Wayne State University
Pedestrian Safety Projects

Michigan Traffic Safety Summit
Lansing, MI
March 23, 2011
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

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TOTAL PEDESTRIAN CRASHES</th>
<th>TOTAL PEDESTRIAN INJURIES</th>
<th>TOTAL PEDESTRIAN FATALITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>638</td>
<td>509</td>
<td>37</td>
</tr>
<tr>
<td>2006</td>
<td>570</td>
<td>454</td>
<td>29</td>
</tr>
<tr>
<td>2007</td>
<td>581</td>
<td>473</td>
<td>29</td>
</tr>
<tr>
<td>2008</td>
<td>467</td>
<td>368</td>
<td>27</td>
</tr>
<tr>
<td>2009</td>
<td>478</td>
<td>373</td>
<td>32</td>
</tr>
</tbody>
</table>

• Comparison of Pedestrian Fatality Rates in Major Cities

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

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

Anthony Wayne Drive
Mid-Block Locations

Woodward Ave. @
Warren Ave.

Warren Ave. @
Cass Ave.

Warren Ave. @
Anthony Wayne Dr.

Cass Ave. @
Hancock St.
Enforcement Programs:
Walk Safely to Wayne State

Violation Rate by Site and Time Period

Walk Safely to Wayne State Program Period

Anthony Wayne Drive Midblock
Warren Avenue and Woodward Avenue
Warren Avenue and Cass Avenue
Warren Avenue and Anthony Wayne Drive
Cass Avenue and Hancock Street
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

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>VIOLATION RATE BY PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BEFORE</td>
</tr>
<tr>
<td>Hubbell and Fenkell</td>
<td>53.6%</td>
</tr>
<tr>
<td>7 Mile and Schoenherr</td>
<td>42.1%</td>
</tr>
<tr>
<td>Dexter and Davison</td>
<td>30.5%</td>
</tr>
<tr>
<td>Conner and Gratiot</td>
<td>32.3%</td>
</tr>
<tr>
<td>Greenfield and Schoolcraft</td>
<td>34.2%</td>
</tr>
<tr>
<td><strong>Phase 1 Total</strong></td>
<td><strong>38.1%</strong></td>
</tr>
<tr>
<td>Grand River and Greenfield</td>
<td>49.7%</td>
</tr>
<tr>
<td>Grand River and Livernois</td>
<td>40.8%</td>
</tr>
<tr>
<td>Griswold and Larned</td>
<td>33.8%</td>
</tr>
<tr>
<td>McNichols and Livernois</td>
<td>41.7%</td>
</tr>
<tr>
<td>Woodward and Clairmount</td>
<td>48.4%</td>
</tr>
<tr>
<td>7 Mile and Gratiot</td>
<td>35.4%</td>
</tr>
<tr>
<td>7 Mile and Van Dyke</td>
<td>40.4%</td>
</tr>
<tr>
<td>Davison and Linwood</td>
<td>52.0%</td>
</tr>
<tr>
<td>Davison and 14th</td>
<td>44.5%</td>
</tr>
<tr>
<td>Lahser and Fenkell</td>
<td>50.4%</td>
</tr>
<tr>
<td><strong>Phase 2 Total</strong></td>
<td><strong>42.1%</strong></td>
</tr>
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</table>
Enforcement Programs: Traveling Trashed is Trouble

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

Phase 2:
Stadium Area
Greektown

<table>
<thead>
<tr>
<th>PROGRAM PHASE</th>
<th>CITATIONS</th>
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<tbody>
<tr>
<td></td>
<td>TYPE</td>
</tr>
<tr>
<td>1</td>
<td>DUI/Open Intoxication</td>
</tr>
<tr>
<td></td>
<td>Expired Plates</td>
</tr>
<tr>
<td></td>
<td>Speeding</td>
</tr>
<tr>
<td></td>
<td>Red Light/Stop Sign Violations</td>
</tr>
<tr>
<td></td>
<td>Safety Belt Violations</td>
</tr>
<tr>
<td></td>
<td>Other (e.g., no insurance/license)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>2</td>
<td>DUI/Open Intoxication</td>
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<td></td>
<td>Expired Plates</td>
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<tr>
<td></td>
<td>Speeding</td>
</tr>
<tr>
<td></td>
<td>Red Light/Stop Sign Violations</td>
</tr>
<tr>
<td></td>
<td>Prohibited Turn</td>
</tr>
<tr>
<td></td>
<td>Safety Belt Violations</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
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

(5.) You are walking to the playground. Which path should you use to get there? (circle one only: A or B)

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

Key:

- ○ K-8 Schools that Received Initial Training (n=38)
- ○ K-8 Schools that Received Initial Training & Retraining (n=6)
- □ 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
Crash!!!
Click anywhere if slide doesn’t animate.
Safe Path Chosen!!!

Click anywhere if slide doesn’t animate.
Choose a Side

Click on A or B

Click anywhere if slide doesn’t animate
On Wrong Side of Road!!!
When Should I Start to Cross?

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.)

(5.) You are walking to the playground.
Which path should you use to get there? (circle one only: A or B)

Example Test Question

Behavioral Monitoring Setup

36 - TG
Educational Programs
K-8 Test Scores – Initial vs. Retraining

Cumulative Improvement = 33%
Educational Programs
K-8 Violation Rate – Initial vs. Retraining

<table>
<thead>
<tr>
<th>Period</th>
<th>Total Violation Rate</th>
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<tbody>
<tr>
<td>Before</td>
<td>39%</td>
</tr>
<tr>
<td>Shortly After</td>
<td>32%</td>
</tr>
<tr>
<td>Long After</td>
<td>30%</td>
</tr>
<tr>
<td>Retraining</td>
<td>25%</td>
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</table>

35%
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

State of Michigan

What Every Driver Must Know

Terri Lynn Land, Secretary of State
www.Michigan.gov/sos

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

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>NON-PEDESTRIAN CRASHES</th>
<th></th>
<th></th>
<th>NON-PEDESTRIAN CRASHES</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>CITY OF DETROIT</td>
<td>CRASHES</td>
<td>INJURIES</td>
<td>FATALITIES</td>
<td>CRASHES</td>
<td>INJURIES</td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td>24,716</td>
<td>7,541</td>
<td>83</td>
<td>292,640</td>
<td>72,567</td>
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<tr>
<td>During</td>
<td></td>
<td>21,047</td>
<td>6,256</td>
<td>74</td>
<td>280,346</td>
<td>65,434</td>
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<tr>
<td>Percent</td>
<td>Reduction</td>
<td>14.8%</td>
<td>17.0%</td>
<td>11.4%</td>
<td>4.2%</td>
<td>9.8%</td>
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<table>
<thead>
<tr>
<th>PERIOD</th>
<th>PEDESTRIAN CRASHES</th>
<th></th>
<th></th>
<th>PEDESTRIAN CRASHES</th>
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<tbody>
<tr>
<td></td>
<td>CITY OF DETROIT</td>
<td>CRASHES</td>
<td>INJURIES</td>
<td>FATALITIES</td>
<td>CRASHES</td>
<td>INJURIES</td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td>576</td>
<td>464</td>
<td>29</td>
<td>1,817</td>
<td>1,772</td>
</tr>
<tr>
<td>During</td>
<td></td>
<td>473</td>
<td>371</td>
<td>30</td>
<td>1,652</td>
<td>1,616</td>
</tr>
<tr>
<td>Percent</td>
<td>Reduction</td>
<td>17.9%</td>
<td>20.1%</td>
<td>-1.7%</td>
<td>9.1%</td>
<td>8.8%</td>
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</table>
# Safety Program Impacts and Conclusions

## Pedestrian Crash-Involvement by Age Group, 2004 to 2009

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CITY OF DETROIT</th>
<th>STATE OF MICHIGAN</th>
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<tbody>
<tr>
<td>2004</td>
<td>112</td>
<td>166</td>
</tr>
<tr>
<td>2005</td>
<td>92</td>
<td>158</td>
</tr>
<tr>
<td>2006</td>
<td>75</td>
<td>136</td>
</tr>
<tr>
<td>2007</td>
<td>67</td>
<td>116</td>
</tr>
<tr>
<td>2008</td>
<td>43</td>
<td>102</td>
</tr>
<tr>
<td>2009</td>
<td>30</td>
<td>103</td>
</tr>
</tbody>
</table>

Percent Reduction:
- City of Detroit: 73.2%, 38.0%, -15.7%, 20.7%, 32.1%, 25.5%
- State of Michigan: 9.4%, 20.0%, 18.2%, 30.6%, 15.2%, 8.7%
### Safety Program Impacts and Conclusions

#### Annual Crash Rates for Enforcement Program Implementation

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>IMPLEMENTATION DATE</th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayne State University Campus</td>
<td>March 2008</td>
<td>1.15</td>
<td>0.59</td>
</tr>
<tr>
<td>City of Detroit</td>
<td>October 2008</td>
<td>1.43</td>
<td>0.36</td>
</tr>
<tr>
<td>Outside of Wayne State Campus</td>
<td>October 2009</td>
<td>1.13</td>
<td>0.75</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1.20</td>
<td>0.51</td>
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</tbody>
</table>

*Data have been extrapolated to full year equivalencies

---

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Pedestrian Crashes Involving Alcohol</th>
<th>Pedestrian Crashes Involving Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>850</td>
<td>700</td>
</tr>
<tr>
<td>2005</td>
<td>820</td>
<td>650</td>
</tr>
<tr>
<td>2006</td>
<td>790</td>
<td>600</td>
</tr>
<tr>
<td>2007</td>
<td>760</td>
<td>550</td>
</tr>
<tr>
<td>2008</td>
<td>730</td>
<td>500</td>
</tr>
<tr>
<td>2009</td>
<td>700</td>
<td>450</td>
</tr>
</tbody>
</table>

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#### Safety Program Impacts and Conclusions

#### Annual Crash Rates for Enforcement Program Implementation

<table>
<thead>
<tr>
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<td>0.75</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1.20</td>
<td>0.51</td>
</tr>
</tbody>
</table>

*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