TRB Webinar: Nighttime Seat Belt Enforcement: Background and Recent Findings
Today’s Moderators and Presenters

JoAnn Wells, Insurance Institute for Highway Safety, jwells@iihs.org

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Mark Solomon, Organization, marksolomon@mindspring.com
Today’s Moderators and Presenters

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Rick Pain, Transportation Research Board, R Pain@nas.edu
TRB Announcements:

- We have emailed you the presenters’ slides in today’s webinar reminder email.

- Upcoming webinars:
  A Master United States Catalog of Subgrade Soil-Water Characteristic Curve Default Input Values for the MEPDG: March 17, 2 PM EDT
  
  Helping Airport and Air Carrier Employees Cope With Traumatic Events: March 25, 2 PM EDT
  

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  [http://twitter.com/TRBofNA](http://twitter.com/TRBofNA)
Nighttime Seatbelt Enforcement: Background to the Problem and Past Efforts

James L. Nichols
Nichols and Associates

Neil K. Chaudhary
Julie Tison
Preusser Research Group
Background to the Problem

- Nighttime Seat Belt Use is Low
- It is Lowest Among Highest Risk Occupants
  - Fatal Crash Involved
  - Alcohol-Impaired Drivers and Their Passengers
  - Young Males
  - Repeat Offenders (traffic and criminal)
- Non-Use Peaks between 12 am and 3 am
  - Same Time as Alcohol Impaired Driving
Seat Belt Use among Fatally Injured Occupants, by Time of Day, All Ages

All Ages: Source: FARS

The graph shows the percent belt use by time of day. The x-axis represents different times of the day, including noon, 2 pm, 4 pm, 6 pm, 8 pm, 10 pm, midnight, 2 am, 4 am, 6 am, 8 am, and 10 am. The y-axis represents the percent belt use. The data indicates a higher percent belt use during the early morning hours (2 am to 4 am) compared to other times of the day.
Number of Unbuckled Fatalities, by Time of Day, and by Presence or Absence of Alcohol: All Ages
(Source: FARS)
Unrestrained and Alcohol-Related Occupant Fatalities: Daytime (6 am to 6 pm) versus Nighttime (6 pm to 6 am)

Source: Varghese and Shankar (2007); FARS, 2005 data.

Unrestrained Deaths: 47% Day, 64% Night
Alcohol-Related Deaths: 18% Day, 60% Night
In Summary of the Problem

Low belt use and alcohol impaired driving are very much intertwined, involving generally the same offenders and peaking late at night.
Can late-night seat belt use among high risk drivers (and their passengers) be increased?
Some Evidence is Available Regarding Two Approaches

- Primary Laws
- Nighttime Enforcement
Primary Laws Have Been Associated with Increases in Nighttime Seat Belt Use

- Results of Two Multi-State Studies
  - Voas et al. (2007)
    - Five States
    - Use in A/R Fatal Crashes
  - Masten (2007)
    - Six States
    - Use in Fatal Crashes (Day and Night)
Five-State Case Study
(Voas et al., 2007)

- California (1993) + 13 points observed
- Maryland (1997) + 13 points observed
- Michigan (2000) + 13 points observed
- Washington (2002) + 12 points observed
- Illinois (2003) + 8 points observed

- All but Maryland had increases in usage among front-seat occupants in A/R fatal crashes
- California, Michigan, and Washington experienced decreases in alcohol-related deaths
<table>
<thead>
<tr>
<th>State</th>
<th>Year</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oklahoma</td>
<td>1997</td>
<td>+12 points observed</td>
</tr>
<tr>
<td>Maryland</td>
<td>1997</td>
<td>+13 points observed</td>
</tr>
<tr>
<td>Indiana</td>
<td>1998</td>
<td>+7 points observed</td>
</tr>
<tr>
<td>Alabama</td>
<td>1999</td>
<td>+23 points observed</td>
</tr>
<tr>
<td>Michigan</td>
<td>2000</td>
<td>+13 points observed</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2000</td>
<td>+17 points observed</td>
</tr>
</tbody>
</table>

- **All but Maryland** had increases in **daytime and nighttime usage** among occupants killed in crashes.
- In **Michigan** and **New Jersey**, **nighttime increases were greater** than daytime increases.
There is reasonably strong evidence of:

- increases in *nighttime* use;
- usage among *drinking drivers killed*; and
- reductions in *alcohol-related fatalities*

*High Risk/Nighttime Drivers* can be Affected
Potential Impact of Enforcement (on Nighttime Seat Belt Use)

- Daytime enforcement may or may not increase nighttime usage, but

- Nighttime enforcement has been shown to increase nighttime usage (few studies)
Effect of Daytime Enforcement on Nighttime Seat Belt Use

- Modesto, CA (1988)
- Connecticut (2005)
- Indiana (2007)
Daytime and Nighttime Seat Belt Use in Modesto, California (1988) 
Lund, Stuster, and Fleming, 1989

Week of Study

Percent Usage

- Modesto (day)
- Modesto (late nite)
Daytime and Nighttime Seat Belt Use in Connecticut Following a Daytime *Click It or Ticket* Mobilization. (Chaudhary, Preusser, and Cosgrove, 2005)
Daytime and Nighttime Seat Belt Use in Indiana Following a Daytime *Click It or Ticket* Mobilization.
(Vivoda, Eby, St. Louis, and Kostyniuk, 2007)
In Summary of Daytime Seat Belt Enforcement

- Daytime usage is affected (many studies)
- Nighttime usage may or may not be affected (few studies)
- Little evidence regarding impact on impaired driving or A/R crashes (few studies)
Effect of Night Enforcement (on Nighttime Usage)

- Nova Scotia (circa 1987)
- Binghamton, NY (1992)
- Reading, PA (2004)
Nighttime Safety Belt Use Among Bar Patrons in Halifax and Moncton, Nova Scotia.
Source: Malenfant and Van Houten, 1988
Daytime and Nighttime Safety Belt Use in Binghamton, NY
Source: Wells, Preusser, and Williams, 1992
Daytime and Nighttime Seat Belt Use in Reading, PA following Nighttime Enforcement.
Source: Chaudhary, Alonge, and Preusser, 2005
Daytime and Nighttime Seat Belt Use in Illinois following a CIOT Mobilization with Night Enforcement.

Source: Nassirpour, 2007
In Summary of Nighttime Enforcement Efforts

- Nighttime usage is affected (few studies)
  - Daytime usage may or may not be affected
- Some evidence with regard to impact on impaired driving and alcohol-related crashes
  - Combined alcohol/seat belt effort in Binghamton, NY
- Currently, primary laws appear to be stronger, but there are few studies of nighttime enforcement
Current Status

- Seat belt use is **very** low late at night and among high risk occupants (e.g. alcohol impaired)
- Nighttime seat belt enforcement increases nighttime usage (at least temporarily)
- Combined nighttime enforcement of seat belt and impaired driving laws has strong potential.
- Obstacles and objections frequently voiced
- New NHTSA-sponsored studies should provide additional evidence regarding both feasibility and impact
End of Introduction
Wrap-Up
Jim Nichols, Nichols and Associates

What evidence is provided by the recent studies with regard to the feasibility and impact of nighttime enforcement?
Question

Can current enforcement procedures, notably CIOT, be modified to be effective at night?
The North Carolina, Washington, and West Virginia studies suggest that they can;

Further, checkpoint-like “enforcement zones” may be the most effective approach.
Question

Can current observational methods be modified to be effective at night?
New Evidence

New guidelines provided by NHTSA have been successful in several past studies.
Can late-night seat belt use among high risk drivers (and their passengers) be increased?
WV and NC studies indicated that improvements at night were typically greater than improvements during the day.

Washington study suggests that usage was increased among serious-injury, fatally-involved, and A/R fatally-involved drivers;
Washington Alcohol Impaired Driver-Involved Death Trend
1998-2008, By Year, *Night-Time Only* (7 p.m.-4:59 a.m.)
Before and During Night-Time Seat Belt Enforcement Project

Regression Analysis Significant at .05 level

**Source:** FARS, **Software:** National Cancer Institute
Change in Vehicle Occupant Deaths by Age Group
Difference in Deaths per Year from 2005-06 to 2007-08

Data Source: FARS
Vehicle occupant deaths with unknown crash hour excluded.
Question

Are Deaths and Injuries Affected by Nighttime Seat Belt Enforcement?
New Evidence

Washington study suggests that usage was increased among serious-injury and fatally-involved drivers and that nighttime serious injuries and fatalities declined.
Number of Vehicle Occupant Deaths
WA 1994-2008

Source: FARS
Daytime: 5 AM - 6:59 PM | Nighttime: 7 PM - 4:59 AM
Vehicle occupant deaths with unknown crash hour excluded from analysis.

2002
Primary seat belt law enacted
Click it or Ticket begins

2007
NTSBE begins
Number of Vehicle Occupant Serious Injuries
WA 1994-2008

Source: WSDOT
Daytime: 5 AM - 6:59 PM | Nighttime: 7 PM - 4:59 AM
Vehicle occupant deaths with unknown crash hour excluded from analysis.
End of Presentation
Evaluation Questions

- Can nighttime enforcement improve the belt use rate at night? At daytime?

- Do different traffic enforcement techniques make a difference?

- Does a night-time enforcement program also deter drinking and driving?
### Study Communities

<table>
<thead>
<tr>
<th>Location</th>
<th>Law Type</th>
<th>Wave Enforcement Tactic</th>
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</thead>
<tbody>
<tr>
<td><strong>North Carolina</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buncombe County (Asheville), NC</td>
<td>Primary</td>
<td>Checkpoint Program</td>
</tr>
<tr>
<td>Pitt County (Greenville), NC</td>
<td>Primary</td>
<td>Saturation Program</td>
</tr>
<tr>
<td>Gaston County (Gastonia), NC</td>
<td>Primary</td>
<td>COMPARISON LOCATION</td>
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<tr>
<td><strong>West Virginia</strong></td>
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<td></td>
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<tr>
<td>Charleston, WV</td>
<td>Secondary</td>
<td>Enforcement Zone/”Checkpoint” Program</td>
</tr>
<tr>
<td>Wheeling, WV</td>
<td>Secondary</td>
<td>COMPARISON LOCATION</td>
</tr>
</tbody>
</table>
Program Site Details

**Enforcement**

- Four 10-night enforcement waves
- One wave per calendar quarter in year 2007
- Enforcement between the hours 10pm and 2am
- Focus on seat belt use

**Publicity**

- TV and radio advertisements concurrent with enforcement waves
- Earned media
- Paid/earned media messages focused on enforcing belt law at night
# Program Evaluation

## North Carolina Status

<table>
<thead>
<tr>
<th></th>
<th>Status</th>
<th>Program Data</th>
<th>Seat Belt Observations</th>
<th>Telephone Awareness Surveys</th>
<th>BAC Roadside Surveys</th>
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<tbody>
<tr>
<td>Buncombe County</td>
<td>Program</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Pitt County</td>
<td>Program</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Gaston County</td>
<td>Comparison</td>
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## West Virginia Status

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<th>BAC Roadside Surveys</th>
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<tr>
<td>Charleston, WV</td>
<td>Program</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Wheeling, WV</td>
<td>Comparison</td>
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## Program Site Observations

<table>
<thead>
<tr>
<th>PROGRAM SITES</th>
<th>Wave 1</th>
<th>Wave 2 (CIOT)</th>
<th>Wave 3</th>
<th>Wave 4</th>
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<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
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<tr>
<td>BUNCOMBE COUNTY</td>
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<tr>
<td>Nighttime (N=16,490)</td>
<td>85.6%</td>
<td>87.5%</td>
<td>86.3%</td>
<td>89.5%</td>
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<tr>
<td>Daytime (N=43,292)</td>
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<td>88.4%</td>
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<tr>
<td></td>
<td>+1.9b</td>
<td>+2.1a</td>
<td>+3.2a</td>
<td>-0.7a</td>
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<tr>
<td>PITTC COUNTY</td>
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<tr>
<td>Nighttime (N=21,729)</td>
<td>83.4%</td>
<td>84.6%</td>
<td>86.2%</td>
<td>87.6%</td>
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<td>+1.2</td>
<td>-0.6</td>
<td>+1.4a</td>
<td>+1.4a</td>
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<td>CHARLESTON</td>
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<tr>
<td>Nighttime (N=12,327)</td>
<td>58.4%</td>
<td>61.8%</td>
<td>66.1%</td>
<td>70.2%</td>
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<tr>
<td>Daytime (N=35,442)</td>
<td>72.7%</td>
<td>72.7%</td>
<td>78.4%</td>
<td>74.7%</td>
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<tr>
<td></td>
<td>+3.4b</td>
<td>0.0</td>
<td>+4.1a</td>
<td>-3.7a</td>
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</table>

- ^a Statistically Significant at p<.01
- ^b Statistically Significant at p<.05
## Comparison Site Observations

<table>
<thead>
<tr>
<th>COMPARISON SITES</th>
<th>Wave 1</th>
<th>Wave 2 (CIOT)</th>
<th>Wave 3</th>
<th>Wave 4</th>
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<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>dif.</td>
<td>Pre</td>
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<tr>
<td><strong>GASTONIA</strong></td>
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<tr>
<td>Nighttime (N=13,520)</td>
<td>73.2%</td>
<td>75.1%</td>
<td>+1.9</td>
<td>83.5%</td>
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<td>Daytime (N=35,411)</td>
<td>80.9%</td>
<td>80.6%</td>
<td>-0.3</td>
<td>83.2%</td>
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<tr>
<td><strong>WHEELING</strong></td>
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<tr>
<td>Nighttime (N=15,699)</td>
<td>64.5%</td>
<td>60.6%</td>
<td>-3.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>69.8%</td>
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<tr>
<td>Daytime (N=39,576)</td>
<td>68.0%</td>
<td>68.5%</td>
<td>+0.5</td>
<td>74.7%</td>
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<sup>a</sup> Statistically Significant at p<.01  
<sup>b</sup> Statistically Significant at p<.05
### BAC in Buncombe/Asheville

<table>
<thead>
<tr>
<th></th>
<th>Wave 1 Pre</th>
<th>Wave 1 Post</th>
<th>Wave 2 CIOT</th>
<th>Wave 3 Pre</th>
<th>Wave 3 Post</th>
<th>Wave 4 Pre</th>
<th>Wave 4 Post</th>
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<tbody>
<tr>
<td><strong>BAC Requests</strong></td>
<td>537</td>
<td>756</td>
<td></td>
<td>849</td>
<td>767</td>
<td>767</td>
<td>704</td>
<td></td>
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<tr>
<td></td>
<td>92%</td>
<td>88%</td>
<td></td>
<td>85%</td>
<td>85%</td>
<td>85%</td>
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<tr>
<td><strong>BAC Samples</strong></td>
<td>92%</td>
<td>88%</td>
<td></td>
<td>85%</td>
<td>85%</td>
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</tr>
<tr>
<td><strong>BAC &gt; .0</strong></td>
<td>78 (16%)</td>
<td>72 (11%)</td>
<td>-5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>99 (14%)</td>
<td>91 (14%)</td>
<td>91 (14%)</td>
<td>59 (10%)</td>
<td>-4&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td><strong>BAC &gt; .049</strong></td>
<td>29 (6%)</td>
<td>30 (4%)</td>
<td>-2</td>
<td>26 (4%)</td>
<td>22 (3%)</td>
<td>22 (3%)</td>
<td>17 (3%)</td>
<td>0</td>
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<tr>
<td><strong>BAC &gt; .079</strong></td>
<td>9 (2%)</td>
<td>19 (3%)</td>
<td>+1</td>
<td>12 (2%)</td>
<td>11 (2%)</td>
<td>11 (2%)</td>
<td>6 (1%)</td>
<td>-1</td>
</tr>
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<sup>a</sup> Statistically Significant at p<.05
BAC in Buncombe/Asheville

<table>
<thead>
<tr>
<th></th>
<th>Pre W1</th>
<th>Post W1</th>
<th>Pre W3</th>
<th>Post W3/Pre W4</th>
<th>Post W4</th>
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<tbody>
<tr>
<td>BAC &gt; 0</td>
<td>15.7%</td>
<td>10.8%</td>
<td>13.7%</td>
<td>14.0%</td>
<td>9.8%</td>
</tr>
<tr>
<td>BAC &gt; .049</td>
<td>5.8%</td>
<td>4.5%</td>
<td>3.6%</td>
<td>3.4%</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

(n=537) (n=756) (n=849) (n=767) (n=704)
Important Questions

Can seat belt use be improved using high visibility enforcement during nighttime hours?
△ All three test sites found that improvements in belt use can be made at night.

What affect does a nighttime enforcement program have on daytime belt use?
△ Improvements measured at nighttime typically were greater than improvements during the daytime.

Did enforcement technique make a difference?
△ Improvements were found in both test sites that used checkpoint style enforcement; less improvement was found in the site using saturation patrol type of enforcement.

Does a high visibility nighttime enforcement program also deter drinking and driving?
△ Drinking drivers decreased over the course of the intervention waves in Buncombe County/Asheville.
High visibility enforcement efforts can be effective both for increasing belt use and decreasing drinking and driving at night.
Contact Information

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Oxford, MS 38655
email: msolomon@preussergroup.com
tel: 662.236.9288

Report Title: Nighttime Enforcement of Seat Belt Laws: An Evaluation of Three Community Programs

NHTSA Report #: DOT HS 811 189

NHTSA COTR: Mr. Alan Block
Effective Nighttime Seat Belt Enforcement: the Washington Experience

Presented by:
Lowell M. Porter, Director
Washington Traffic Safety Commission

Date: March 9, 2010
Location: Olympian, WA
Purpose

- Review Washington’s Nighttime Seat Belt Enforcement Project development and implementation;
- Review the primary and secondary outcomes of this project;
- Review briefly what was learned about the high risk drivers and their propensity for involvement in crime.
Problem Identification:

- What led the state of Washington to move all seat belt media and enforcement resources from daytime to nighttime?

- Could the traditional “Click-It-Or-Ticket” Model be modified for effective implementation at night; and

- Could these initiatives replicate seat belt use rates experienced during the day?
Projected to 2030 (preliminary data for 2007)
PREPARED BY WTSC - June 2008 (Source: FARS)

PROJECTED TRAFFIC DEATHS IN 2030 = 362

Current trend is a decrease of 9.0 traffic fatalities per year...

...But to reach the goal of zero traffic fatalities will require a decrease of 24.7 fatalities per year.

PERFORMANCE GAP
1986-2008 WA Seatbelt Use Rates & Vehicle Occupant Fatal Rates

Occupant fatalities per 100 million VMT

---

**Source:** FARS, WSDOT, WTSC Seatbelt Observation Survey

*Seatbelt survey not conducted in 1990.*
WA Seat Belt Use Analysis

- Daytime observed use rate over 96% since 2005;
- Vehicle occupant deaths correspondingly dropped with increased use rates;
- However, if you segmented this same data by time of day – 6 AM – 6PM and 6PM – 6AM, you found a much different outcome;
WA Seat Belt Use Analysis

- Seat belt use during 6PM – 6AM could be as much as 15 points lower;
- Which contributed to a death rate four times higher when compared to the daytime!
- Therefore, WA needed to move its vehicle occupant resources to the nighttime!
- This was the starting point for the Nighttime Seat Belt Enforcement Project.
What Drove the Change to NTSBE?

- WA commitment to a data driven, evidence based, integrated systems approach to traffic safety – Target Zero!
- Aggressive Target Zero alignment and implementation throughout WA traffic safety network;
- Target Zero priorities driving ALL investments of traffic safety resources (people, time and money) in initiatives where the most safety benefit can be realized!
- The aggressive analysis of performance data to ensure desired outcomes are achieved!
The WA NTSBE Project:

- WTSC moved all seat belt program funding to nighttime mobilizations;

- Mobilization budgets;
  - Enforcement: $300,000 per mobilization
  - Publicity: $350,000 per mobilization
  - “Sustained” -- $100,000 in between mobilizations

- Dunlap & Assoc. project evaluation;
  - First year preliminary evaluation report in final edit
  - Total evaluation/report
# Paid Media Campaign Overview:

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<thead>
<tr>
<th>Date</th>
<th>Paid Media</th>
<th>Bonus Media</th>
<th>Total Value (paid and bonus)*</th>
<th>Total # of ads (pd &amp; bonus)</th>
<th>Reach and frequency Males 18/34</th>
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<tbody>
<tr>
<td>May ‘07</td>
<td>$290,000</td>
<td>$194,000</td>
<td>$482,000</td>
<td>1,640</td>
<td>90% / 11 TV</td>
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<tr>
<td></td>
<td>(835)</td>
<td>(805)</td>
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<td>16 daily papers</td>
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<tr>
<td>Oct. ’07</td>
<td>$258,000</td>
<td>$288,000</td>
<td>$545,000</td>
<td>2142 TV</td>
<td>78% / 6 TV</td>
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<tr>
<td></td>
<td>1187 TV</td>
<td>955 TV</td>
<td></td>
<td>3325 Radio</td>
<td>59% / 9 Radio</td>
</tr>
<tr>
<td></td>
<td>1664 Radio</td>
<td>1661 Radio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May ’08</td>
<td>$299,000</td>
<td>$309,000</td>
<td>$607,592</td>
<td>4647 TV</td>
<td>80% / 6 TV</td>
</tr>
<tr>
<td></td>
<td>1955 TV</td>
<td>2692 TV</td>
<td></td>
<td>3510 Radio</td>
<td>60% / 9 Radio</td>
</tr>
<tr>
<td></td>
<td>1663 Radio</td>
<td>1847 Radio</td>
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<tr>
<td>Nov. ’08</td>
<td>$270,000</td>
<td>$301,141</td>
<td>$571,000</td>
<td>3820 TV</td>
<td>83% / 5 TV</td>
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<tr>
<td></td>
<td>1522 TV</td>
<td>2298 TV</td>
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<td>3368 Radio</td>
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</tr>
<tr>
<td></td>
<td>1626 Radio</td>
<td>1742 Radio</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>May ’09</td>
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<td>$265,000</td>
<td>$537,000</td>
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<tr>
<td></td>
<td>1979 TV</td>
<td>2200 TV</td>
<td></td>
<td>4101 Radio</td>
<td>60% / 11 Radio</td>
</tr>
<tr>
<td></td>
<td>1801 Radio</td>
<td>2300 Radio</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

^All dollar figures have been rounded. *Includes newspaper which is paid only.
# Earned Media Results:

<table>
<thead>
<tr>
<th>Mobilization Date</th>
<th>Number of counties with patrols</th>
<th>Number of daily newspapers pitched</th>
<th>No. of dailies that ran stories</th>
<th>Weeklies pitched</th>
<th># of weeklies that ran stories</th>
<th>TV pitched</th>
<th>T.V. stations that ran stories</th>
<th>Radio pitched</th>
<th>Radio pick up</th>
<th>Web Stories</th>
<th>Total stories</th>
<th>total PSAs from the earned media effort:</th>
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</thead>
<tbody>
<tr>
<td>May-07</td>
<td>20</td>
<td>21</td>
<td>19</td>
<td>74</td>
<td>39</td>
<td>22</td>
<td>19</td>
<td>153</td>
<td>107</td>
<td>26</td>
<td>442</td>
<td>1717</td>
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<td>Oct. '08</td>
<td>19</td>
<td>19</td>
<td>11</td>
<td>76</td>
<td>29</td>
<td>22</td>
<td>17</td>
<td>108</td>
<td>19</td>
<td>61</td>
<td>215</td>
<td>737</td>
</tr>
<tr>
<td>May-08</td>
<td>26</td>
<td>26</td>
<td>18</td>
<td>88</td>
<td>40</td>
<td>19</td>
<td>17</td>
<td>147</td>
<td>75</td>
<td>26</td>
<td>311</td>
<td>428</td>
</tr>
<tr>
<td>Nov. '08</td>
<td>23</td>
<td>21</td>
<td>13</td>
<td>80</td>
<td>31</td>
<td>19</td>
<td>16</td>
<td>164</td>
<td>94</td>
<td>23</td>
<td>424</td>
<td>705</td>
</tr>
<tr>
<td>May '09</td>
<td>22</td>
<td>20</td>
<td>20</td>
<td>109</td>
<td>52</td>
<td>18</td>
<td>14</td>
<td>136</td>
<td>77</td>
<td>44</td>
<td>371</td>
<td>289</td>
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</table>
## The Number of Media Stories Covered:

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<thead>
<tr>
<th></th>
<th>Dailies</th>
<th>Weeklies</th>
<th>T.V.</th>
<th>Radio</th>
<th>PSAs</th>
<th>Web</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>May '07</td>
<td>18</td>
<td>39</td>
<td>118</td>
<td>267</td>
<td>1717</td>
<td>26</td>
<td>2185</td>
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<tr>
<td>Oct. '07</td>
<td>12</td>
<td>31</td>
<td>82</td>
<td>90</td>
<td>737</td>
<td>19</td>
<td>971</td>
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<tr>
<td>May '08</td>
<td>22</td>
<td>42</td>
<td>90</td>
<td>157</td>
<td>428</td>
<td>26</td>
<td>765</td>
</tr>
<tr>
<td>Nov. '08</td>
<td>13</td>
<td>31</td>
<td>48</td>
<td>332</td>
<td>705</td>
<td>23</td>
<td>1152</td>
</tr>
<tr>
<td>May '09</td>
<td>21</td>
<td>52</td>
<td>41</td>
<td>212</td>
<td>289</td>
<td>44</td>
<td>659</td>
</tr>
</tbody>
</table>
Awareness of NTSBE Media

Survey Date

Percent Recalling Media

May 07: 10.3%
June 07: 62.6%
September 07: 38.2%
November 07: 70.2%
February 08: 49.2%
March 08: 40.7%
April 08: 39.8%
July 08: 50.1%
### Media Mentions

![Bar Graph]

- **Percent Exposed**
  - **TV**: 41.9% (Max)
  - **Radio**: 31.4% (Max)
  - **Road Sign**: 23.4% (Max)
  - **Newspaper**: 13.5% (Max)
  - **Billboard**: 8.8% (Max)
  - **Police**: 0.7% (Max)

**Min**
- **TV**: 5.4%
- **Radio**: 3.9%
- **Road Sign**: 2.0%
- **Newspaper**: 2.5%
- **Billboard**: 1.5%
- **Police**: 0.7%
Patrols in major population areas:
## NTSBE Enforcement Data:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agencies participating</td>
<td>72</td>
<td>68</td>
<td>55</td>
<td>49</td>
<td>75</td>
<td>64</td>
<td>135</td>
</tr>
<tr>
<td>Hrs worked:</td>
<td>5563</td>
<td>5586</td>
<td>6248</td>
<td>5362</td>
<td>5715</td>
<td>5694</td>
<td>11,731</td>
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<tr>
<td>Violator contacts</td>
<td>10,845</td>
<td>10,121</td>
<td>11,329</td>
<td>7,517</td>
<td>10,380</td>
<td>10,038 (28%)</td>
<td>36,378</td>
</tr>
<tr>
<td>Seatbelt citations &amp; warnings</td>
<td>5,258</td>
<td>3653</td>
<td>6,005</td>
<td>4428</td>
<td>5171</td>
<td>4903 (2770)</td>
<td>9892</td>
</tr>
<tr>
<td>Child car seat citations and warnings</td>
<td>326</td>
<td>194</td>
<td>286</td>
<td>181</td>
<td>215</td>
<td>240 (77)</td>
<td>276</td>
</tr>
<tr>
<td>Aggressive driving:</td>
<td>107</td>
<td>130</td>
<td>98</td>
<td>57</td>
<td>176</td>
<td>114 (38)</td>
<td>135</td>
</tr>
<tr>
<td>DUI (alc &amp; drugs):</td>
<td>87</td>
<td>121</td>
<td>105</td>
<td>83</td>
<td>144</td>
<td>108 (30)</td>
<td>108</td>
</tr>
<tr>
<td>Other alcohol and drug</td>
<td>101</td>
<td>197</td>
<td>132</td>
<td>113</td>
<td>204</td>
<td>149 (61)</td>
<td>218</td>
</tr>
<tr>
<td>Felony warrants &amp; felony arrests</td>
<td>29</td>
<td>66</td>
<td>169</td>
<td>64</td>
<td>66</td>
<td>79 (33)</td>
<td>121</td>
</tr>
<tr>
<td>Misd. Warrants:</td>
<td>99</td>
<td>144</td>
<td>158</td>
<td>134</td>
<td>139</td>
<td>135 (79)</td>
<td>283</td>
</tr>
<tr>
<td>Suspend/Revoked:</td>
<td>339</td>
<td>382</td>
<td>444</td>
<td>282</td>
<td>344</td>
<td>358 (222)</td>
<td>794</td>
</tr>
<tr>
<td>Uninsured:</td>
<td>699</td>
<td>641</td>
<td>583</td>
<td>478</td>
<td>726</td>
<td>625 (585)</td>
<td>2091</td>
</tr>
</tbody>
</table>

## Notes:
- All data is from NTSBE and represents enforcement efforts from May to November in various years.
- The table includes the number of agencies participating, hours worked, violator contacts, and various traffic offenses such as seatbelt violations, child car seat citations, aggressive driving, DUI, other alcohol and drug offenses, and more.
- The average values are calculated across the specified months.
- The CIOT (Combined Index of Traffic Offenders) is also provided for comparison.
Stationary Seat Belt Patrols at Night:

**Day:**
- Officer works individually;
- Easier to schedule;
- Fewer staffing issues;
- Easier to see violators.

**Night:**
- Need more advanced planning;
- Need more officers;
- Hard to see violators;
- Low traffic volumes;
- Law enforcement agencies understaffed;
- Officers say they are more fun!
**Productivity – Night vs. Day:**

Tickets per patrol hour – night vs. day:

- **74.8% more** child car seat tickets;
- **82.5% more** DUI/DUID citations;
- **532.4% more** felony arrests;
- **79.5% more** “other alcohol” arrests;
- **3.8% fewer** seat belt tickets; and
- **85.5% fewer** speeding tickets.
Washington Vehicle Occupant Deaths:

Before CIOT:
517 VO deaths/yr
43% SB use in fatals

After CIOT & before NTSBE:
(2003-2006)
454 deaths/yr (-12%)
56% SB use in fatals

After NTSBE:
(2007-2008)
389 deaths/yr (-14%)
59% SB use in fatals
WA *Nighttime Vehicle Occupant Deaths:*

**Before CIOT:**
- 221 VO deaths/yr
- 31% SB use in fatals

**After CIOT & before NTSBE:**
(2003-2006)
- 200 deaths/yr (-9.3%)
- 46% SB use in fatals

**After NTSBE:**
(2007-2008)
- 175 deaths/yr (-12.8%)
- 46% SB use in fatals
**WA Vehicle Occupant Serious Injuries:**

**Before CIOT:**
(2002)
1,502 VO serious injuries/yr
76% SB use in serious injuries

**After CIOT & before NTSBE:**
(2003-2006)
1,281 serious injuries/yr (-15%)
80% SB use in serious injuries

**After NTSBE:**
(2007-2008)
1,016 serious injuries/yr (-21%)
85% SB use in serious injuries
Before CIOT:
(2002)
538 VO serious injuries/yr
63% SB use in serious injuries

After CIOT & before NTSBE:
(2003-2006)
452 serious injuries/yr (-16%)
69% SB use in serious injuries

After NTSBE:
(2007-2008)
366 serious injuries/yr (-19%)
74% SB use in serious injuries
Percent Seat Belt Use for Vehicle Occupant Serious Injuries
WA 1994-2008

Source: WSDOT
Daytime: 5 AM - 6:59 PM | Nighttime: 7 PM - 4:59 AM
Vehicle occupant deaths with unknown crash hour and seat belt use excluded from analysis.
Number of Vehicle Occupant Deaths
WA 1994-2008

Source: FARS
Daytime: 5 AM - 6:59 PM | Nighttime: 7 PM - 4:59 AM
Vehicle occupant deaths with unknown crash hour excluded from analysis.
## Number of Vehicle Occupant Serious Injuries
### WA 1994-2008

![Graph showing the number of vehicle occupant serious injuries in WA 1994-2008, with data points for each year from 2002 to 2008. The graph includes a trend line showing a decrease in injuries over time, with a notable increase in 2006.](image)

### Key Data Points:
- **2002:**
  - Daytime: 964
  - Nighttime: 538
- **2007:**
  - Daytime: 687
  - Nighttime: 387
- **2008:**
  - Daytime: 612
  - Nighttime: 345

### Important Dates:
- **2002:**
  - Primary seat belt law enacted
  - Click it or Ticket begins
- **2007:**
  - NTSBE begins

### Source:
WSDOT

Daytime: 5 AM - 6:59 PM | Nighttime: 7 PM - 4:59 AM
Vehicle occupant deaths with unknown crash hour excluded from analysis.
Change in Vehicle Occupant Deaths by Age Group

Difference in Deaths per Year from 2005-06 to 2007-08

Data Source: FARS
Vehicle occupant deaths with unknown crash hour excluded.
Washington Alcohol Impaired Driver-Involved Death Trend
1998-2008, By Year, *Night-Time Only* (7 p.m.-4:59 a.m.)
Before and During Night-Time Seat Belt Enforcement Project

Regression Analysis Significant at .05 level
Source: FARS, Software: National Cancer Institute
Nighttime High Risk Drivers

- What did this research learn about nighttime high risk drivers?

- Is a nighttime seat belt violation a strong predictor of high risk drivers who are more frequently involved in other dangerous behaviors?
Presentation Summary

Preliminary NTSBEP Data Shows:

- The CIOT Model can be successfully modified for use at night;

- Nighttime seat belt enforcement reduces deaths and serious injuries;
Presentation Summary

- There are multiple ways to conduct nighttime seat belt patrols, and all seem to work well if implemented via strong communications and dedicated law enforcement patrols; and

- There are many peripheral benefits to nighttime seat belt enforcement.
A Nighttime Seat Belt Enforcement Strategy:

- Produces positive outcomes in other areas of traffic safety (speed and impaired driving);
- Provides an effective pointer index for identifying high risk and anti-social drivers at increased rates;
- Produces increased rates of enforcement in many areas of criminal interdiction;
In times of diminishing resources and increasing public demand, developing and implementing effective enforcement strategies that produce multiple benefits and desired outcomes is essential; especially when they directly impact social harm, quality of life, the public’s welfare, and the economy.

NTSBE accomplishes both of these desired outcomes and many more!
Contact Information

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Director
360-725-9899
lporter@wtsc.wa.gov

Washington Traffic Safety Commission
621 8th Avenue SE, Suite 409
Olympia, WA 98504-0944
www.wtsc.wa.gov
Guidelines to Observe and Estimate Statewide Seat Belt Use at Night

Linda Cosgrove, Ph.D.
Chief, Injury Prevention Research
Office of Behavioral Safety Research
National Highway Traffic Safety Administration
March 9, 2010
Background

• Why estimate seat belt use at night?
  – Relatively lower seat belt use at night compared to daytime.
  – Disproportionate number of fatalities at night.
  – Evaluation of nighttime enforcement efforts.
Day vs. Night Differences in Traffic

• Lower traffic volume at night.
• Volume drop-off is not the same for different functional classes of roadways (e.g., interstates retain more traffic at night).
• Larger percentage of nighttime traffic is commercial (particularly large trucks).
Purpose of Guidelines

• Use a State’s existing approved design under the Uniform Criteria for estimating daytime belt use to provide options for appropriate weighting of observations to generate representative estimates of nighttime seat belt use.

• Provide tips for observing seat belt use at night.
Three Issues

• Where to observe nighttime passenger vehicles.
• How to weight the observations.
• How to observe seat belt use at night.
Overview of Options

• Draw a new nighttime sample.
• Use existing daytime sample, but weight data to account for nighttime traffic patterns. Method depends on whether your State has:
  – Hourly traffic counts or
  – 24-hour traffic counts
New Nighttime Sample

• States may opt to draw an entirely new sample for night observations.
• Hourly traffic volume by vehicle type for all eligible roadways must be available to do this option.
• Same procedures as drawing the daytime sample, except selection is based on nighttime passenger vehicle volumes.
Re-Weighting Daytime Plan

• Begin with existing daytime sample, and adjust the daytime weights to account for nighttime traffic volumes.

• Take manual counts of eligible passenger vehicles ("clicker counts") at night for each site in the daytime survey.
## Two Methods of Re-Weighting

<table>
<thead>
<tr>
<th>Hourly Traffic Counts Available?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
|                                  | Two separate clicker counts will be needed:  
  1. All vehicles that would be included in night survey  
  2. Excluded vehicles (e.g., large trucks)  
  Yields the percentage of passenger vehicles at each hour of the night. | One clicker count will be needed:  
  1. All vehicles that would be included in night survey  
  Yields the percentage of the total 24-hour volume that a particular hour represents. |
Re-Weighting

- The guidelines provide instructions, formulas, and examples for calculating passenger vehicle volume using the clicker counts.
- The concept is to replace the 24-hour volume data in the State’s spreadsheet with new weights based on adjusted VMT or AADT for nighttime passenger vehicles.
Examples

• Pennsylvania – weighting scheme is somewhat standard – 4 geographic regions, randomly selected counties, 4 road functional classes, 150 target sites, each weighted by own VMT (& region or county for each functional class).

• Connecticut – not a typical weighting scheme, includes AADT (& VMT) based on volume data at 100 survey sites.
Table 1. Hypothetical Manual Counts for Collectors in Connecticut

<table>
<thead>
<tr>
<th>Time</th>
<th>Site</th>
<th>Passenger Volume (pV)</th>
<th>Non-passerenger Volume (oV)</th>
<th>%pV for Site</th>
<th>Average %pV</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 p.m.</td>
<td>Site 1</td>
<td>112</td>
<td>30</td>
<td>78.87%</td>
<td>83.3%</td>
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<tr>
<td></td>
<td>Site 2</td>
<td>72</td>
<td>10</td>
<td>87.80%</td>
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<tr>
<td>10 p.m.</td>
<td>Site 3</td>
<td>54</td>
<td>8</td>
<td>87.10%</td>
<td>88.5%</td>
</tr>
<tr>
<td></td>
<td>Site 4</td>
<td>90</td>
<td>10</td>
<td>90.00%</td>
<td></td>
</tr>
<tr>
<td>11 p.m.</td>
<td>Site 5</td>
<td>43</td>
<td>4</td>
<td>91.49%</td>
<td>95.7%</td>
</tr>
<tr>
<td></td>
<td>Site 6</td>
<td>4</td>
<td>0</td>
<td>100.00%</td>
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<tr>
<td>12 a.m.</td>
<td>Site 7</td>
<td>2</td>
<td>0</td>
<td>100.00%</td>
<td>97.0%</td>
</tr>
<tr>
<td></td>
<td>Site 8</td>
<td>35</td>
<td>2</td>
<td>94.59%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site 9</td>
<td>27</td>
<td>1</td>
<td>96.43%</td>
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</tr>
<tr>
<td>1 a.m.</td>
<td>Site 10</td>
<td>27</td>
<td>2</td>
<td>93.10%</td>
<td>88.9%</td>
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<tr>
<td></td>
<td>Site 11</td>
<td>7</td>
<td>1</td>
<td>87.50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site 12</td>
<td>25</td>
<td>4</td>
<td>86.21%</td>
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</tr>
<tr>
<td>2 a.m.</td>
<td>Site 13</td>
<td>13</td>
<td>1</td>
<td>92.86%</td>
<td>96.4%</td>
</tr>
<tr>
<td></td>
<td>Site 14</td>
<td>2</td>
<td>0</td>
<td>100.00%</td>
<td></td>
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</table>
Table 2. Calculations for Passenger Vehicle Night Vehicle Miles Traveled Using Connecticut Data

<table>
<thead>
<tr>
<th>Segment</th>
<th>9 p.m.</th>
<th>10 p.m.</th>
<th>11 p.m.</th>
<th>12 a.m.</th>
<th>1 a.m.</th>
<th>2 a.m.</th>
<th>Night Passen</th>
<th>Segment</th>
<th>pV</th>
<th>tV</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Average</td>
<td>%pV</td>
<td>83%</td>
<td>89%</td>
<td>96%</td>
<td>97%</td>
<td>89%</td>
<td>96%</td>
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<tr>
<td>Segment 1</td>
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<td>76</td>
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<td>Segment 2</td>
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</tr>
<tr>
<td></td>
<td>pV</td>
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<td>73</td>
<td>67</td>
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<td>44</td>
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| Segment n |  |  |  |  |  |  |  |  |  |  |
| Night ADT |  |  |  |  |  |  |  |  |  |  |
| Night VMT |  |  |  |  |  |  |  |  |  |  |

ADT 2142  VMT 4164
### Tables 4 & 5. Calculations for Adjusted AADT Using Connecticut Data.

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<tr>
<td>Other/Local</td>
<td>1.90%</td>
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<td>1,129.38</td>
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</table>
Conducting Nighttime Observations

• Two-person teams
  – Separate observer and recorder to accommodate additional demands

• Safety considerations
  – Traffic may not see observers
  – High crime locations
Conducting Nighttime Observations

• Lighting
  – Move observation site to improve lighting, as long as the site is part of the same traffic stream.

• Special equipment
  – Night vision equipment
  – Infrared spotlights
Conducting Nighttime Observations

• Low traffic volume
  – Observation time may be increased.
  – Data may be combined across multiple years.
Summary

• To the extent possible, keep observations the same as daytime.

• Make the observations representative of nighttime traffic by either:
  – Drawing an entirely new sample, or
  – Re-weighting the existing sample with nighttime volume data.

Link to the full report on NHTSA’s Web site:

Contact Information

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202.366.5592