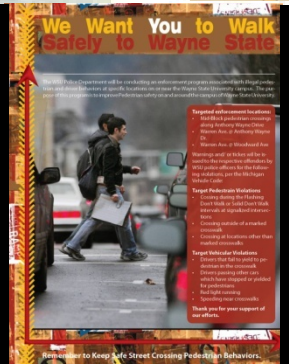


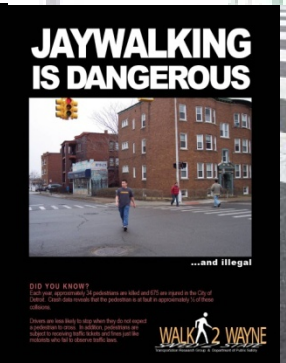


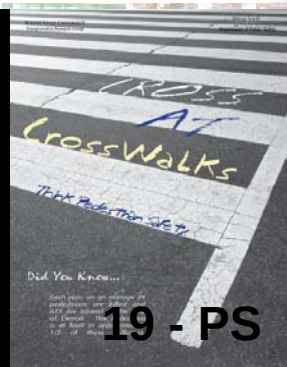










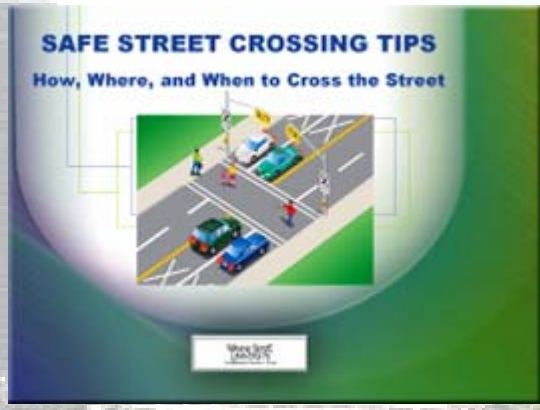


Educational Program

- Goal: To improve student awareness of proper pedestrian behavior and street-crossing techniques
- Objectives:
  - Develop pedestrian safety training program for elementary and middle school students
  - Implement program at schools in City of Detroit
    - Initial training
    - Retraining
  - Evaluate effectiveness of training program:
    - Pre/Post Testing
    - Before and After Behavioral Observations

K-8 Training Program Scope

- Develop pedestrian safety program for K-8 students
  - Portable
  - Easy to implement
  - Contained within a single class period
  - Localized messages
- Implement within City of Detroit
- Evaluate effectiveness
  - Test students' comprehension through written pre- and post-tests
  - Observe student before & after street-crossing behavior



K-8 Program Details

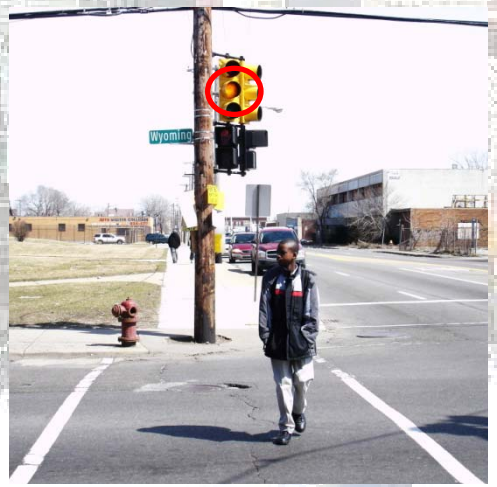
- PowerPoint with photos, animations, and videos
  - Customizable template
- Topics
  - Proper search methods
  - Crossing location and path selection
  - When to start crossing
- Common problem-scenarios
  - Signalized and unsignalized intersections
  - Intersections without crosswalks
  - Midblock areas
  - Locations with no sidewalks or impassable sidewalks
- Includes an interactive component

Examples of Bad Ped Behavior

Parent Waving Children Across

Crossing Between Parked Cars

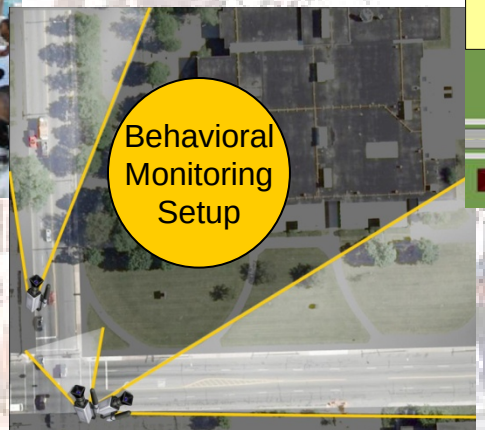
Unmarked Midblock Crossing

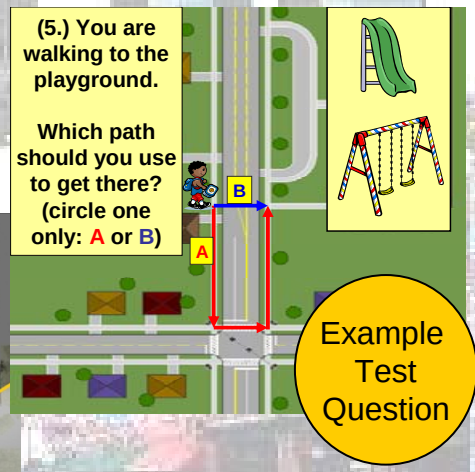


Running

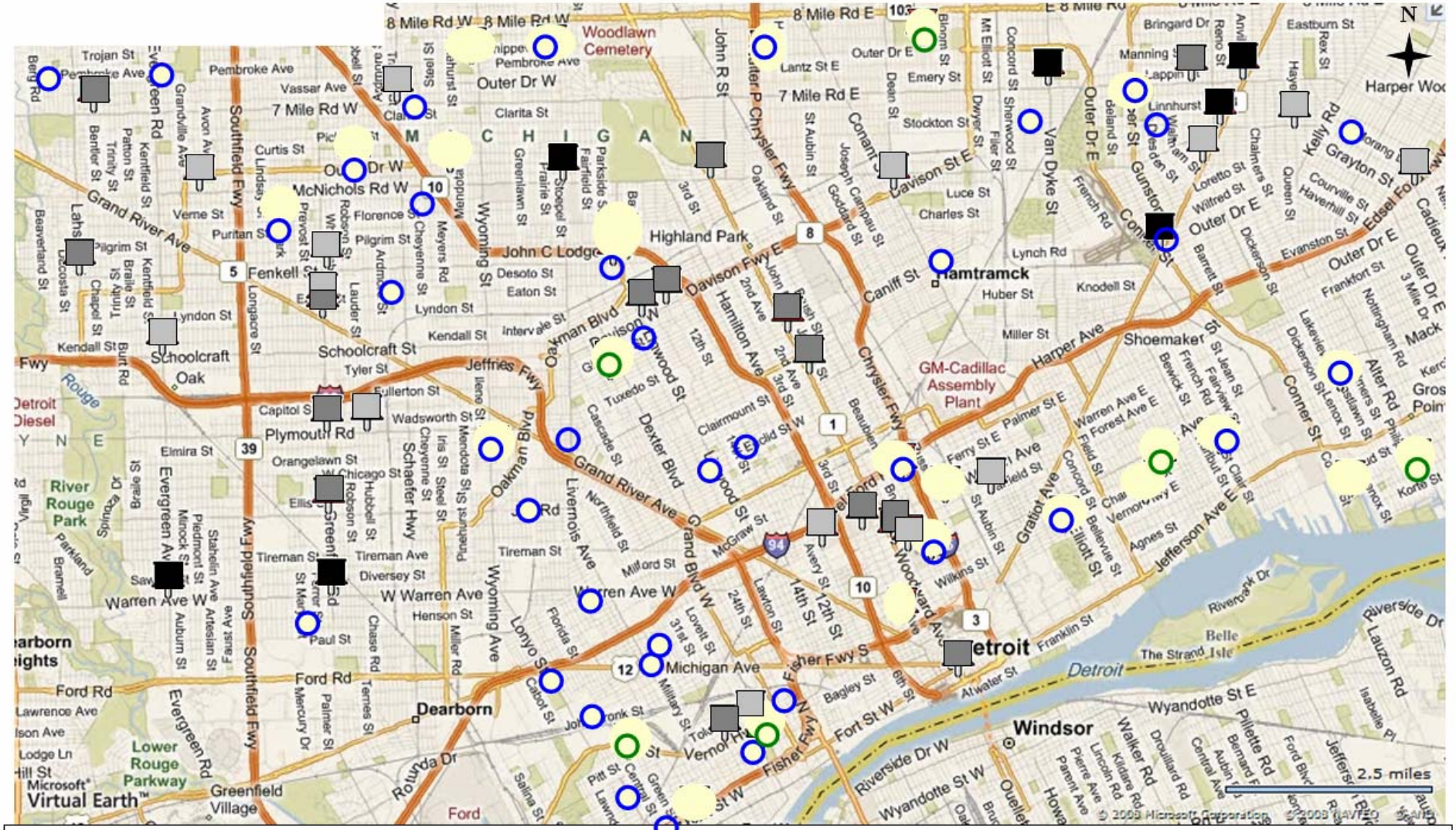
Program Implementation

- 44 Detroit schools
- 10,000 children trained
- 8,000 pre/post tests
- 6,000 child pedestrian crossing observations





K-8 Program Schools and High Ped Crash Locations in Detroit



Key:

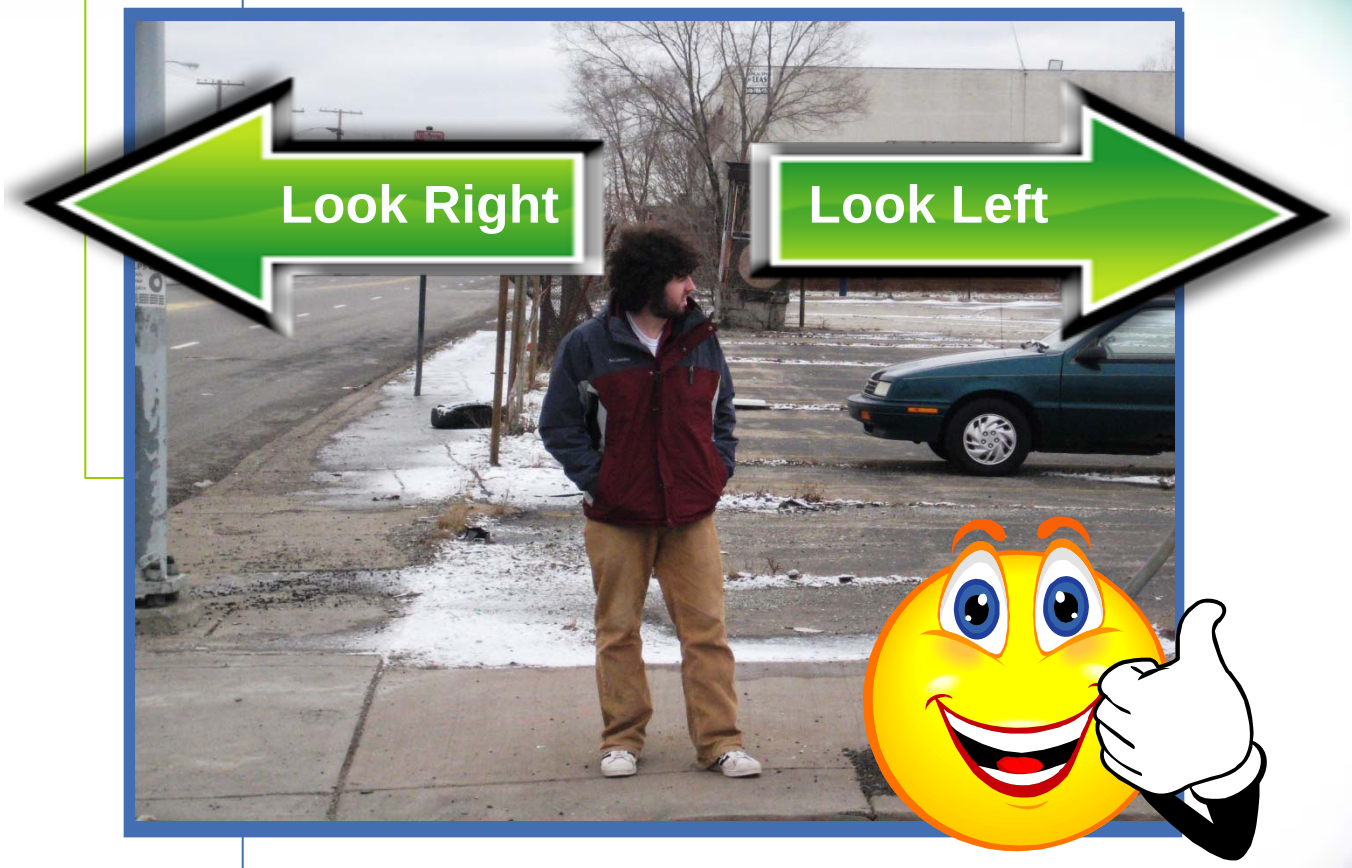
SCHOOLS

- K-8 Schools that Received Initial Training (n=38)
- K-8 Schools that Received Initial Training & Retraining (n=6)

HIGH PED CRASH LOCATIONS

- 9-11 Ped Crashes from '02 to '07
- 6-8 Ped Crashes from '02 to '07
- 3-5 Ped Crashes from '02 to '07

Always Stop Then
Look **LEFT-RIGHT-LEFT** Before Crossing



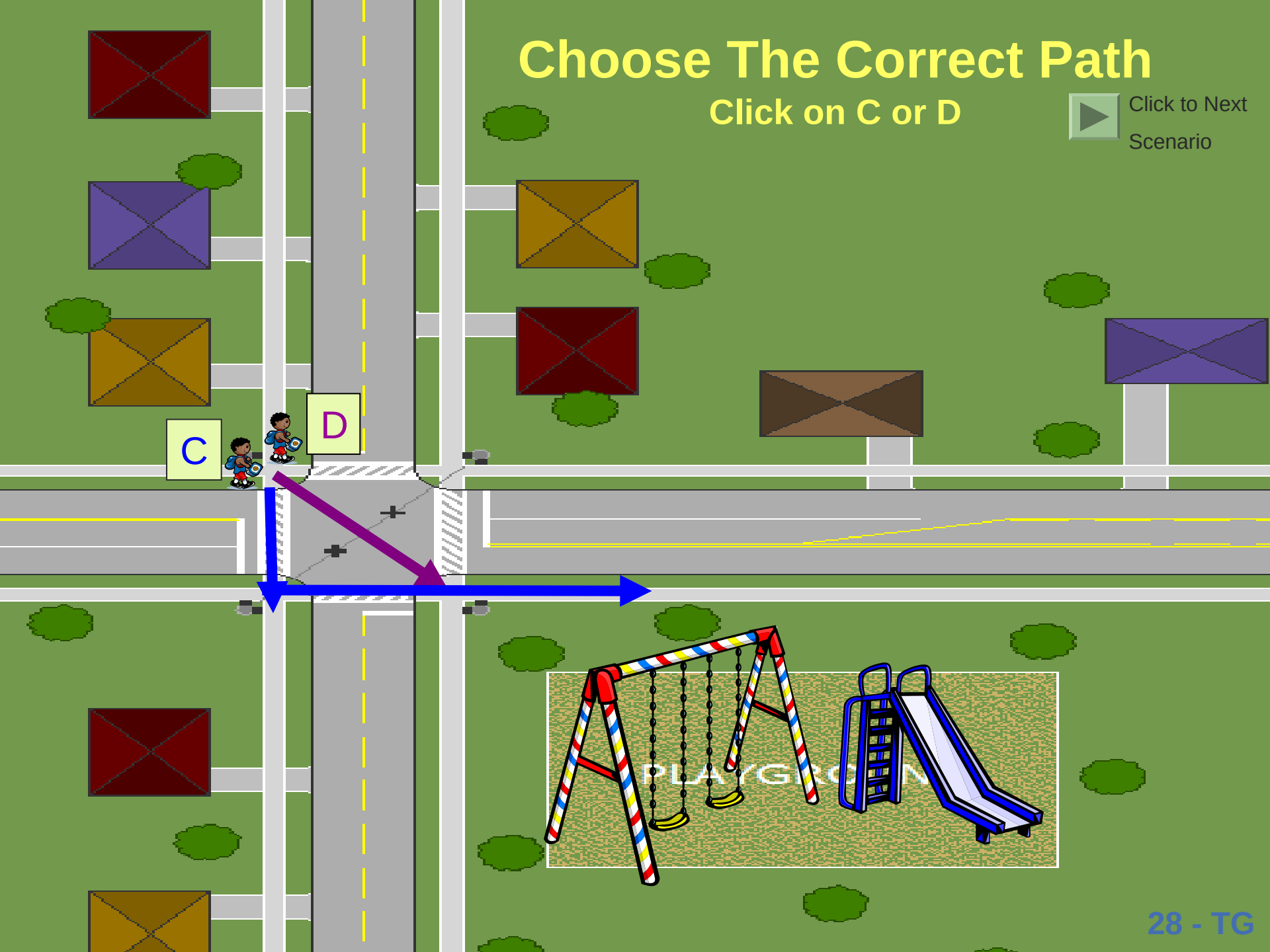
Do **NOT** Cross Between **PARKED VEHICLES**

Drivers can't see you between parked vehicles

Choose The Correct Path

Click on C or D

Click to Next Scenario



Crash!!!
Click anywhere if slide doesn't animate
Return to Previous
PLAYGROUND

Return to Previous

Safe Path Chosen!!!

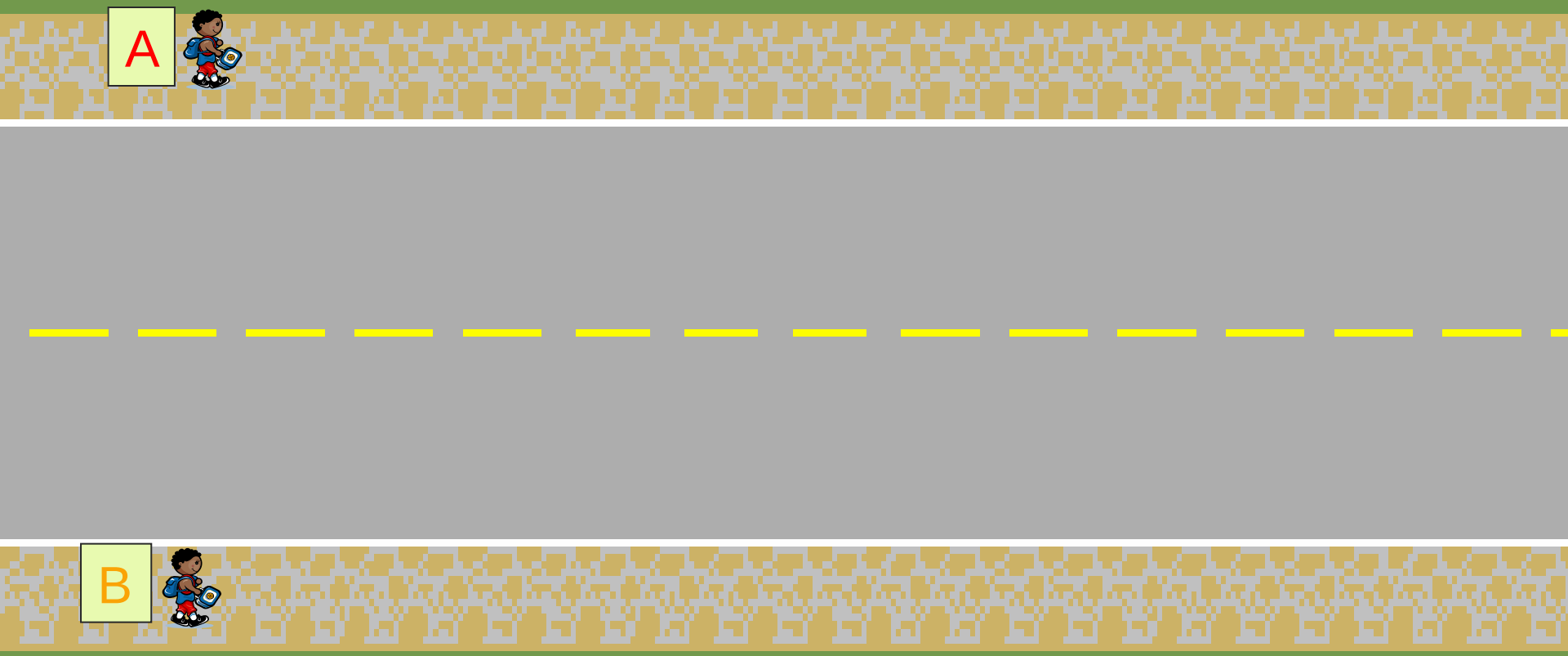
Click anywhere if slide doesn’t animate

Choose a Side

Click to Next

Click on A or B

Click anywhere if slide doesn’t animate



Correct side of Road!!!

Return to Previous

Click anywhere if slide doesn't animate

On Wrong Side of Road!!!

Click anywhere if slide doesn't animate

Return to Previous

When Should I Start to Cross?

Click to Next

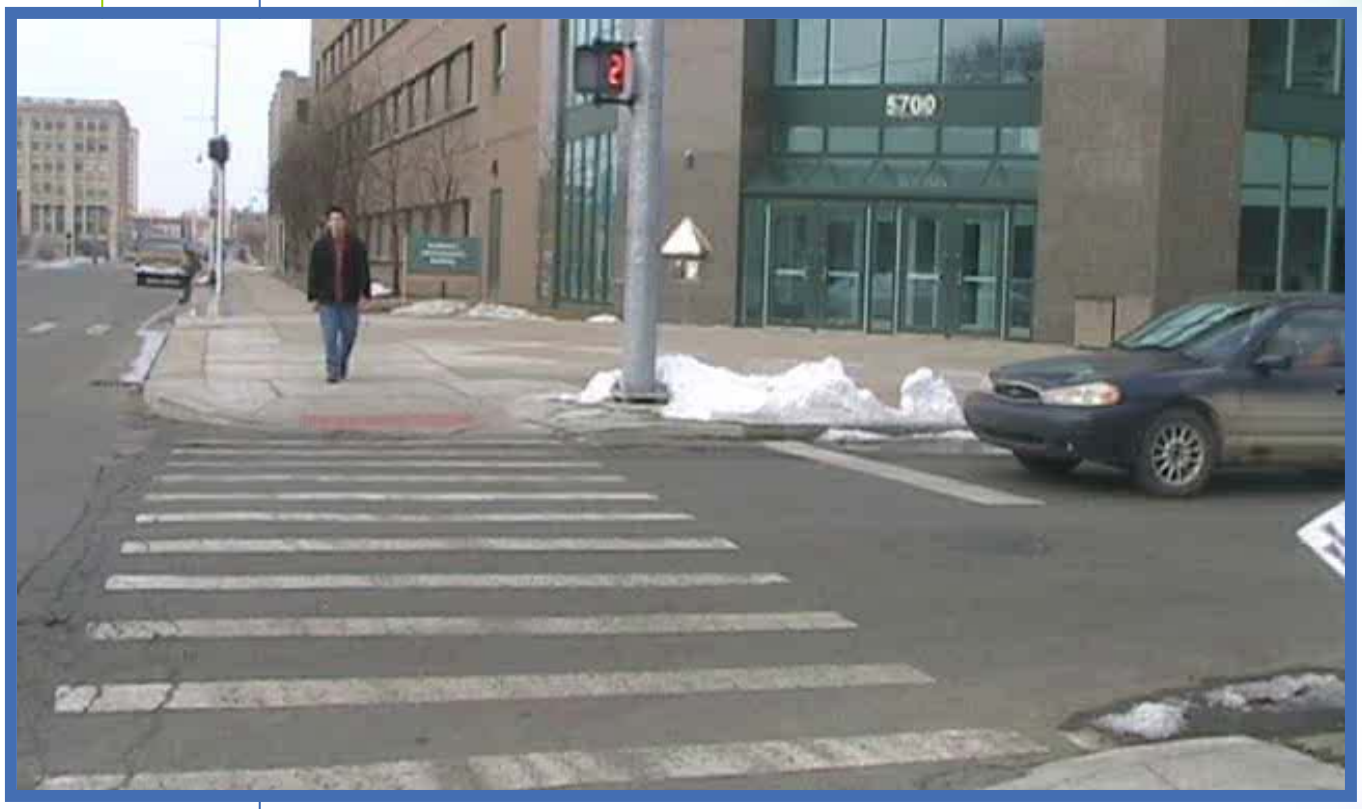
Click on an image

A

B

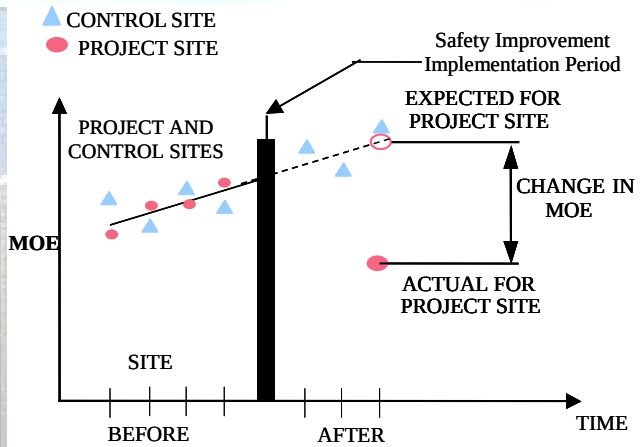
C

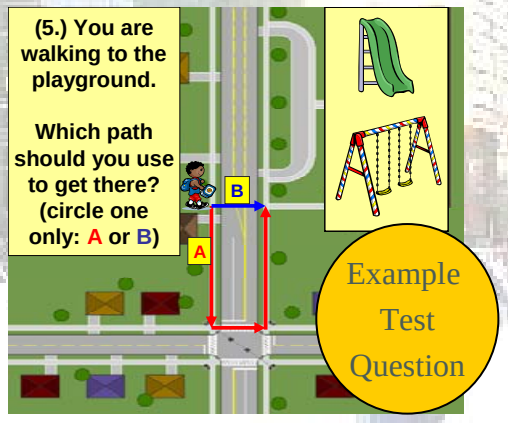
Wrong!

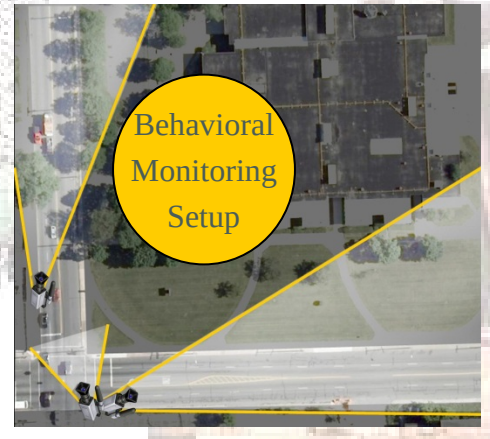


Evaluation

- Was the program effective?
- Knowledge Gains
  - Testing (Pre/Post)
- Ped Behavioral Modifications
  - Field observations of ped violations (jaywalking, signal violations, etc.)



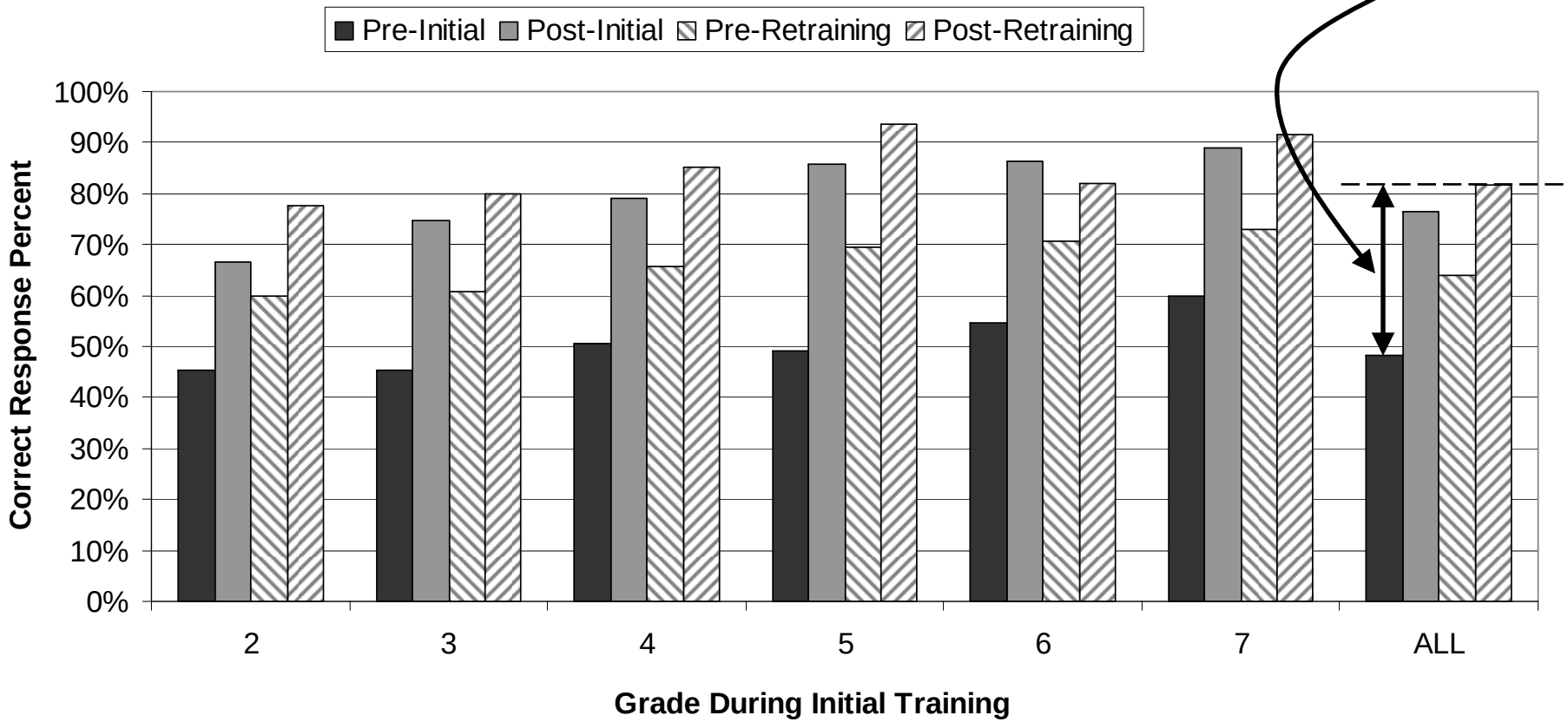




Educational Programs

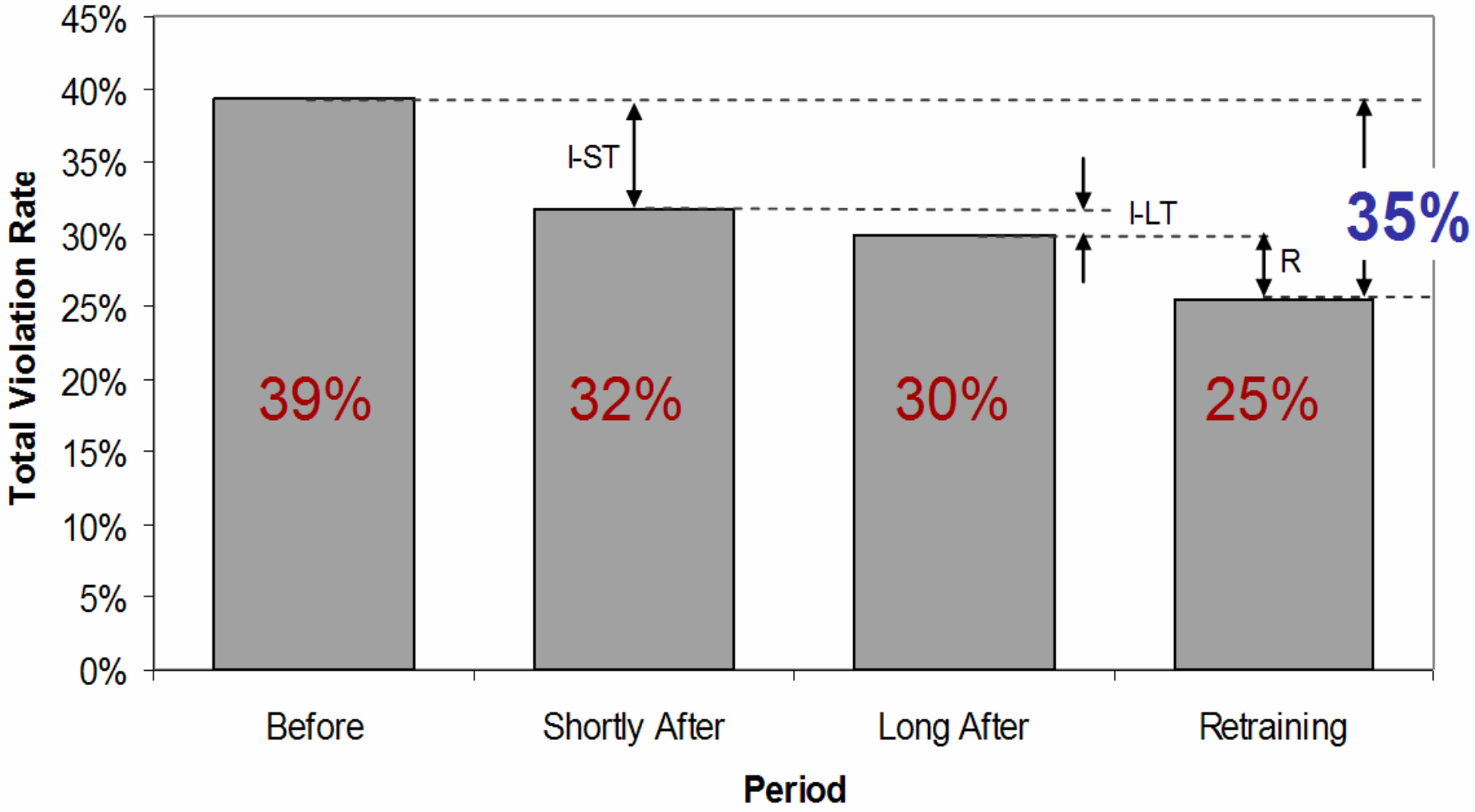
K-8 Test Scores – Initial vs. Retraining

Cumulative Improvement = 33%



Educational Programs

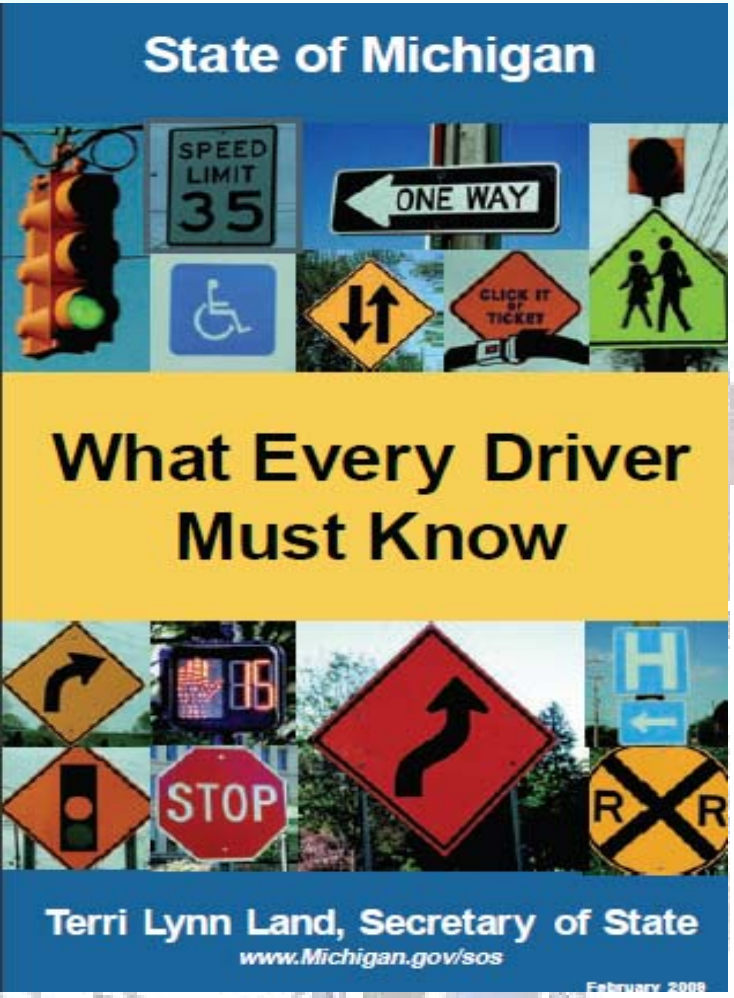
K-8 Violation Rate – Initial vs. Retraining

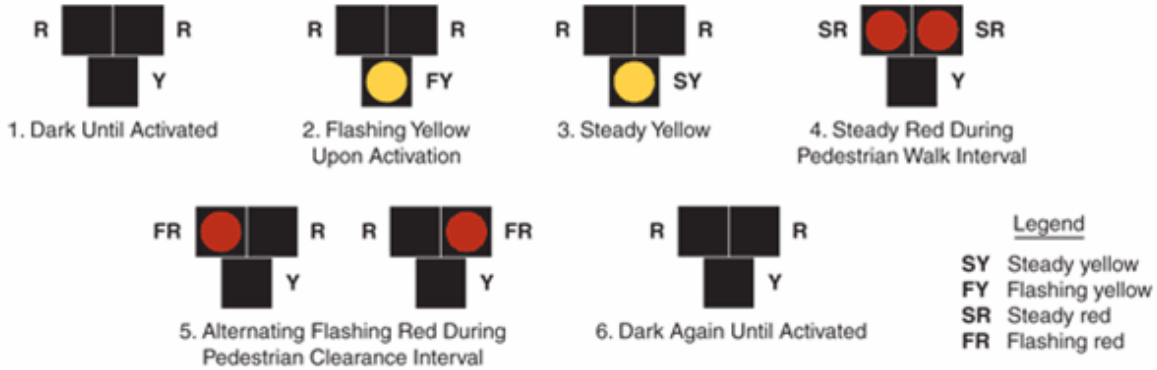


Conclusions & Recommendations

- Positive impacts on ped safety comprehension and behavior
- Program best suited for grades 3-6
  - Program modified for K-2 and 7-8
- Keep audience size under 100
  - Individual classrooms for K-2
- Annual retraining is effective
  - No additional benefit if performed more frequently
- Findings twice presented at Transportation Research Board
- Two papers published in Transportation Research Record

Changes to State of Michigan's *What Every Driver Must Know*

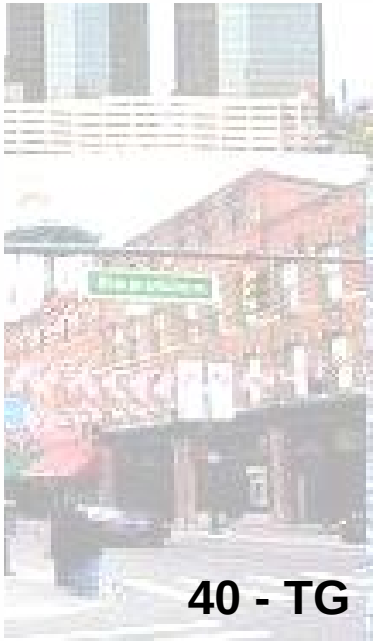




Vehicular Indications for "HAWK" Signal

Two Section Types

Countdown Displays



Development of Transferable Pedestrian Safety Model

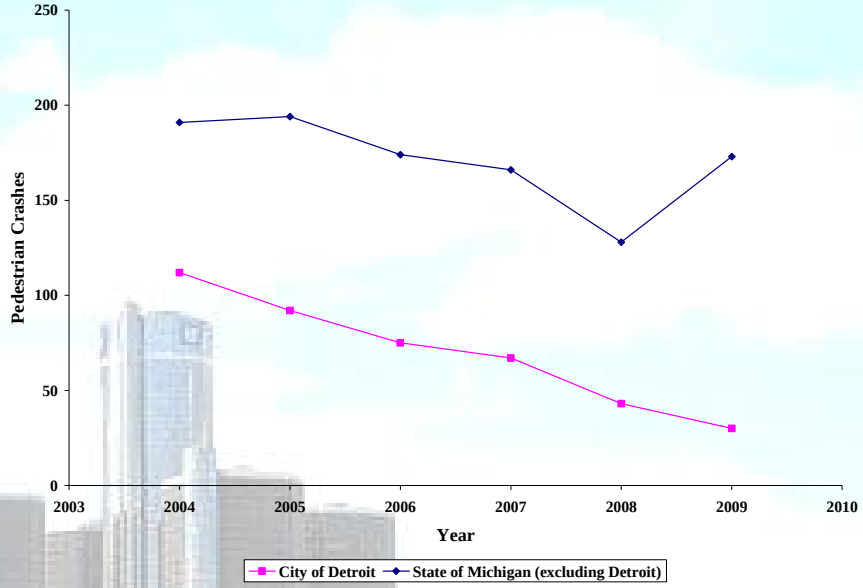
- Guidelines for implementation of comprehensive pedestrian safety programs in other jurisdictions
- Instructions/How-to-Guide
  - Create a Pedestrian Safety Action Team
  - Develop a Pedestrian Safety Action Plan
  - Education, Enforcement, and Engineering Programs
  - Sample Materials from the City of Detroit
    - Pedestrian Safety Action Plan Outline
    - Step-by-Step Program Guides
    - Public Awareness Materials
  - Information regarding various resource materials

Safety Program Impacts and Conclusions

Crash Trends Between Periods Before and During Detroit Intervention Programs

PERIOD	NON-PEDESTRIAN CRASHES CITY OF DETROIT			NON-PEDESTRIAN CRASHES MICHIGAN (EXCLUSIVE OF DETROIT)		
	CRASHES	INJURIES	FATALITIES	CRASHES	INJURIES	FATALITIES
Before	24,716	7,541	83	292,640	72,567	866
During	21,047	6,256	74	280,346	65,434	735
Percent Reduction	14.8%	17.0%	11.4%	4.2%	9.8%	15.1%
PERIOD	**PEDESTRIAN CRASHES CITY OF DETROIT**			**PEDESTRIAN CRASHES MICHIGAN (EXCLUSIVE OF DETROIT)**		
	CRASHES	INJURIES	FATALITIES	CRASHES	INJURIES	FATALITIES
Before	576	464	29	1,817	1,772	107
During	473	371	30	1,652	1,616	88
Percent Reduction	17.9%	20.1%	-1.7%	9.1%	8.8%	17.4%

Safety Program Impacts and Conclusions

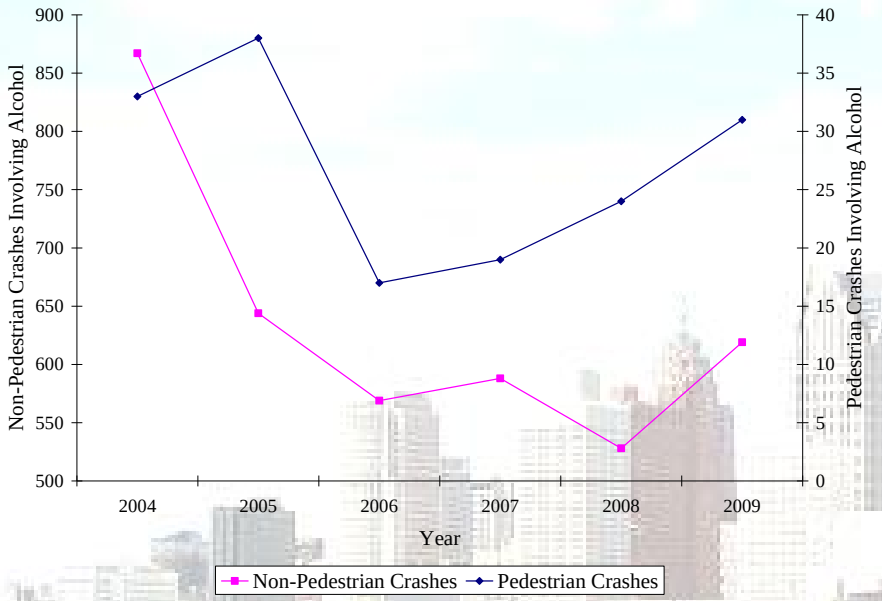


Pedestrian Crash-Involvement by Age Group, 2004 to 2009

YEAR	CITY OF DETROIT					
	0-9	**10-19**	**20-29**	**30-39**	**40-49**	**50+**
2004	112	166	70	82	106	145
2005	92	158	61	86	109	110
2006	75	136	82	63	68	102
2007	67	116	80	71	104	133
2008	43	102	60	51	79	111
2009	30	103	81	65	72	108
Percent Reduction	**73.2%**	**38.0%**	**-15.7%**	**20.7%**	**32.1%**	**25.5%**
YEAR	**STATE OF MICHIGAN**					
	0-9	**10-19**	**20-29**	**30-39**	**40-49**	**50+**
2004	191	544	368	245	269	393
2005	194	519	353	219	278	380
2006	174	552	372	214	267	383
2007	166	466	331	181	231	381
2008	128	505	338	181	207	393
2009	173	435	301	170	228	359
Percent Reduction	**9.4%**	**20.0%**	**18.2%**	**30.6%**	**15.2%**	**8.7%**

Pedestrian Crash-Involvement of Children Ages 0-9 the State of Michigan

Safety Program Impacts and Conclusions



Alcohol-Involved Crashes in the City of Detroit, 2004 to 2009

Annual Crash Rates for Enforcement Program Implementation

LOCATION	IMPLEMENTATION DATE	AVERAGE NUMBER OF PEDESTRIAN CRASHES PER YEAR*	
		BEFORE	AFTER
Wayne State University Campus	March 2008	1.15	0.59
City of Detroit Outside of Wayne State Campus	October 2008	1.43	0.36
	October 2009	1.13	0.75
Total		**1.20**	**0.51**

*Data have been extrapolated to full year equivalencies

Additional Contributions of DAPSAT

- High-Intensity Activated Crosswalk (HAWK) signals and Rectangular Rapid Flash Beacons (RRFB) on WSU Campus
- Complete Streets Community Action Team
- Anthony Wayne Drive Streetscape Project
- City Adoption of Pedestrian Safety Related Policies
- Trumbull Ave. Project

Continuation of Programs

- Partnership with Michigan Safe Routes to School
- Tasks include:
  - Provide local engineering services for SR2S schools
  - Customize and implement K-8 pedestrian training program
  - Integration of SR2S materials into WSU courses
  - Develop school prioritization strategy

K-8 Program
Statewide Implementation

- Universal template is being developed
  - Scenarios are being added
  - Photo database being compiled
  - Local scenarios and photos are preferred
- Customizable for individual schools through SR2S
  - Training assistance
  - Implementation

Questions?

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