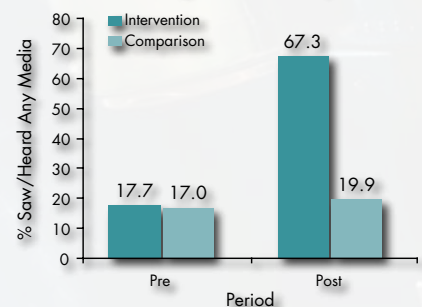


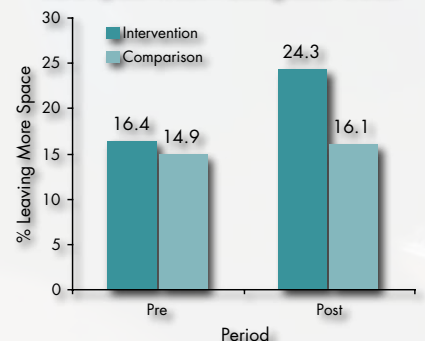
# Ticketing Aggressive Cars and Trucks in Washington State

High Visibility Enforcement Applied to *Share the Road Safely*

**Percent Who Saw or Heard Media About Giving Semi Trucks Space**



**Percent Who Said They Are Leaving More Space When Passing Semi Trucks**



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16. Abstract <p>In 2004, Congress directed the National Highway Traffic Safety Administration and the Federal Motor Carrier Safety Administration to work together “<i>to educate the drivers of passenger vehicles on how to share the road safely with commercial motor vehicles (CMVs).</i>” Washington State was selected as the site for an 18 month pilot project because of its success in implementing other highway safety enforcement projects such as Washington State Patrol’s <i>Step Up and R.I.D.E.</i> program in Seattle. <i>Ticketing Aggressive Cars and Trucks (TACT)</i> is a pilot project using enforcement, education, media and evaluation to reduce fatalities and injuries resulting from cutting off, tailgating, and speeding around trucks. It applies NHTSA’s High Visibility Enforcement model of <i>Click It or Ticket</i> to unsafe driving by any vehicle around large trucks. Public awareness activities and paid media were designed to increase motorists’ awareness of the need to leave one car length for every 10 miles of speed when merging in front of trucks. Four high-crash interstate corridors, each approximately 25 miles in length, were selected; two intervention corridors received <i>TACT</i> media messages and increased enforcement while two comparison corridors did not. Two waves of enforcement each lasting two weeks (July 11-22 and September 19-30, 2005) took place at the intervention sites.</p> <p>There were a total of 4,737 contacts made with drivers during the two enforcement waves, approximately 237 contacts per day over the 20 days of special <i>TACT</i> enforcement. Most contacts resulted in a citation being issued (72%). Overall, drivers at the intervention sites who said they saw or heard any of the <i>TACT</i> messages increased from 17.7 percent in the pre period to 67.3 percent in the post period. Drivers at the intervention sites also reported increased exposure to the core message of leaving more space when passing trucks (14% pre to 40% post period). The percentage of drivers who said they leave more room when passing trucks than when passing cars, rose from 16 percent in the pre period to 24 percent in the post period at the intervention sites, while comparison sites showed no change. WSP officers in unmarked cars video recorded driving behaviors (one pre and four post interventions) while following semi trucks. Approximately 160 hours of video (8 hours x 4 sites x 5 waves) containing 1,843 sequences in which a passenger vehicle crossed paths with a CMV, whether or not a violation was committed, were extracted from the video based on the information recorded by the troopers. Statistical analyses showed that violation rates were reduced significantly at the intervention sites (between 23% and 46%), while remaining constant at the comparison sites.</p> <p>Overall, the evaluation results provide a consistent picture of the effectiveness of the <i>TACT</i> pilot project. Success was demonstrated at every step – messages were received and understood, knowledge was changed in the intended direction, self reported driving behavior around large trucks improved, and observed driving behaviors confirmed the self reports. An innovative road sign was the most recalled method of relaying <i>TACT</i>’s enforcement and safety message.</p>					
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DEPARTMENT OF TRANSPORTATION  
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**TECHNICAL SUMMARY**

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REPORT TITLE <b><i>Ticketing Aggressive Cars and Trucks (TACT) in Washington State: High Visibility Enforcement Applied to Share the Road Safely</i></b>	REPORT DATE May 2006
REPORT AUTHOR (S) Penny Nerup <sup>1</sup> , Phil Salzberg <sup>1</sup> , Jonna VanDyk <sup>1</sup> , Lowell Porter <sup>1</sup> , Richard Blomberg <sup>2</sup> , F. Dennis Thomas <sup>2</sup> , and Linda Cosgrove <sup>3</sup>	

<sup>1</sup> Washington Traffic Safety Commission <sup>2</sup> Dunlap and Associates, Inc. <sup>3</sup> Office of Research and Technology, National Highway Traffic Safety Administration

Selective Traffic Enforcement programs (sTEPS) have been used effectively for many years to change motorists' traffic behaviors in a very short period of time. The *Click It or Ticket* (CIOT) model is a well-known sTEP and is associated with an impressive increase in safety belt use across the nation in the past few years (Solomon et al, 2002). A sTEP model typically relies heavily on enforcement of a State's traffic safety laws (safety belts in *CIOT*) supported by intensive paid publicity that focuses on enforcement. The model includes: 1) data collection before, during and after media and enforcement phases; 2) earned and paid publicity announcing vigorous enforcement; 3) highly visible enforcement each day of a two week enforcement period; and 4) a media event announcing program results and thanking all the participants in the community.

*Share the Road Safely (STRS)/Ticketing Aggressive Cars and Trucks (TACT)* is a pilot demonstration program using education, enforcement, media, and evaluation to reduce fatalities and injuries resulting from cutting off trucks, tailgating trucks, and speeding around trucks. It is an 18-month program applying the CIOT model to unsafe driving behaviors around large commercial vehicles. In the Consolidated Omnibus Appropriations Act of FY 2004 (P.L. 108-401), Congress directed the National Highway Traffic Safety Administration (NHTSA) to work with the Federal Motor Carrier Safety Administration (FMCSA) to "educate the motoring public on how to share the road safely with commercial motor vehicles." The appropriation directed NHTSA and FMCSA to apply lessons learned from NHTSA's experience in high visibility enforcement campaigns such as *Click It or Ticket* to FMCSA's *Share the Road Safely* outreach program to educate drivers to drive safely around large trucks.

Washington State was selected as the site for a pilot project because of its success in implementing other highway safety enforcement projects such as

Washington State Patrol's (WSP) *Step Up and R.I.D.E.* program in Seattle. The local project (also familiarly called the "Trooper in the Truck") put a trooper in a commercial vehicle to observe unsafe driving behaviors and radio other troopers who then stopped and ticketed the driver. The Washington Traffic Safety Commission (WTSC) had the lead for the project and named this pilot project *TACT, Ticketing Aggressive Cars and Trucks*. *TACT* was directed at unsafe driving by any vehicle around large trucks using a high visibility enforcement model.

## **Objective**

The purpose of the *TACT* pilot project was to increase awareness by the driving public about dangerous driving behaviors around moving commercial motor vehicles (CMVs). It was also intended to reduce unsafe driving behaviors by both trucks and passenger vehicles as measured by self-reported surveys and actual observed driving instances. That is, a high visibility enforcement campaign used paid advertisements and innovative road signs to raise motorists' and trucker's awareness of the aggressive driving and enforcement campaign. The WTSC developed and tested a new road sign prior to the program to assure that the graphic accurately conveyed a positive message to "*leave more space*" when passing trucks, coupled with an active enforcement message, "*Don't Get a Ticket.*" Paid advertisements were placed on radio and in newspapers. The enforcement and media programs occurred over the summer of 2005. The evaluation focused on observed unsafe driving behaviors, driver attitudes, knowledge, and recall of program messages and themes. Data collection occurred week-by-week before, during, and after the enforcement campaign ended.

## **Methods**

The Washington Traffic Safety Commission selected four high crash interstate corridors, each approximately 25 miles long, to include in the study.

### ***Problem Identification and Site Selection***

During the problem identification phase of the program, a number of criteria were considered when identifying the sites. First, using the most current Washington data (2002), 10-mile segments of the interstates were ranked in terms of the number of crashes that involved CMVs, the average daily traffic, the proportion of CMVs included in the daily traffic where available, existing enforcement citations for aggressive driving, and various combinations of truck and passenger vehicle crashes. State roads were also considered. Further criteria considered in site selection were the cost of the media markets in the intervention corridors and the possible media spillover into a comparison corridor, corridors where enforcement could use aircraft assistance and where shoulders were wide enough to make a safe traffic stop. Finally, road conditions, such as the number of lanes, areas where trucks were not permitted in the left lane, and planned construction projects were considered. From a list of the top ten locations, the final intervention and comparison sites were selected.



## Washington State TACT Project Corridors

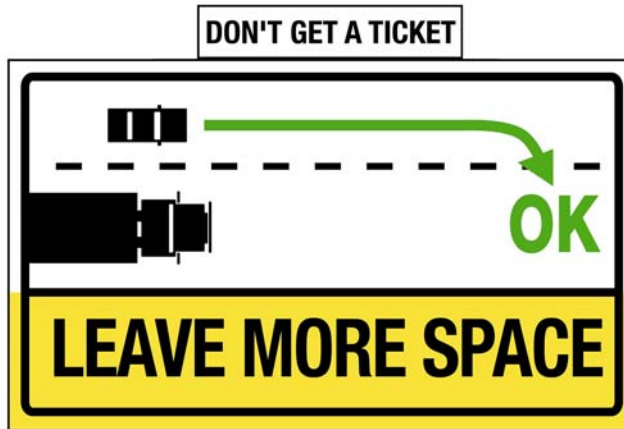


The two intervention corridors were I-5 south of the City of Tumwater in Thurston County to the SR-512 exchange south of the City of Tacoma in Pierce County (Lacey/Olympia) and I-5 from the City of Stanwood through the southern part of the City of Bellingham in Skagit and Whatcom Counties (Bellingham). The two control/comparison corridors were on I-5 from the City of Kalama through the vicinity of State Route 506 (Kelso) and I-90 just west of the City of Spokane to the vicinity of the Maple Street exit in the City of Spokane.

### ***Cutting Off Trucks Safety Messages and Road Sign***

After considering a number of unsafe driving behaviors around semi trucks, TACT targeted “cutting off trucks” as the unsafe behavior to address. Public awareness activities and paid media were designed to increase awareness among all motorists of the need to leave one car length for every 10 miles of speed when merging in front of trucks.

**Road sign.** Public feedback was used to develop a large road sign that communicated the safe merging distance and enforcement messages. The road signs will remain up for one year following the end of the project (until the end of September 2006).



**Paid media.** A Seattle advertising company was commissioned to develop a radio advertisement that conveyed the message to “*leave more space*” when merging in front of CMVs (Appendix A). A Seattle firm purchased advertising spots and negotiated additional free airtime placements as part of this purchase agreement. The advertisement aired between July 7 and October 20, 2005 in Olympia and Bellingham (in Seattle it ran until September 4). The ad ran 45 times Monday through Friday during major drive times (6 a.m. through 7 p.m.) on all major radio stations in the intervention areas. The message reached more than one million people in the Seattle media market, 113,200 in Olympia, and 42,800 in Bellingham.

The table below shows that the \$194,425 media budget purchased the equivalent of \$384,843 in paid radio advertisements and bonus spots. In the Seattle media market, \$94,110 was spent with an additional \$89,843 worth of bonus media negotiated in that market. In Bellingham and Olympia, the media budgets totaled \$100,315 and the value of the bonus media was \$100,560. The bonus media aired during the same time slots as the paid media schedule. There were 6,033 bonus radio placements with 986 of those in Seattle and the remainder in Bellingham and Olympia. In addition to radio placements, newspaper ads were carried in the major daily newspapers of both intervention corridors, as well as in the Fort Lewis Army Base papers. Print ads ran between six and ten times in these papers. See Appendix A for a sample of the print ad.

<b>Media Market</b>	<b>Radio Media Purchases</b>	<b>Radio Bonus Ads</b>	<b>Total Media Value</b>
<b>Seattle</b>	\$ 94,110	\$89,843	\$183,953
<b>Bellingham &amp; Olympia</b>	\$110,315	\$100,560	\$210,875
	\$194,425	\$190,403	\$384,843

## ***Earned Media***

Earned media activities included a series of press events that were covered by TV and newspapers, posters, banners, flyers, road signs, and large trucks wrapped in *TACT* banners that traveled up and down the intervention corridors. Applying the *Click It or Ticket* high visibility enforcement model to the *TACT* pilot project, WTSC ran the media at the intervention sites prior to and during the two enforcement waves. Media started on the Monday following the July Fourth, 2005 holiday weekend and continued through the end of enforcement in the last week of September 2005.

## ***Enforcement Activity***

Two waves of enforcement in each of the intervention corridors occurred in July and September 2005. These months were selected because weather in western Washington State is generally good enough then for the use of the WSP Aviation Unit during the enforcement periods. Each enforcement wave lasted two weeks, running Monday through Friday -- July 11-22, 2005, from 6 a.m. to 2 p.m. and September 19-30, 2005, for the same hours.

Law enforcement officers riding in CMVs provided by the trucking industry observed unsafe driving around large trucks. They were equipped with mobile radios. When they observed a violation, they radioed ahead to other officers who made the traffic stop. A WSP aviation unit supported the enforcement when weather permitted, and also radioed ahead to waiting officers. Local law enforcement agencies participated by providing officers to ride in the truck and in both marked and unmarked vehicles patrolling the corridors during the intervention periods.

## **Results**

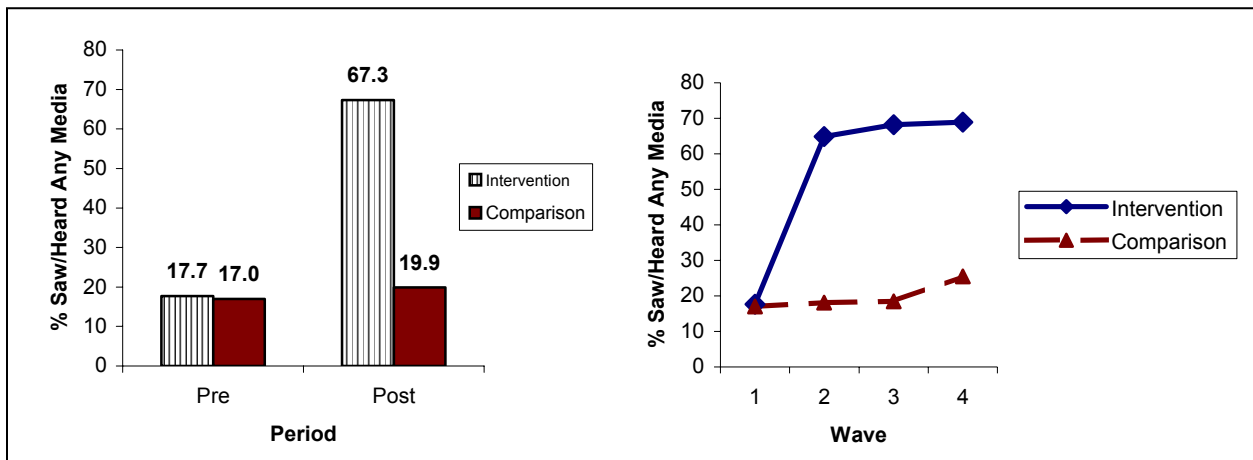
### ***Citation Data***

A total of 4,737 contacts with drivers were made during the two enforcement waves, approximately 237 contacts per day over the 20 days of special *TACT* enforcement. Most contacts resulted in a citation being issued (72%) while 28 percent resulted in warnings. PV drivers accounted for 86 percent of contacts and CMV drivers 14 percent. Most stopped drivers were male (73%) and the average age was 52. Most were residents of western Washington (28% lived near the Bellingham intervention corridor, 21% near the Tacoma intervention corridor, and 22% lived in other western Washington communities). Very few drivers were from eastern Washington (less than 1%), while many were from Canada (13%) and other States (15%). The numbers of driver contacts were equally distributed across days of the week with the largest proportion (17%) of contacts during the morning commute hours (7 a.m. to 8 a.m.).

## **Exposure of Drivers to the TACT Messages**

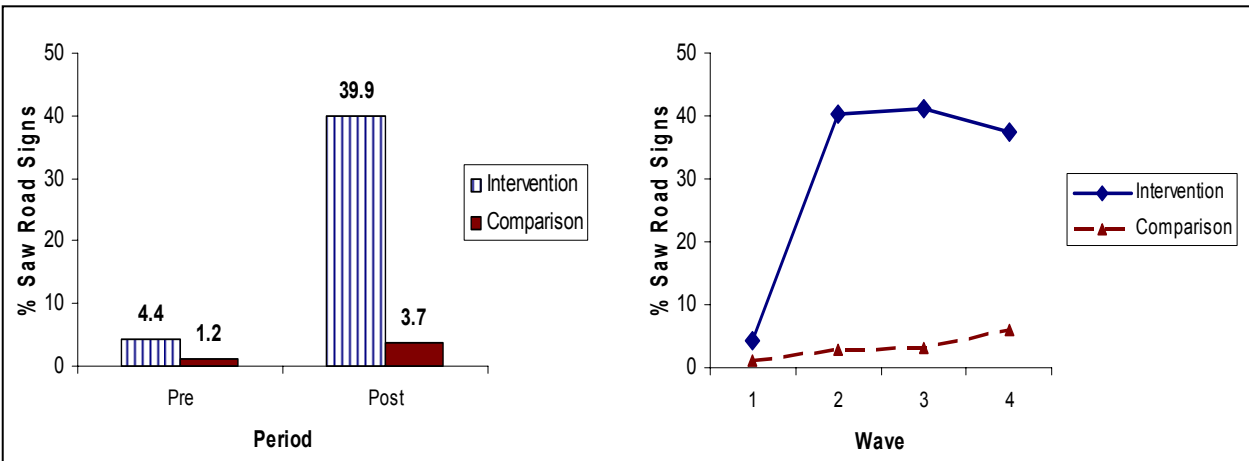
The Washington State Department of Licensing (DOL) administered public awareness surveys to 6,155 motorists who visited the DOL offices serving the four test corridors. Overall, drivers at the intervention sites who said they saw or heard any of the *TACT* messages increased from 17.7 percent in the pre period to 67.3 percent in the post period (Figure 1). Drivers at the intervention sites also reported increased exposure to the core message of leaving more space when passing trucks (14% pre to 40 % post). Intervention site drivers reported increased exposure to the message via road signs (4% pre to 40% post), radio ads (3% pre to 18% post), television (5% pre to 15% post) and newspaper (4% pre to 9% post). Drivers at comparison sites showed no changes in exposure.

**Figure 1. Percent who saw/heard media about giving semi trucks space**



As seen in Figure 2, the percentage of people who saw the road signs in both the intervention and comparison groups increased significantly from the pre to post periods. The increase for the intervention sites was substantially higher. Out of all of the people surveyed at the intervention sites, only 4.4 percent in the pre period reported seeing road signs or billboards, while nearly 39.9 percent in the post period reported seeing them. A dramatic increase is seen between Wave 1 and Wave 2 at the intervention sites and remains steady between Waves 2 and 3, with a small drop-off between Waves 3 and 4.

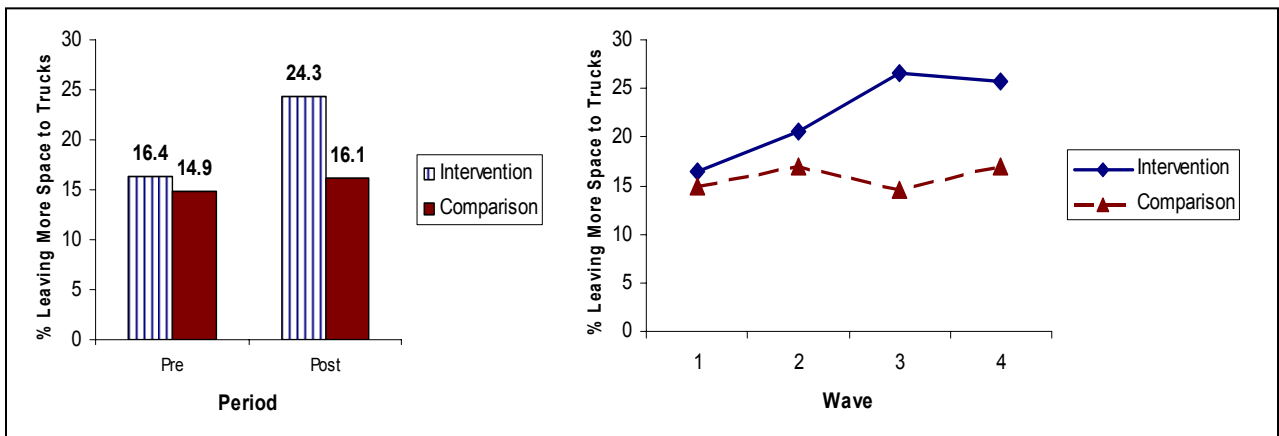
**Figure 2. Percent who saw the road sign**



***Self Reported Behavior Change***

The percentage of drivers who said they leave more room when passing trucks than when passing cars, rose from 16 percent in the pre period to 24 percent in the post period at the intervention sites, while comparison sites showed no change (See Figure 3).

**Figure 3. Percent leaving more space when passing semi trucks**



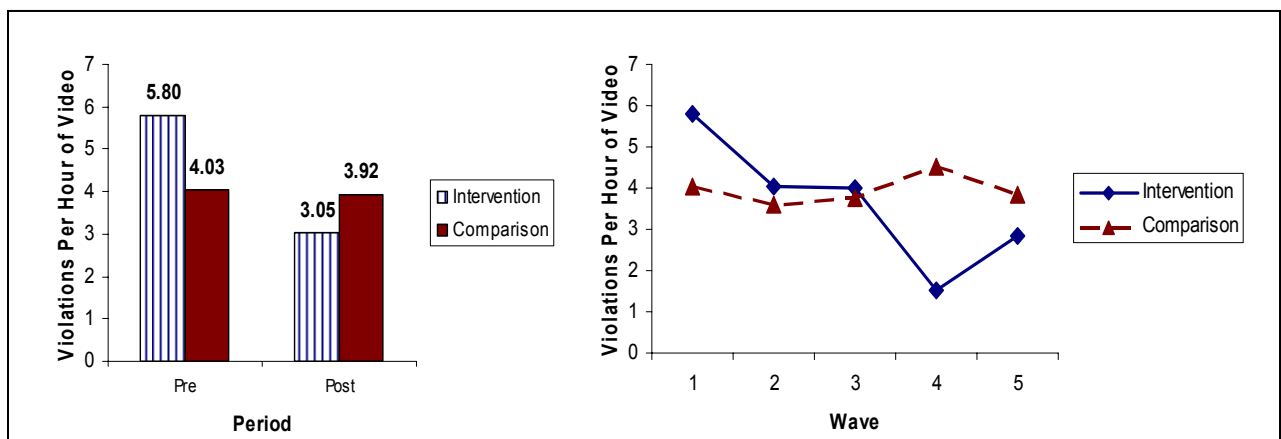
***Observed Changes in Driving Behaviors***

Five waves of driving behaviors (1 pre and 4 post intervention) were recorded on video by WSP troopers who followed semi trucks in unmarked cars on both intervention and comparison corridors using a predetermined observation and

recording protocol. Approximately 160 hours of video (8 hours x 4 sites x 5 waves) were collected. Violation sequences were extracted from the video based on the visual and auditory information provided by the troopers. Overall, 1,843 interactions were coded from the video data. Interactions included all instances when an officer indicated a violation in the immediate vicinity of a large truck, or when a vehicle and a semi truck's paths crossed (whether or not a violation was committed).

One interesting question was whether there would be fewer violations after the *TACT* intervention. An analysis looking at the intervention and comparison sites across each of the post waves showed a highly significant treatment effect (regression coefficient = -0.262,  $p = 0.01$ ) between the intervention and comparison sites. The odds ratio (OR = 1.30) indicates that the comparison sites had approximately 1.30 times as many violations in the final four waves (the post period waves) as the intervention sites. Using the reciprocal of the OR indicates a 23 percent reduction in violations for the intervention sites. Other statistical analyses showed that violation rates might have been reduced by as much as 46 percent at the intervention sites while rates remained constant at the comparison sites. Figure 4 shows the changes in violation rates over the course of the *TACT* program.

**Figure 4. Rate of violations per observation hour**



### ***Seriousness of Violations***

A random sample of violation sequences was selected from the intervention site video data and rated by three groups of participants blind to the study (5 truckers, 6 WSP officers, and 6 highway safety professionals) to determine if any changes in the seriousness of violations occurred after the *TACT* program. Post intervention violations at the intervention sites were rated as lower in crash risk, less intentional, less illegal, and less intimidating than in the pre period.

## **Discussion**

*TACT* is a pilot demonstration program using enforcement, education, media, and evaluation to reduce unsafe driving behaviors that could lead to fatalities and injuries resulting from cutting off trucks, tailgating trucks, and speeding around trucks. Overall, the evaluation results provide a consistent picture of the effectiveness of the *TACT* pilot project. Success was demonstrated at every step — messages were received and understood, knowledge was changed in the intended direction, self reported behavior improved, and observed behavior confirmed the self reports.

Public awareness data showed that people at the intervention sites were seeing or hearing the *TACT* messages and remembering the core message of leaving more space when passing trucks. Road signs were the most memorable method of relaying the *TACT* safety messages to drivers, with radio ads also effective but a distant second. Drivers reported changing their behaviors around semi trucks, especially when it comes to leaving more space when passing. Drivers near the intervention sites felt that law enforcement was being stricter about unsafe driving around semi trucks after the *TACT* program was implemented. Whether this perception came from the publicity about increased enforcement or the higher visibility of law enforcement cannot be determined from the survey. Overall, the DOL survey results suggest that both the media and enforcement campaigns had the desired effects on exposure and self reported behaviors.

The results of this evaluation confirmed that intensive selective traffic enforcement that is well-publicized can produce large gains in drivers' knowledge, attitudes, and self-reported behaviors about driving around large trucks. Applying the proven *Click It or Ticket* high visibility enforcement model to a safe driving campaign involving large trucks can achieve positive results over a short period of time. An innovative road sign that combined a positive message ("*Leave More Space*") with an enforcement warning ("*Don't Get a Ticket*") was effective.

### ***Limitations of Study***

The study design included before, during, and after public awareness data, unsafe driving observations, and law enforcement and media activity data along two intervention corridors and two comparison corridors. This is a reasonably powerful evaluation design because it tracks before and after measures while simultaneously assessing whether those changes might have occurred naturally at the comparison sites. However, the final measures were collected shortly after the end of the interventions. Thus, there is no definitive information on the persistence of the positive *TACT* effects over the long term.

Also, analyses conducted after the *TACT* project interventions suggested that motorists near one of the comparison sites (Kelso) may not have been completely isolated from *TACT*'s activities, which is not so unusual in field demonstration projects. The 100-person intercept interview surveys conducted in October gathered information about possible spillover of the media messages in Kelso,

which was 70 miles away. The intercept interview technique is a convenience sample and is not intended to be representative of Washington's driving population, and further testing would be necessary to confirm the preliminary suggestions of the intercept interviews. If, however, Kelso's data were removed as one of two comparison corridors, the effect would be to increase the magnitude of *TACT's* positive effects in increasing motorist's awareness about leaving more space around trucks and in reducing the instances of unsafe driving around large trucks.



## INTRODUCTION

This report presents results from an 18-month project in Washington State that attempted to reduce specific unsafe driving behaviors around large commercial vehicles on specific segments of interstate highways.

Selective Traffic Enforcement programs (sTEPS) have been used effectively for many years to change motorists' traffic behaviors in a very short period of time. The *Click It or Ticket* (CIOT) model is a well known sTEP and is associated with an impressive increase in safety belt use across the nation in the past few years (Solomon et al, 2002). A sTEP model typically relies heavily on enforcement of a State's traffic safety laws (safety belts in *CIOT*) supported by intensive paid publicity that focuses on enforcement. The model includes: 1) data collection before, during and after media and enforcement phases; 2) earned and paid publicity announcing vigorous enforcement; 3) highly visible enforcement each day of the two week enforcement period; and 4) a media event announcing program results and thanking all the participants in the community.

*Share the Road Safely/Ticketing Aggressive Cars and Trucks (TACT)* is a pilot demonstration program using education, enforcement, media, and evaluation to reduce fatalities and injuries resulting from cutting off trucks, tailgating trucks, and speeding around trucks. It is an 18-month program applying the CIOT model to unsafe driving behaviors around large commercial vehicles. In the Consolidated Omnibus Appropriations Act of FY 2004 (P.L. 108-401), Congress directed the National Highway Traffic Safety Administration (NHTSA) to work with the Federal Motor Carrier Safety Administration (FMCSA) to "educate the motoring public on how to share the road safely with commercial motor vehicles." The appropriation directed NHTSA and FMCSA to apply lessons learned from NHTSA's experience in high visibility enforcement campaigns such as *Click It or Ticket* to FMCSA's *Share the Road Safely* outreach program to educate drivers to drive safety around large trucks.

Washington State was selected as the site for a pilot project because of its success in implementing other highway safety enforcement projects such as the Washington State Patrol's (WSP) *Step Up and R.I.D.E.* program in Seattle. The local project (also familiarly called the "Trooper in the Truck") put a trooper in a commercial vehicle who observed unsafe driving behaviors and radioed other troopers who then stopped and ticketed the driver. The Washington Traffic Safety Commission (WTSC) had the lead for the project and named it *TACT, Ticketing Aggressive Cars and Trucks*.

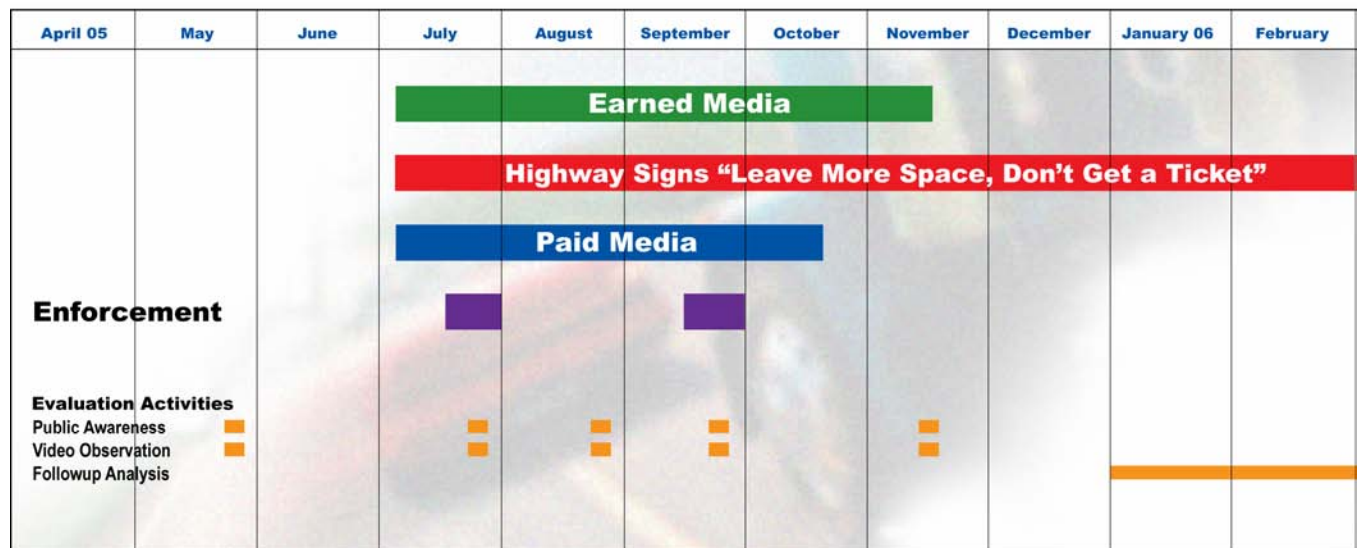
## **TACT Model Description, Timelines and Resources**

The purpose of the *TACT* pilot project was to increase awareness by the driving public about dangerous behaviors around moving commercial motor vehicles (CMVs) and to reduce the instances of one particular unsafe driving maneuver – cutting off trucks. The pilot demonstration program combined NHTSA’s proven high visibility enforcement model (e.g., *Click It or Ticket* for safety belts), with FMCSA’s *Share the Road Safely* education campaign for safe driving around large trucks.

The Figures 5 and 6 below show, respectively, the intervention and organizational timelines for the program. The *TACT* model includes: 1) data collection before, during and after media and enforcement phases; 2) earned and paid publicity announcing vigorous enforcement; 3) highly visible enforcement each day of the two week enforcement period; and 4) a media event announcing program results and thanking all the participants in the community.

**Figure 5. TACT intervention timeline**

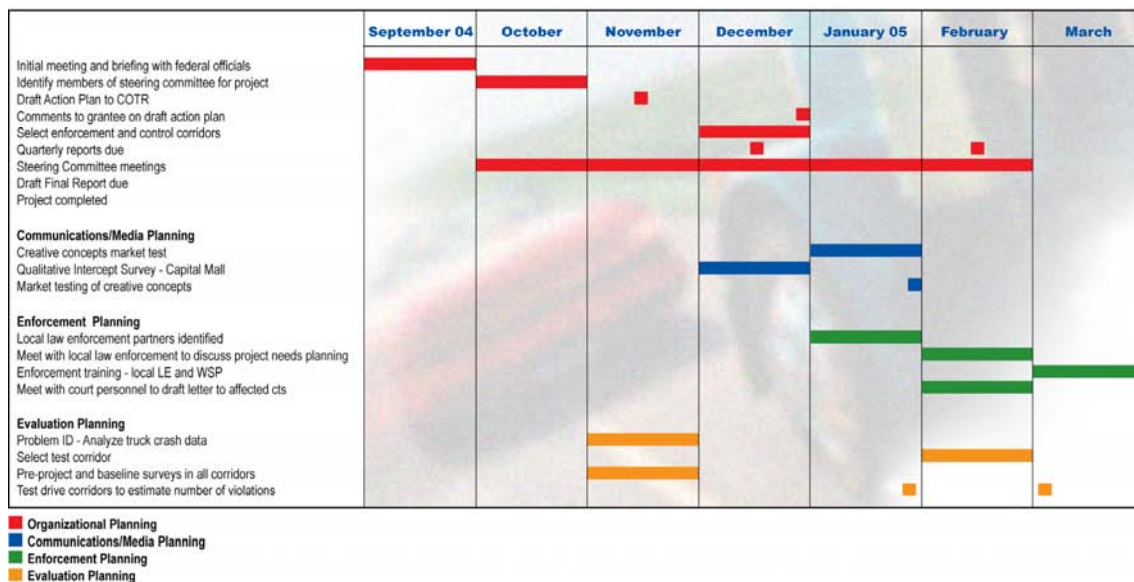
### **TACT Timeline - 2005**



Funding for the *TACT* pilot program was provided by NHTSA (\$497,000), the WTSC (\$117,500), and the FMCSA MCSAP (\$100,000) in Fiscal Year 2004. In Fiscal Year 2005, \$68,168 from NHTSA hired an evaluator to collect and process data, and an additional \$99,000 was directed by Congress and awarded to the WTSC. WTSC provided an additional \$10,000 to the program. The FY 2005 funds were used to enhance the media buy during the final enforcement wave. The additional funding was also used to contract with an independent analyst who will conduct follow-up evaluations at six month and one year intervals after project completion.

Figure 6. TACT organizational and planning timeline

## Organizational and Planning Timeline - 2005



### Project Goals

**Goal 1:** To test the effectiveness of high visibility enforcement in reducing high-risk unsafe driving behaviors that contribute to CMV crashes.

**Goal 2:** To document unsafe driving behaviors around CMVs by both CMV and passenger vehicle drivers. The specific driving behavior targeted was cutting off large trucks. Other behaviors targeted were tailgating, speeding, and aggressive driving.

**Goal 3:** To measure public awareness of the combined campaign of enforcement, paid and earned media, and outreach.

**Goal 4:** To develop a model that is replicable in other States.

The WTSC established a Steering Committee for the project. Stakeholders who served on the Steering Committee for this project included representatives from NHTSA (national office and Pacific Northwest Region), FMCSA (national office and Seattle office), Federal Highway Administration (FHWA), WSP Commercial Vehicle Division, Washington Association of Sheriffs and Police Chiefs who represented local law enforcement, the Washington Trucking Association, and the Washington State Department of Transportation Data Office and the Roadway Signage Office. Participants from WTSC included the deputy director, research investigator, public information officer, accountant, project manager, and committee assistant. The Steering Committee met monthly from October 2004 through October 2005.

## **Problem Identification and Site Selection**

During the problem identification phase of the program, a number of criteria were considered when identifying the sites. First, using the most current Washington data (2002), 10-mile segments of the interstates were ranked in terms of the number of crashes that involved CMVs, the average daily traffic, the proportion of CMVs included in the daily traffic where available, existing enforcement citations for aggressive driving, and various combinations of truck and passenger vehicle crashes. State roads were also considered.

Further criteria considered in site selection were the cost of the media markets in the intervention corridors and the possible media spillover into a comparison corridor, corridors where enforcement could use aircraft assistance and where shoulders were wide enough to make a safe traffic stop. Finally, road conditions, such as the number of lanes, areas where trucks were not permitted in the left lane, and planned construction projects were considered. From a list of the top ten locations, the final intervention and comparison sites were selected.

As shown in Figure 7, the two intervention corridors were I-5 south of the City of Tumwater (Thurston County) to the SR-512 exchange south of the City of Tacoma (Pierce County) and I-5 from the City of Stanwood through the southern part of the City of Bellingham (Skagit and Whatcom Counties). The two control/comparison corridors were on I-5 from the City of Kalama through the vicinity of State Route 506 (Kelso) and I-90 just west of the City of Spokane to the vicinity of the Maple Street exit in the City of Spokane.

**Figure 7. Locations of test corridors**  
**Washington State TACT Project Corridors**

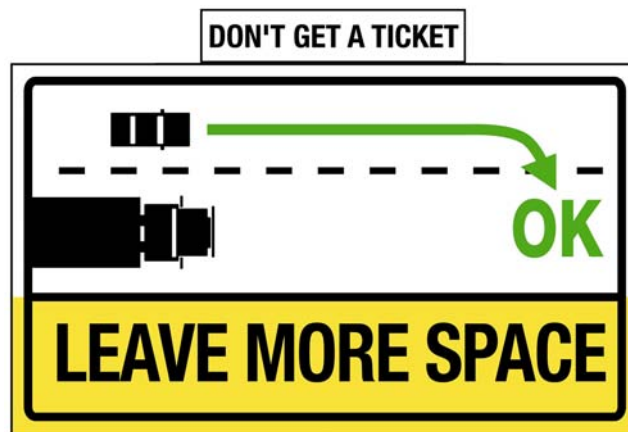


## **Cutting Off Trucks Safety Message and Road Sign**

After considering a number of unsafe driving behaviors, *TACT* targeted “cutting off trucks” as the unsafe behavior to address. Using the State’s citation database as a resource, other behaviors considered included speeding, unsafe lane changes, aggressive driving, and tailgating. “Cutting off trucks” was chosen because there was a specific traffic violation in Washington’s statutes that officers could cite for the enforcement part of the campaign, and it could be rephrased into a positive message for the driving public – “leave more space.”

Public awareness activities and paid media were designed to increase awareness among all motorists of the need to leave one car length for every 10 miles of speed when merging in front of trucks. Public feedback was used to develop a road sign (Figure 8) that communicated the safe merging distance and enforcement messages. The road signs will remain up for one year following the end of the project (until the end of September 2006). The message applied equally to drivers of large commercial vehicles and passenger vehicles.

**Figure 8. TACT road sign**



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## **PROJECT DESCRIPTION**

The project components consisted of enforcement interventions supported by an innovative road sign, paid and earned media, and a detailed evaluation. The interventions are described in this section. The design and results of the evaluation are covered in the next section.

### **Enforcement**

Two waves of enforcement each lasting two weeks (July 11-22 and September 19-30, 2005) took place at the intervention sites. Increased enforcement was deployed Monday through Friday, from 6 a.m. to 2 p.m. Crash data had shown that most CMV/PV collisions occurred weekdays during the morning commute and lunch hours. State and local law enforcement officers rode in the CMVs, equipped with mobile radios to document the violations they observed around trucks. WSP aviation supported the enforcement, and marked and unmarked patrol vehicles made the traffic stops.

The local law enforcement agencies that had jurisdiction on the stretches of I-5 in the intervention corridors were encouraged to participate in the *TACT* pilot project alongside the WSP. The Whatcom and Skagit County Sheriffs' Offices and the Bellingham Police Department participated in the project in the Bellingham intervention corridor and the Lakewood and Lacey Police Departments worked with WSP in the Olympia intervention corridor. Prior to the enforcement waves, a WSP trooper met with representatives of each participating local agency to discuss techniques of working on the freeways and to provide consistency in reporting violations. Initially, only the WSP troopers were to ride in the CMVs, but by the end of the second enforcement wave, local law enforcement also served in that capacity.

Prior to the enforcement waves, the project director discussed the project with the court clerks whose offices would likely see an increased volume of tickets due to the *TACT* pilot project. The clerks were provided with written details about the project. The judges from the affected courts expressed their preference that tickets written during the project not be identified in any special way.

The trucking industry provided CMVs to the law enforcement officers to traverse their corridors during enforcement times. For logistical reasons, two CMVs were used in the Olympia intervention corridor during both enforcement waves. The WSP provided an aviation unit to observe unsafe driving actions from the air, and both local and State law enforcement agencies provided marked and unmarked patrol vehicles to make the actual traffic stops.

WSP has an unmarked vehicle unit that it uses for aggressive driving enforcement. This unit is called the aggressive driving apprehension team (ADAT). Members of the ADAT took part in the *TACT* pilot project. In addition, local law enforcement agencies that had access to unmarked vehicles successfully used those vehicles in the project. These unmarked vehicles were driven by uniformed law

enforcement officers and operated independently of the troopers in the trucks. Law enforcement officers in unmarked vehicles were able to observe and cite drivers of both passenger vehicles and commercial vehicles who were driving aggressively in the intervention corridors. They also responded to violations observed by the officers riding in the trucks or to aviation troopers, if not otherwise engaged.

The WSP Aviation Unit was used in the intervention corridors to locate aggressively driven vehicles. The trooper observing the violations from the air radioed to the ground troopers and officers waiting in their patrol cars in the intervention corridors. Use of WSP Aviation was dependant upon weather and visibility and upon prior commitments for the use of the aircraft. Participating law enforcement rated aircraft use as the single most effective enforcement tool during the project.

### ***Citation Data***

A total of 4,737 contacts with drivers were made during the two enforcement waves. On average there were 237 contacts per day over the twenty days of *TACT* enforcement. The vast majority of contacts resulted in a citation being issued (72%) while 28 percent resulted in warnings. Also, the majority of contacts were with PV drivers, 86 percent; 14 percent were with CMV drivers. Most drivers were male, 73 percent, and the average age was 51.6 years old.

Most of the drivers contacted were residents of western Washington (28% lived in the vicinity of intervention corridor #1, 21% in intervention corridor #2, and 22% lived in other western Washington communities). Very few drivers were from eastern Washington (less than 1%), while many were from Canada (13%) and other States (15%). The numbers of driver contacts were roughly equally distributed across days of the week. The most productive times of the day were during the morning commute hours (between 7a.m. and 8 a.m., 17%). (See Appendix B for summary of citation data.)

## **Communications**

### ***Overview – Taking a Strategic Approach***

The Steering Committee utilized a strategic communications approach to support the enforcement program. Once the enforcement program priorities were determined, the Committee developed a communication plan based on the *Click It or Ticket* high visibility enforcement (HVE) model used to significantly raise safety belt use nationwide. The HVE model works by strategically marketing increased enforcement through paid advertising and earned media outreach during special emphasis periods.

As part of the strategic communications process, the Committee reviewed traffic and enforcement-related data and market research to determine the primary audiences and their related attitudes and knowledge, priority markets, behavioral



objectives, key messages, how best to reach and influence primary audiences, and evaluation criteria for communication efforts.

### ***Communication Priorities***

The Committee created the following priority communication goals based on the enforcement plan:

- “Cutting off trucks” was the targeted driving behavior. Other behaviors considered were tailgating, speeding, and aggressive driving especially around commercial motor vehicles.
- Test the use of the HVE model in two priority markets to determine the impact in reducing the risky driving behaviors that may contribute to crashes involving large trucks.
- Select two markets as comparison sites for evaluation purposes
- Develop a model communications process that could be replicable by other States.

### ***Message Development***

In addition to the primary message to “leave more space” around commercial vehicles, other messages about driving safely around CMVs were part of the communications effort. A vigorous public relations campaign communicated these messages to the public and to the news media who reported the message in their television and radio reporting (earned media). Likewise, messages to truck drivers to drive safely around passenger vehicles were included in this broader communication effort.

**Intercept survey.** The WTSC conducted a 100-person intercept survey to gauge public attitudes and awareness levels about driving around CMVs and leaving one car length for every 10 miles of speed when merging in front of CMVs. The survey findings underscored anecdotal evidence from law enforcement and the trucking industry that cutting off trucks was an undesirable but widespread habit of motorists. This survey found that 42 percent of motorists reported that they leave three or fewer car lengths at 60 mph when merging in front of large trucks, even though they think of themselves as safe drivers.

In the first intercept survey, a road sign visual was shown to respondents to gauge their perceptions and reactions to it. Building on this feedback, the road sign visual was further refined and tested with a second 100-person intercept survey to ensure that drivers could read the road sign while traveling at speeds of 60 to 70 mph. The road sign communicated to drivers that they needed to leave more space when merging in front of large trucks and that extra law enforcement patrols would increase their chance of being ticketed.

**Radio message and air buy.** A Seattle advertising company was commissioned to develop a radio advertisement that conveyed the message to “leave more space” when merging in front of CMVs (Appendix A). A Seattle firm

purchased advertising spots and negotiated additional free air time placements as part of this purchase agreement. The advertisement aired between July 7 and October 20, 2005, in Olympia and Bellingham (in Seattle it ran until September 4). The ad ran 45 times Monday through Friday during major drive times (6 a.m. through 7 p.m.) on all major radio stations in the intervention areas. The message reached more than one million people, aged 18 to 54 in the Seattle media market, 113,200 in Olympia, and 42,800 in Bellingham. Spots on radio stations were bought with the general driving public as the target audience in mind.

Table 1 below shows that the \$194,425 media budget purchased the equivalent of \$384,843 in paid radio advertisements and bonus spots. In the Seattle media market, \$94,110 was spent with an additional \$89,843 worth of bonus media negotiated in that market. In Bellingham and Olympia, the media budgets totaled \$100,315 and the value of the bonus media was \$100,560. The bonus media aired during the same time slots as the paid media schedule. There were 6,033 bonus radio placements with 986 of those in Seattle and the remainder in Bellingham and Olympia. (Appendix A)

**Table 1. Media value**

<b>Media Market</b>	<b>Media Purchases</b>	<b>Bonus Ads</b>	<b>Total Media Value</b>
<b>Seattle</b>	\$ 94,110	\$89,843	\$183,953
<b>Bellingham &amp; Olympia</b>	\$110,315	\$100,560	\$210,875
	\$194,425	\$190,403	\$384,843

In addition to radio placements, newspaper ads were carried in the major daily newspapers of both intervention corridors, as well as in the Fort Lewis Army Base papers. Print ads ran between 6 and 10 times in these papers. See Appendix A for a sample of the print ad.

**Media Relations.** A vigorous public relations campaign accompanied this effort. A press event with participation by the *TACT* Steering Committee kicked off the campaign. The event took place at the Nisqually truck weigh station north of Olympia. Appendix A has a photograph of the press event.

News coverage of the campaign was carried in the major daily newspapers along the intervention corridors and in Seattle. The campaign was covered by five news stories, four editorials and numerous letters-to-the-editors. In addition, two weekly newspapers carried the story, a trucking industry publication, and a magazine and electronic newsletter reaching the 520,000 AAA members in Washington. Appendix A has letters-to-editors that ran in January 2006.

Television coverage was extensive with eight TV stations in the Seattle and Bellingham area reporting the story. Five of those stations carried the story more than once. Appendix D has a list of the TV stations.

Radio station news coverage was carried on 16 stations, 10 of them in the Seattle media market. News coverage and live, on-air interviews were conducted with WSP troopers involved with the project. An interview of WTSC Director Lowell Porter was carried on a satellite radio channel reaching five million subscribers. Appendix A has a complete list of radio coverage.

**Road sign.** Eight innovative road signs were erected in each of the two intervention corridors, four southbound and four northbound per corridor. The road signs will remain in place for one year after the project has ended (until the end of September 2006).

**Wrapped CMVs.** Three CMVs, one each from Gordon Trucking, Interstate Transport, and Bates Technical College, were wrapped with the *TACT* pilot project campaign visuals. These CMVs traveled the intervention corridor areas from the beginning of the enforcement waves in July 2005. The trucks served as a visual testimony to the public of the trucking industry's support for this project and served as a public awareness message on wheels.

**Posters, Banners and Flyers.** Posters, banners, and flyers were developed and distributed as part of the publicity effort. Flyers were handed out by law enforcement during all traffic stops as an educational tool for the project. Posters were erected in 112 businesses in the areas of the intervention corridors, in stores, gas stations, restaurants, government offices, and groceries. Thirty-one banners were put up in and outside of public buildings. (See Appendix A for visuals of the poster, flyer and banner.)

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## EVALUATION

The evaluation design was a comparison of two intervention corridors with two comparison corridors at multiple time periods including pre-project baseline, during each of the media-enforcement waves, and after completion of the project. The same types of data were collected for each of the four project corridors.

### **Approach and Design**

The *TACT* program included an extensive evaluation component conducted both by the WTSC and by Dunlap and Associates, Inc. of Stamford, Connecticut under a task order agreement from NHTSA. This section first discusses the evaluation approach and design and then presents the specific methods and results for each of the evaluation measures.

#### ***Approach***

As described earlier, the *TACT* program consisted of enforcement and education interventions applied along two road corridors—Bellingham and Lacey/Olympia. In programs of this type, the objective is to alter driver behavior by conveying information on the correct way to perform and by creating general deterrence of illegal actions through a heightened fear of an enforcement sanction. The effectiveness of the effort will depend to some degree on the extent to which the intended audiences receive the message and perceive an increased risk of enforcement. It will also depend on whether the information is understood and recalled at the time when the correct, legal behaviors must be performed—in this case when the driver interacts with a semi truck on the highway. Program success will also be related to the ability of the driver to actually carry out the advice. For example, can drivers adequately judge that they have allowed sufficient distance after passing a semi truck before they pull back in?

In order to evaluate *TACT* fully and fairly, it was necessary to measure its effects at various points in the intervention process. Discussions earlier in this report covered the extent to which information materials were distributed and the number of citations written by law enforcement. Those can be thought of as the “input” to the program. The next measurement point was the determination of the extent to which these inputs were actually received by the intended audience. This was measured by a survey of exposure, knowledge, and self-reported behavior.

The determination of whether driver behavior changed and violations around semi trucks declined was accomplished using observations of vehicle interactions with semi trucks on the highway. Also, it was of interest to determine if the residual violations—those that still occurred after the *TACT* program—had changed in nature or severity. It was certainly possible that exposure to the *TACT* messages and the fear of a ticket prompted drivers to behave better even though their actions still constituted a violation of the law. This was assessed through ratings of behaviors observed before and after the *TACT* intervention.

Thus, the approach was to measure to the extent possible the effects of the *TACT* enforcement and media program through the actual behavior of the intended motorists on the road. In this manner, it was possible to document how the intervention processes performed as the project unfolded.

### ***Design***

The evaluation approach used a design that measured before and after shifts in key measures of effectiveness at the two intervention locations—Bellingham and Lacey/Olympia—and contrasted them to similarly derived measures collected at two untreated “comparison” sites—Kelso and Spokane. This is a relatively powerful evaluation design because it assesses pre to post changes at the treated sites while simultaneously determining if those changes might possibly have occurred naturally without the *TACT* intervention at the comparison sites.

The presentation of evaluation results below follows the steps in the intervention process. First, a public awareness survey determined whether the intended audience was exposed to the *TACT* program and recalled its content. This is followed by the analysis of the violation rates before and after the *TACT* intervention. Then, the results of the assessment of the change in the nature of the violations themselves are presented. Finally, an additional survey to examine the possible spillover of *TACT* countermeasures into the Kelso comparison site is discussed. For each evaluation step, the data collection methods are presented first followed by a summary of the most meaningful results.

## **Specific Evaluation Methods and Results**

### ***Exposure and Knowledge Survey***

The WTSC conducted a paper-and-pencil survey in cooperation with the DOL. Four driver licensing offices servicing the areas of interest—Bellingham, Kelso, Lacey and East Spokane—served as sampling sites. The Bellingham and Lacey offices were the only ones close to the intervention corridors on which countermeasures were being applied. Kelso had only a single DOL office. Spokane has multiple DOL offices. The East Spokane DOL office was selected to represent this comparison locale because of its size and closeness to the highway on which the behavioral measures were taken.

Four cycles or “waves” of survey data were collected in each office. Each wave covered approximately two weeks. The data collected in Wave 1 represented the baseline or “before” data since they were collected prior to the implementation of the *TACT* countermeasures and media campaigns. Subsequent waves were collected during the initial period of countermeasure activity, just after the peak of the countermeasures and after countermeasures had been in place for several months.

The survey process placed a low burden on both the respondents and the office staff. DOL agents in each office handed copies of the one-page, 16-item survey (see Appendix C) to licensed drivers and asked them to complete the information while they were waiting for their driver license or other transaction to be completed. Respondents either handed the anonymous completed survey back to the DOL employee or dropped it in a designated box. At the end of each wave, the completed questionnaires were sent to Dunlap and Associates, Inc. for key entry and analysis.

Overall as shown in Table 2, 6,155 people responded to the survey in the four DOL offices. The primary purposes of this survey were to determine if people in the intervention sites had read, seen, or heard the media and enforcement campaigns and whether they reported that they changed their behavior in response to the countermeasures. For analysis and presentation purposes, data were combined into intervention and comparison groups and pre and post campaign periods. Thus, Lacey and Bellingham were aggregated to form the intervention sites, while Kelso and Spokane were combined as the comparison sites. The pre exposure period consisted of Wave 1 of the survey which was conducted between May 3 and May 14, 2005. The post campaign period was comprised of Waves 2-4 collected during July 19 – 30, 2005, August 16 – 27, 2005, and September 20 – October 1, 2005, respectively.

**Table 2. Sample Sizes of DOL Survey Respondents**

	<b>Pre TACT (baseline)</b>	<b>Post TACT</b>	<b>Total</b>
<b>Intervention Sites</b>	1,630	2,198	3,828
<b>Comparison Sites</b>	1,039	1,288	2,327
<b>Total</b>	2,669	3,486	6,155

The driver licensing office survey technique has been widely used to assess trends and changes in public awareness of traffic safety programs, such as *Click It or Ticket*. It is not intended to be a representative survey of all Washington State drivers, but the technique is good at measuring changes over time. It is the magnitude of change across the TACT waves that is of interest, not the precise measurement. Customers who arrive at a driver licensing office are the target audience of interest in traffic safety programs – they own or drive vehicles on the public highways.

**Demographics.** Demographic information included age, gender, ethnicity, annual mileage, and type of vehicle driven most often. Demographics characterize the people who responded to the survey and are checked to assure that generally the same types of people completed the survey in each of the waves. There were no noteworthy differences in these demographic variables among the various

waves. Table 3 below shows that the ages of survey respondents appeared to be a reasonable representation of the driving public when compared to the age distribution of licensed drivers in Washington State.

**Table 3. Age Distribution of Department of Licensing (DOL) Public Awareness Surveys vs. Licensed Drivers in Washington State**

Age	TACT Driver Licensing Office Surveys* 2005			Washington State Licensed Drivers** 2004		
	Number	Percent	Cumulative Percent	Number	Percent	Cumulative Percent
under 21	361	5.88	5.88	295,893	6.34	6.34
21-25	629	10.25	16.14	429,412	9.20	15.55
26-39	1,377	22.44	38.58	1,224,200	26.24	41.79
40-49	1,409	22.97	61.55	980,553	21.02	62.80
50-59	1,317	21.47	83.02	863,197	18.50	81.31
60 plus	1,042	16.98	100.00	872,072	18.69	100.00
Total	6,135	100.00		4,665,327	100.00	

\* Of those who reported age on the survey

\*\* Drivers with valid Washington licenses and residences, DOL, 2004

**Safety Belt Use and Other Driving Habits.** Because of the general interest in safety belt use and as a further method of characterizing the survey sample, respondents were asked how often they used their safety belts when driving. Approximately 93 percent of all respondents said that they “always” use their safety belt. This is consistent with the Washington statewide observed safety belt use.

There were no remarkable patterns seen in basic information regarding driving habits, such as type of car driven most often and miles driven per year, among the four offices. Of particular interest was the finding that relatively few (1.3% in the total sample) of the respondents drove a semi truck as their most frequent vehicle. Thus, it is a reasonable conclusion that the survey sample had little if any first hand experience with respect to the operational characteristics and limitations of a semi truck.

**Media Exposure.** The media and enforcement campaigns were successful in creating meaningful exposure levels among drivers at the intervention sites. Based on the total sample, the percentage of people who said that they heard or saw something that was clearly related to TACT increased significantly from 17.7 percent in the pre period to 67.3 percent in the post period at the intervention sites (Chi Square = 924.851,  $p < 0.001$ ,  $N = 3,828$ ).<sup>1</sup> There were no significant changes

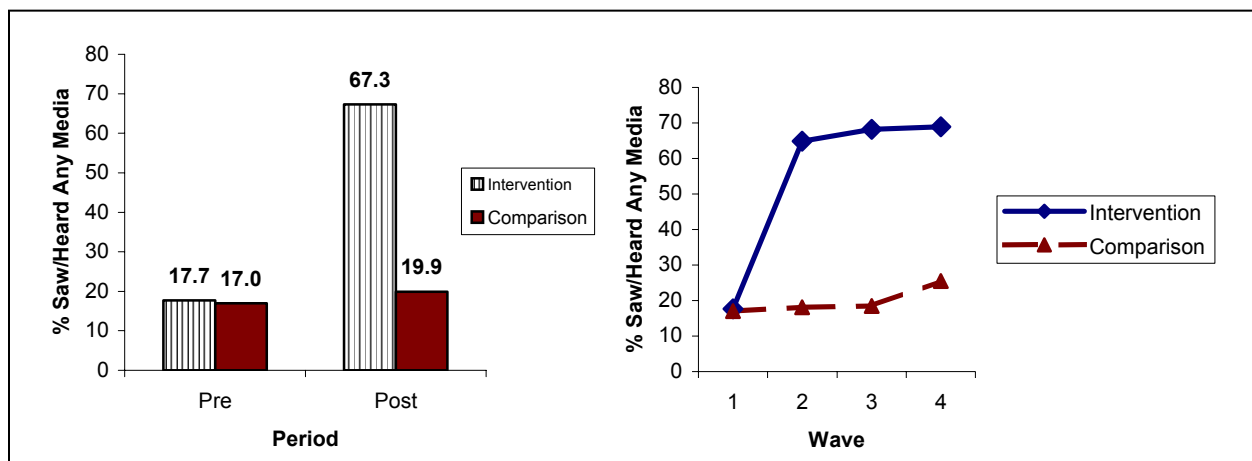
<sup>1</sup> Statistical significance was tested using the Chi Square statistic which is a measure of association. Chi Square analyses examined the actual versus expected frequency of responses at intervention and comparison sites or between pre and post periods. A pre to post or intervention to comparison effect was considered statistically significant if the probability that it could have arisen by chance as calculated from the Chi Square statistic was less than 5 percent ( $p < 0.05$ ). In the remainder of this



at the comparison sites, where percentages stayed low (17.0 % pre and 19.9 % post, N.S.). Figure 9 shows these findings for pre and post periods and by wave. Exposure levels jumped from Wave 1 to Wave 2 and remained at the higher level throughout the subsequent waves of data collection.

It is not surprising that approximately 17 percent of the respondents reported exposure in the pre period. The specific question asked was “*Have you recently read, seen or heard anything about giving semi trucks more space when you pass them?*” This prompt is sufficiently general that it can be expected that some people will respond in the affirmative. This could be based on hearing some other recent highway safety message or simply on traffic safety messages remembered from any time in the past. It also could be the result of trying to give what they perceived to be the “correct” answer. Regardless of the origin of the baseline values, however, the change in reported exposure to messages about leaving more room for semi trucks is large and clearly only at the intervention sites. This demonstrates that the *TACT* media exposure was reaching its intended audience of licensed drivers and that they recalled the messages when prompted.

**Figure 9. Percent who saw/heard media about giving semi trucks space**



Since the *TACT* program resulted in high exposure, it was of interest to determine which forms of media were most successful in reaching the public. The survey asked where a person had seen or heard the information about driving behavior around semi trucks. Choices included newspaper, radio, TV, road sign, brochure, police, billboard, poster and banner. The media campaign had engaged in all of the above methods of information dispersion, with the exception of using

section, significant associations are reported together with their Chi Square value and the associated exact probability that they could have arisen by chance. Differences that were not significant by the Chi Square test are simply listed as “(N.S.)” or reported as not significant when described. The sample size or “N” value on which each Chi Square is based is also shown when the results are reported as percentages.

billboards. However, billboard was included in case people thought that the large road signs constituted billboards.

Five of the media forms showed a statistically significant and operationally meaningful increase in the percentage of people who said they had heard or seen the message via that particular medium. These media forms were road signs, billboards, radio, television, and newspapers. Although billboards and road signs separately showed a significant exposure, their data were combined since it is virtually certain that people responding with respect to billboards were actually making reference to the large road signs.

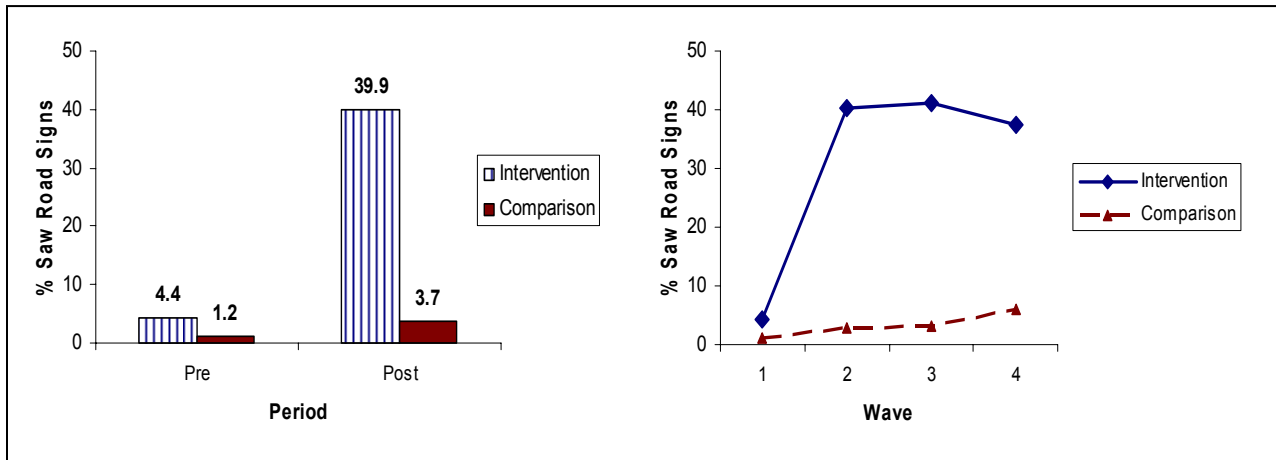
As seen in Figure 10, the percentage of people seeing the signs in both the intervention and comparison groups increased significantly from the pre to post periods.<sup>2</sup> However, the increase for the intervention sites was substantially higher. Out of all of the people surveyed at the intervention sites, only 4.4 percent in the pre period reported seeing road signs or billboards, while nearly 39.9 percent in the post period reported seeing them (Chi Square = 634.631,  $p < 0.001$ ,  $N = 3,828$ ). A dramatic increase is seen between Wave 1 and Wave 2 at the intervention sites and remains steady between Waves 2 and 3, with a small drop-off between Waves 3 and 4.

At the comparison sites, 1.2 percent of all people surveyed in the pre period said they saw the signs, while nearly 3.7 percent in the post period claimed to have seen the signs (Chi Square = 15.142,  $p < 0.001$ ,  $N = 2,327$ ). Although statistically significant, the magnitude of the increase in exposure at the comparison sites is not operationally meaningful compared with the large jump at the intervention locations. The wave-by-wave data in Figure 2 reveal that exposure increased for comparison sites at a steady rate across waves but still remained well below the levels of exposure seen at the intervention sites. Also, virtually all of the increase at the comparison sites came from Kelso. Since Kelso is relatively close to Lacey and on the same I-5 corridor, Kelso residents might have been exposed to the signs near Lacey. In order to investigate this possibility, a follow-up intercept survey was mounted. Its results are presented later in this report.

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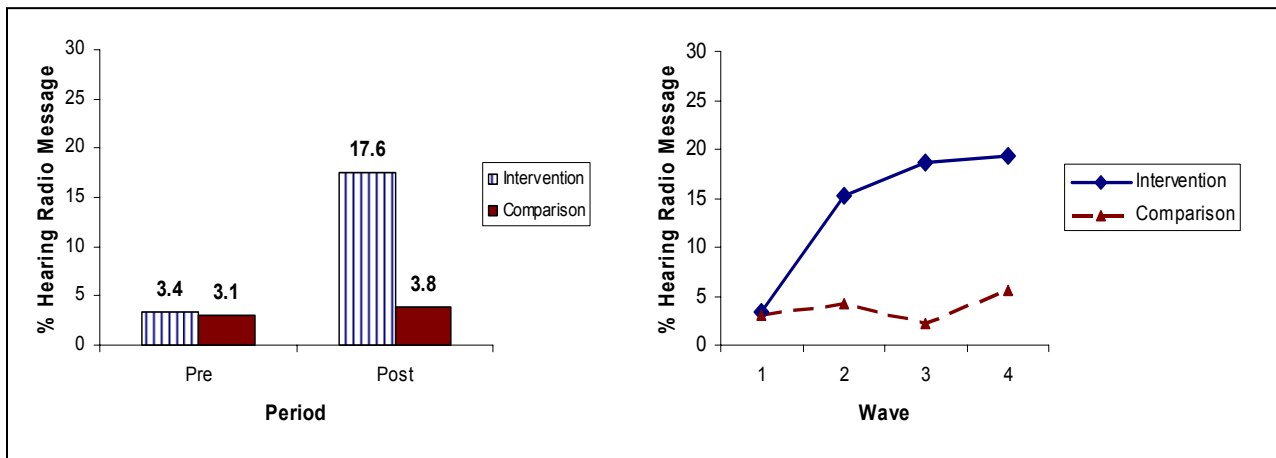
<sup>2</sup> All of the percentages reported for the survey are based on the total number of respondents. This includes everyone who did not see any of the media (about one third of the sample). If the percentages had been based only on those respondents who indicated they had been exposed to some TACT campaign component, the percentages would have been higher. As presented, the results are the best estimate of the extent of the total intended audience that each media form reached.

**Figure 10. Percent who saw the road sign**



Exposure to the radio message at the intervention sites followed a pattern involving a large initial increase between Waves 1 and 2 and smaller increases between Waves 2, 3 and 4, while exposure at the comparison sites remained low and fairly constant (See Figure 11). Respondents at the intervention sites reporting having heard the radio message showed a significant and operationally meaningful increase in exposure rising from 3.4 percent in the pre period to 17.6 percent in the post period (Chi Square = 183.673,  $p < 0.001$ ,  $N = 3,828$ ). There was low exposure to radio at the comparison sites and no significant change from pre to post. This clearly suggests that the radio messages were effective.

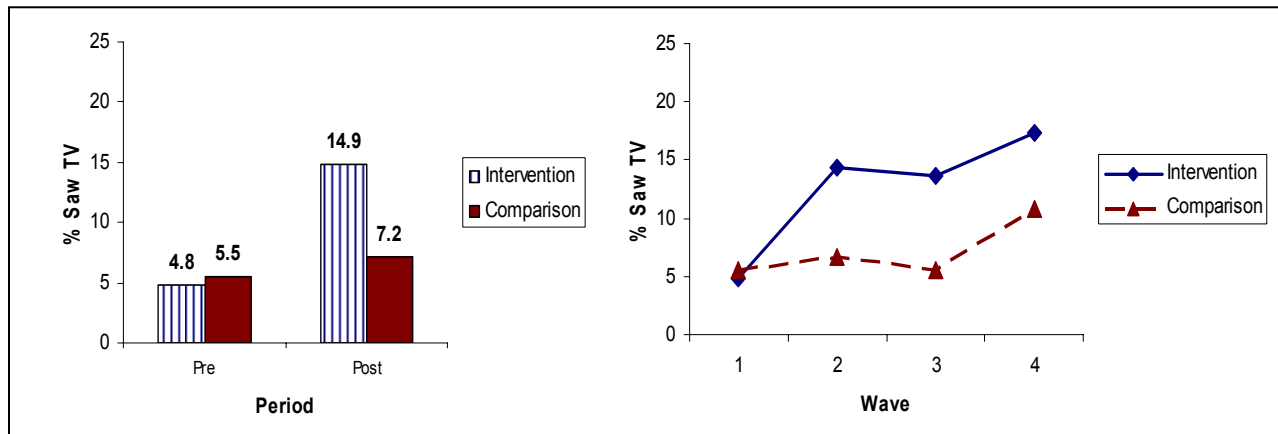
**Figure 11. Percent of people who heard radio message**



Exposure to the earned media on television followed a similar pattern to the radio messages (see Figure 12). Respondents at the intervention sites who said they saw a message on television showed a significant and operationally meaningful increase in exposure rising from 4.8 percent in the pre period to 14.9 percent in the

post period (Chi Square = 100.00  $p < 0.001$ ,  $N = 3,828$ ). The primary increase was once again between Waves 1 and 2, with a smaller increase at the intervention sites between Waves 3 and 4. There was low exposure to messages on television at the comparison sites and no significant change from pre to post, although by Wave 4 there does appear to be a small increase in exposure.

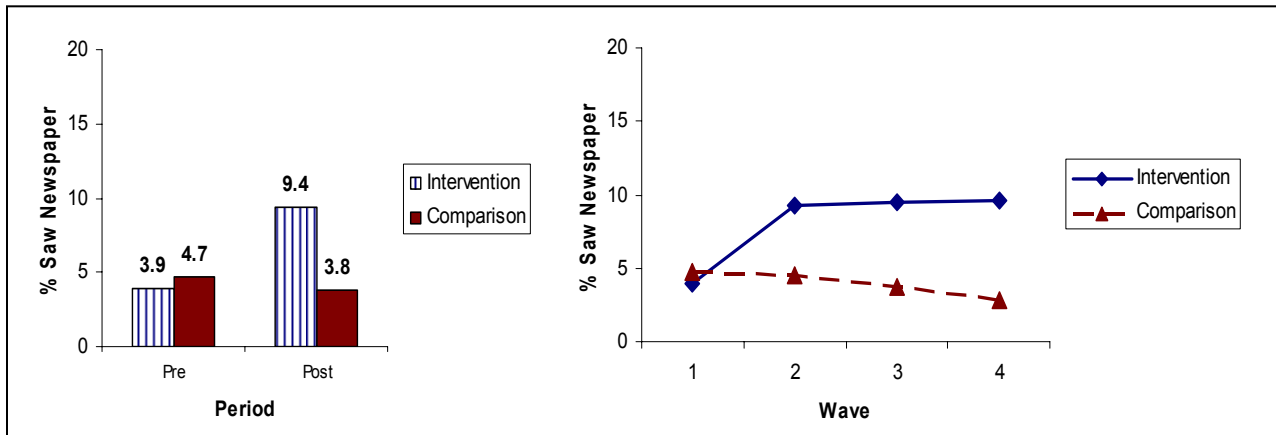
**Figure 12. Percent of people who saw the television messages**



The survey also showed an increase in exposure to the newspaper materials at the intervention sites, however the change was not as large as for the other media forms (See Figure 13). Exposure rose from 3.9 percent in the pre period to 9.4 percent in the post period (Chi Square = 42.90  $p < 0.001$ ,  $N = 3,828$ ). The increase occurred between Waves 1 and 2, and exposure levels remained steady through the subsequent waves. There was low exposure to the newspaper placements at the comparison sites and no significant change from pre to post.

The other media, including brochures, banners, and posters showed no meaningful increase in reported exposure for the intervention or comparison sites over time. It is interesting that the radio messages, which were well produced and carefully distributed with paid media, did not produce as large an exposure increase as did the road signs. It is possible that this is an artifact of the survey process. Respondents were given a list of media forms and asked to check all that they had seen or heard. Some people, however, may only have checked the one form they remembered first or only those media that they had been exposed to most recently or most repeatedly. The road signs had the ability to produce many repeated exposures especially for anyone commuting along the I-5 corridor near Lacey or Bellingham. Thus, they may have been the most compelling presentation of the *TACT* message due to repetition and because they presented the *TACT* message at the point of behavior for drivers. Or they may have been compelling because they were an "official" sign placed by the transportation department.

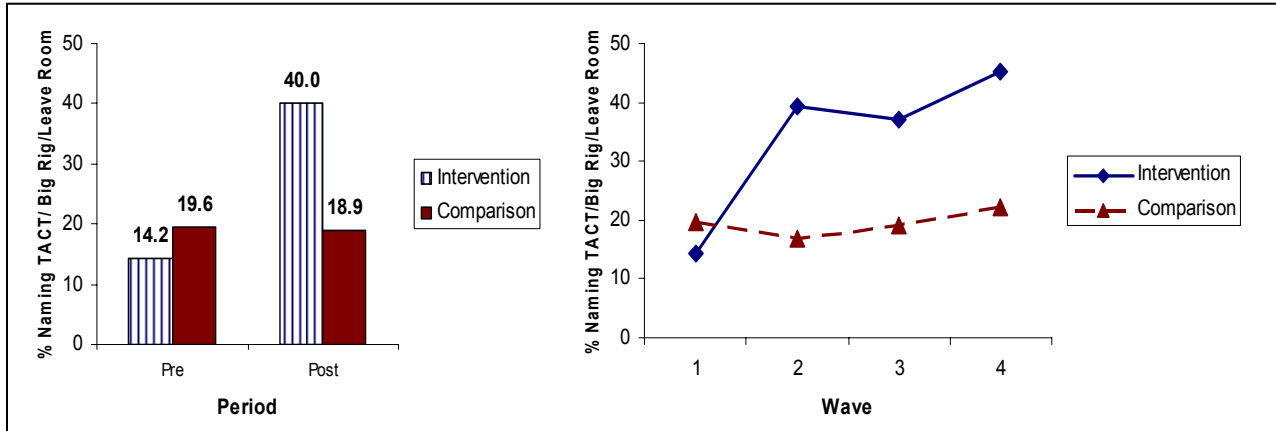
**Figure 13. Percent of people who saw the newspaper messages**



**Recall of Program Name.** After determining that people experienced increased exposure to the message of giving semi trucks more space when passing, it was also of interest to determine whether people remembered the name of the program. The official program name of Ticketing Aggressive Cars and Trucks (*TACT*) was virtually unknown in both the intervention and comparison sites. Only 1.5 percent of respondents in both the pre and post periods at the intervention sites, and 1.3 percent and 2 percent for the pre and post periods, respectively, at the comparison sites, said they knew the name *TACT* as a program relating to safety around semi trucks. This is not surprising since the name was purposely not publicized as part of the program and therefore served as a distractor question in the survey.

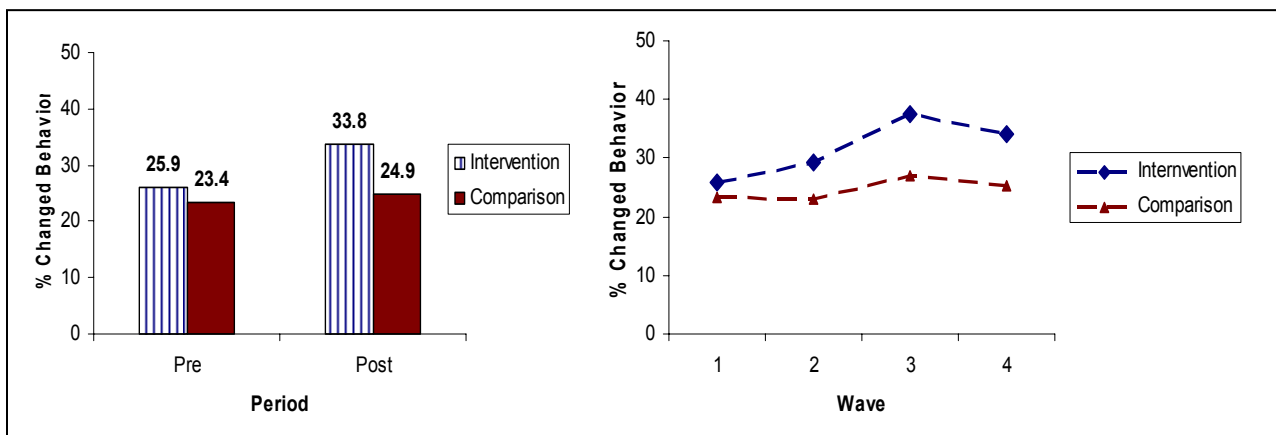
A much larger percentage of people said that the names “Give Big Rigs Big Space” and “Leave Room When Passing” were programs that did pertain to safety around semi trucks. Although these were not the actual program names, they are central themes in the *TACT* messages, especially on the road signs and in the radio messages. If these three names are combined for purposes of analysis, there is a significant increase in recall for the intervention sites but not for the comparison sites (Figure 14). Awareness went up from 14.2 percent in the pre period to 40 percent in the post period for intervention sites (Chi Square = 302.345,  $p < 0.001$ ,  $N = 3,828$ ). Similar to results discussed earlier, a large jump in exposure is seen between Waves 1 and 2 with a smaller increase between Waves 3 and 4. There was no significant change at the comparison sites.

**Figure 14. Percent of people naming TACT/Big Rig/Leave Room**



**Self-Reported Behavior Change.** Since the survey confirmed that much of the driving population in the intervention sites had been exposed to the *TACT* message, it was of interest to examine the extent to which this exposure affected the target behaviors. The survey asked people to self-report if they had changed their driving behavior around semi trucks in the past two months. Results indicated that significantly more people reported having changed behavior in the last two months during the post period than the pre period for the intervention sites, but not for the comparison sites. People reporting that they changed behaviors rose from 25.9 percent to 33.8 percent at the intervention sites (Chi Square = 27.382,  $p < 0.001$ ,  $N = 3,828$ ). Figure 15 demonstrates the gradual increase at the intervention sites across Waves 1, 2 and 3, with a minor reduction during Wave 4. Comparison sites showed virtually no change across the four waves.

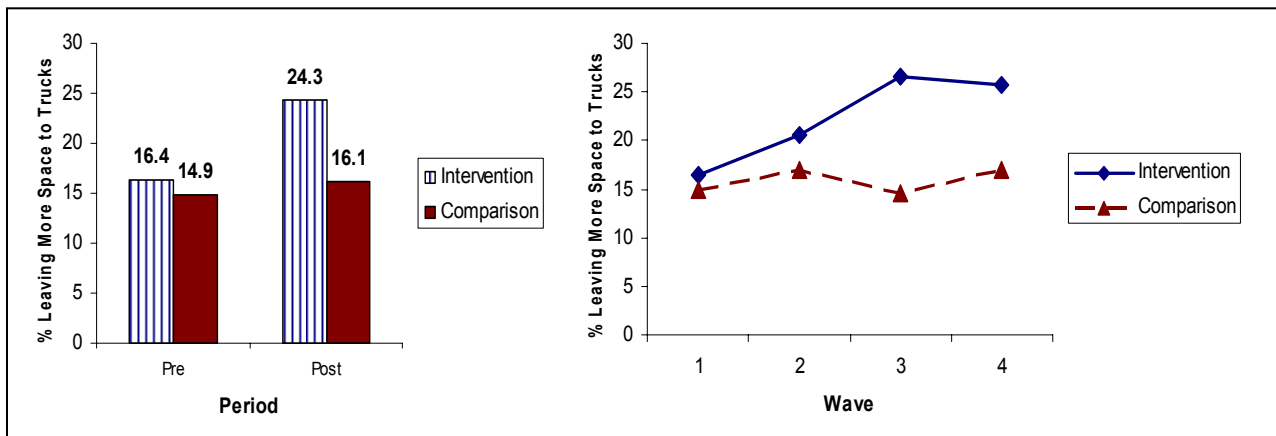
**Figure 15. Percent who said they changed behavior in last 2 months**



Of the three choices presented for changes in behavior, the one selected most frequently was "*I leave more space when passing.*" As shown in Figure 16, respondents reporting that they left more space when passing rose significantly

from 16.4 percent in the pre period to 24.3 percent in the post period at the intervention sites (Chi Square = 35.431,  $p < 0.001$ ,  $N = 3,828$ ). Increases are seen at Waves 2 and 3 that level off at the higher level during Wave 4. There was no significant pre/post change at the comparison sites. The other two survey responses of "I don't follow as closely" and "I stay out of the truck driver's blind spots" showed no significant change between pre and post periods for either the intervention or comparison sites. These results are consistent with the *TACT* campaign's message.

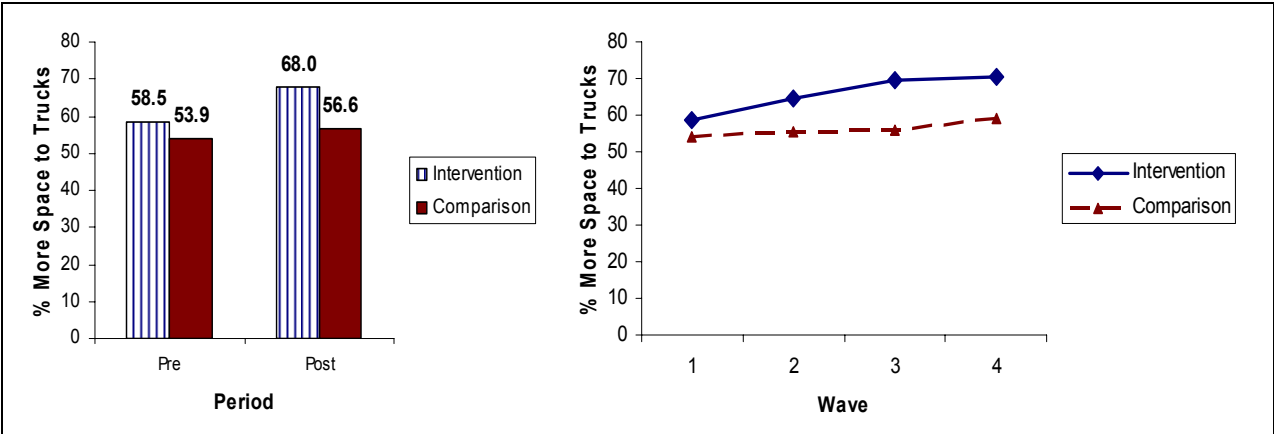
**Figure 16. Percent leaving more space when passing semi trucks**



Another way to measure behavior change in response to the *TACT* interventions is with respect to specific actions motorists take when passing semi trucks and cars. Separate survey items asked people to indicate how many feet or car lengths they left when they passed a car and when they passed a semi truck. Based on the responses, a ratio of semi truck to car distance was computed to determine if people left less, the same, or more space when passing semi trucks than when passing cars. A significant increase in the number of people saying they left more space for trucks than for cars was found at the intervention sites with percentages rising from 58.5 percent in the pre period to 68.0 percent in the post period, (Chi Square = 31.323,  $p < 0.001$ ,  $N = 3,310$ ).<sup>3</sup> The increase is slow and steady at Waves 2 and 3 and levels off at Wave 4. Comparison sites showed no significant change. As shown in Figure 17, these results provide further support that people self-reported that they were leaving more space for trucks after exposure to the *TACT* campaign. As will be seen later, these self reports were confirmed by the observational data.

<sup>3</sup> Note that N is based on the number of people who provided viable data for analysis. Missing or uninterpretable responses were eliminated.

**Figure 17. Percentage who leave more space for semi trucks than for cars.**



**Strictness of Enforcement.** Respondents were also asked how strictly they thought the Washington State Patrol enforces unsafe driving around semi trucks. Analysis showed a significant increase in the percentage of respondents at intervention sites saying that they thought the WSP enforcement was somewhat strict to very strict. Percentages went from 52.2 percent in the pre period to 56.4 percent in the post period (Chi Square = 5.907, p = 0.015, N = 3,422). Overall, more respondents at comparison sites (approximately 61 percent) thought that enforcement by the WSP was strict, but the percentage did not change significantly from pre to post.

Another item asked if the respondent had ever been stopped by the police for tailgating or cutting off a semi truck. The number of “yes” responses was extremely small at all sites, and no significant effects were found.

**Summary of Survey Results.** Overall, the DOL public awareness survey demonstrated that people at the intervention sites were seeing or hearing the *TACT* messages and remembering the core message of leaving more space when passing trucks. Interestingly, in the present study road signs were the best method of relaying the *TACT* safety messages to drivers, with radio ads also effective but a distant second. This is not surprising since both media types are point of behavior countermeasures, and drivers likely have more repeated exposures to the road signs than to the radio spots. A noteworthy fact is that people reported changing their behaviors around semi trucks, especially when it comes to leaving more space when passing. Results also indicated that people at the intervention sites felt that the WSP was being stricter about unsafe driving around semi trucks after the *TACT* program was implemented. Whether this perception came from the publicity about increased enforcement or the higher visibility of the WSP cannot be determined from the survey. Overall, the DOL survey results suggest that both the media and enforcement campaigns had the desired effects on public awareness of the messages and enforcement and self reported behaviors.



## ***Violation Rates Near Semi Trucks***

The DOL survey showed that people had been exposed to the *TACT* campaign and that they said they had changed their behaviors around semi trucks. In order to determine if any true changes in behaviors were occurring around semi trucks, actual driving behaviors around semi trucks were observed. This resulted in the conclusion that actual violation rates were reduced in the intervention sites but not in the comparisons.

**Video Data Collection.** In order to acquire a sufficiently large sample of vehicle interactions with semi trucks, it was decided to follow semi trucks and videotape the behavior of drivers passing or otherwise interacting with them. The WSP patrol agreed to assign officers to 8-hour shifts of following semi trucks in unmarked cars equipped with video equipment. A protocol was developed to define how the observations were to be made and the judgments desired from the troopers on the scene. WSP troopers were then assigned at each of the four sites and trained to collect data according to the protocol. Video equipment mounted on the dashboard and looking to the front of the unmarked cars recorded data. Collection took place in five waves at each of the intervention and comparison corridor sites. Although each data collection day consisted of eight hours of patrol time, the actual recorded time varied significantly due to external factors such as the availability of semi trucks, compelling needs for the troopers to take enforcement action and equipment malfunctions.

Officers were asked to move in or out of the lane behind the semi truck when possible in order to allow the video cameras to obtain images about vehicle behaviors before, during, and after passing the trucks. This information included signaling in and out of lanes, time for lane changes, and action after passing (e.g., slowing down, accelerating, and space left). Officers were asked to identify any violations around the semi trucks or violations committed by the trucks themselves using the audio channel on the video recorders. Officers looked for speed, improper lane change, failure to signal, following too closely, reckless driving and negligent driving 2<sup>nd</sup> degree violations. Officers were asked to verbalize what action they would take regarding the vehicle's actions so it would be caught on the audio portion of the tape, although they were asked not to stop vehicles unless absolutely necessary. The three possible actions an officer might take when there was a violation included: 1) no stop, 2) driver would be stopped and warned, and 3) driver would be ticketed. The measure of interest was whether the rate of violations (number of violations per unit of observation time) decreased. Rates had to be used rather than raw numbers of violations since the amount of observation time per wave at each site varied due to the extraneous factors mentioned above.

**Video Coding.** Video data were sent by the WSP to the WTSC where they were copied for protection and then forwarded to Dunlap and Associates for coding and analysis.

A total of approximately 160 hours of video were collected (8 hours x 4 sites x 5 waves). Video violation sequences were then extracted from the video based

on the visual and auditory information provided by the troopers. Overall, 1,843 interactions were coded from the video data. The total number of interactions coded includes all instances when an officer indicated a violation in the immediate vicinity of a semi truck, or when a vehicle and a semi truck's paths crossed. If vehicle and truck paths crossed without a violation, the event was recorded as a "no violation" interaction. Instances where vehicles simply drove by, did not commit a violation and did not cross paths with the semi truck were not coded.

For each relevant sequence, an array of information was coded based on trooper comments, environmental and weather conditions, vehicle type, and observed vehicle behaviors including signaling in or out of lanes, position relative to a semi truck, and the number of highway lanes. Although 1,843 interactions were coded, an interaction was only classified as a violation based on the comments of the troopers.

**Violation Rate Results.** Several minor issues arose involving the quality of video data. The audio in all of Wave 4 for Lacey was lost. Therefore, the coder made judgments as to the nature of any indicated violations (officers gave a visible signal to the camera when a violation occurred). Also, one and a half tapes of data were lost in Wave 3 for Lacey due to an equipment malfunction. To address these issues, data were normalized among the four sites by calculating a violation rate per observation hour determined by dividing the number of observed violations at each site by the number of video recording hours required to collect them.

As in the analysis of the DOL survey, site data were combined into intervention and comparison condition and by pre and post periods. Violation rates per hour of observation were used to test for changes before and after the *TACT* program and between intervention and comparison sites using the Poisson log linear offset procedure described in Agresti (2002) and as implemented in SPSS® Version 13 (2004). This technique weighs and adjusts the observed counts for differences in exposure.<sup>4</sup> In the present study, exposure is represented by the amount of time (hours) over which each cell count (number of violations for a wave and site) was observed. The analysis addresses whether or not the enforcement program was associated with change in the rate of violations.

The analysis is similar in concept to an analysis of variance with the intervention factors of site type (intervention/comparison) and period (pre-*TACT*/post-*TACT*). The effects of most interest were whether there was a significant reduction in violation rate pre to post and whether that reduction was

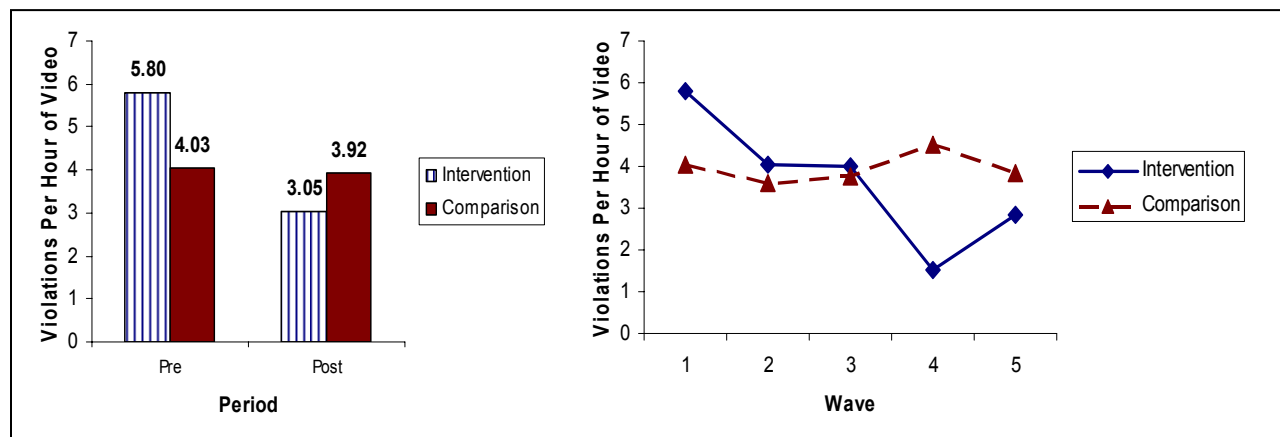
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<sup>4</sup> The Poisson log linear procedure is a complex statistical approach that will not be described here. The approach is based on the assumption that the distribution of the counts and rates among the cells follows a Poisson distribution. Although usually a reasonable approximation, this assumption is often not completely valid in analyzing count data; instead one frequently encounters moderate "over-dispersion" in which the variance exceeds the mean. A sensitivity analysis was therefore performed using various levels of assumed over-dispersion. It was found that even if the actual variances were twice as large as those of the Poisson distribution, the program effects observed here would still be highly significant ( $P < .01$ ). In simple terms, this means that any threats to the validity of employing this approach are extremely small.

significantly more at the intervention sites, i.e., the interaction effect of site type by period was statistically significant. The results of the analysis demonstrated a significant interaction effect (regression coefficient = 0.615,  $p = 0.002$ ) in the predicted direction.<sup>5</sup> Calculating the odds ratio (OR = 1.85) indicates that the comparison group had 1.85 times as many violations per hour than did the intervention group when controlled for their respective rates in the pre-period. Using the reciprocal of the OR, which is an alternative way of describing the findings, shows that there was an approximately 46 percent reduction in violations for the intervention sites when controlled for the pre period rates.

Given that the effect is significant, a simpler way to examine it is by looking at the calculated rates of violations for the pre and post periods for the intervention and comparison sites. As seen in Figure 18, the rate of violations for the intervention sites decreases from 5.8 violations per hour of observation for the pre period to 3.05 violations per hour of observation for the post period. Dramatic drops in the violation rate are seen between Waves 1 and 2 and again between Waves 3 and 4. The intervention sites then show a small increase in violation rate between Waves 4 and 5. Comparison site violation rates stay virtually the same from pre to post with rates of 4.03 and 3.92 respectively.

**Figure 18. Rate of violations per observation hour**



In order to bound the magnitude of the violation rate reduction observed after the *TACT* intervention, a second analysis was conducted excluding the pre period data and looking at intervention and comparison sites across each of the remaining post period waves. The same Poisson log linear offset procedure described earlier was used for the wave 2, 3, 4 and 5 data. As expected, the

<sup>5</sup> The results for period and site are not of major interest in the context of the present study but they must be included in the model in order to calculate the interaction. The coefficient for group represents the difference between the intervention and comparison areas on the pre- and post-period rates combined. The coefficient for period represents the difference between the pre and post period for intervention and comparison areas combined. The component of primary interest is the site by period interaction. This interaction reflects the impact of the enforcement program on subsequent violation rates by examining changes in the pre vs. post rates between the intervention and comparison groups.

analysis resulted in a smaller but highly significant treatment effect (regression coefficient = -0.262,  $p = 0.01$ ). The difference between intervention and comparison sites was significant, but none of the differences among the waves reached significance. The odds ratio (OR = 1.30) indicates that the comparison sites had approximately 1.30 times as many violations in the final four waves (the post period waves) as the intervention sites.

Using the reciprocal of the OR indicates a 23 percent reduction in violations for the intervention sites. This result is conservative since it does not take into account the difference in violations at baseline. However, the results including the baseline presented above based on the treatment by period interaction could possibly be inflated somewhat since there is only one wave for the pre-period and there are four for the post. The best estimate is therefore that the actual violation rate reduction lies somewhere in the interval 23 percent to 46 percent.

**Summary of Violations Results.** Overall, there was a decrease in the rate of violations per observation hour at the intervention sites but not at the comparisons. Since the observation protocol was followed consistently between intervention and comparison sites and for the pre and post periods, these results suggest there was a significant reduction in the actual number of violations at the intervention sites but not at the comparisons.

### ***Seriousness of Violations***

The final step in the process of determining changes in the behaviors of drivers after the implementation of the *TACT* program involved rating the “goodness/badness” of behaviors observed in the videos. As discussed earlier, analyses of the rates of violations showed that a reduction in the number of violations occurred at intervention sites. It was also of interest to determine if the nature of the violations observed after the *TACT* enforcement and messages (residual violations) had changed at the intervention sites. The characteristics of the residual violations were important to shed light on the reductions obtained. For example, the lowered numbers of violations could have been a result of the elimination of the least egregious behaviors or a general reduction of all violations regardless of their seriousness. Also, it is possible that people in the *TACT* areas responded in the desired direction but did not change sufficiently to avoid a violation altogether. These questions were addressed by having raters review violation sequences on video to assess their characteristics.

**Violation Rating Data Collection.** The same video data used to assess the rates of violations were used to determine if any changes occurred in the nature of violations before and after the *TACT* campaign. Ninety-nine video segments containing a driver violation were randomly selected out of the pool of all possible violations in which a semi truck and another vehicle interacted.<sup>6</sup> Violations from which the random sample of 99 was drawn included those where the driver cut off a

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<sup>6</sup> The sample size of 99 was chosen because that is the upper limit of the number of menu entries that can be conveniently placed on a DVD, the medium selected to present sequences to the raters.

semi truck, followed too closely, failed to signal, improperly changed lanes, drove negligently<sup>7</sup> or drove recklessly.

The interest was in changes in the nature of violations at the intervention sites only because the DOL survey showed little or no penetration of the *TACT* intervention into the comparison sites, and there was no change in their violation rates. Thus, any observed change in the nature of their violations could not have been associated with the *TACT* activities.

The total of 99 video segments was composed of 50 segments of video containing a violation in which a semi truck and another vehicle interacted that were randomly selected from the post period at the intervention sites. In addition, 49 segments of video containing a violation in which a semi truck and another vehicle interacted were taken from the pre period. Since there were not a sufficient number of non-speeding violations at the intervention sites in the pre period to provide the 49 video segments, the sample was composed of violation data from both the intervention and comparison sites. It was initially thought that it was reasonable to combine violations from the intervention and comparison sites for the pre period since neither could have been influenced by the *TACT* program. This assumption proved invalid when analyses showed that pre-*TACT* ratings of violations at the intervention sites were quite different from ratings of violations at the comparison sites (see results below for a discussion of this point).

In each video segment, a single interacting vehicle was designated by an arrow superimposed on the video presentation. Raters were instructed to rate each segment with respect to both the behaviors of the driver of the vehicle designated by the arrow and those of the semi truck drivers. The video segments were rated on the crash risk, intent, legality, intimidation, and aggressiveness of the driver of the interacting vehicle using four 5-point scales (see Appendix D for the rating instructions and rating form). Participants also answered a summary question characterizing the designated vehicle driver's behavior as being not a problem, a lapse, an error, or an intentional violation. Participants also indicated whether or not a police officer should stop the driver of the designated vehicle. The truck driver's behaviors were only rated on aggressiveness, the same summary question and whether or not an officer should stop the semi truck.

Three groups of raters provided the data—six WSP officers, five semi truck drivers, and six members of the WTSC staff. Raters were given a three-ring binder that contained a DVD, instructions, and 99 rating forms—one for each violation. The order of the violation scenes was randomized between pre and post periods, and the timing of the violation was unknown to the raters. They independently rated all 99 segments.

**Video Rating Results.** The rating data were analyzed with respect to reliability and differences between the pre and post intervention periods. Reliability

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<sup>7</sup> Negligent driving 2nd degree as determined by the observing trooper.

is discussed first because it is a prerequisite to reaching valid conclusions about any changes in violation characteristics across periods.

Reliability analyses demonstrated that all raters, and groups of raters, were using the scales similarly. Reliability analyses also showed that items were highly inter-correlated for the designated vehicle and semi truck ratings, respectively. Items regarding the designated vehicle's behavior were initially created with the intent to measure different dimensions of behavior. However, factor analysis<sup>8</sup> revealed that all of the items for the driver of the designated vehicle were actually measuring one dimension. This dimension appears to be related to the overall "goodness" or "desirability" of the behavior. As expected a separate dimension was found for the three items relating to behaviors of the semi truck drivers.

Rating data were screened further to determine if the assumption that the video segments in the pre period from the intervention and comparison sites were rated comparably and could therefore be combined in the analyses to determine pre versus post effects. Results indicated that the ratings of the pre period video segments for the intervention and comparison sites were significantly different on all of the items. For example, the mean rating of crash risk during the pre period for the intervention sites was significantly higher than the mean rating of crash risk for the comparison sites ( $t[16] = 8.771, p < 0.001$ ). Crash risk was calculated from the opinions of all of the scorers of a particular truck and passenger vehicle interaction, with 1 being low risk of a crash resulting from the maneuver to 5 being a high risk of a crash. Mean ratings followed a similar pattern for all of the items, with violations at the intervention sites being rated "worse," suggesting that there were systematic differences between the intervention and comparison site violations observed on the videos for the pre period. Due to these findings, all of the remaining analyses included only ratings of the intervention site video segments for both the pre and post periods. The net effect of the elimination of the video segments from the comparison sites in the pre period was a reduction in the sample size of violations entering the analysis. This in turn meant that a larger pre-to-post difference was needed for any effect to be deemed statistically significant.

After the screening process, the next step was to determine if any differences in ratings from the pre to post periods for the intervention site video segments occurred. Any differences in ratings would indicate a change in the nature of the violations that were occurring. As discussed earlier, if a difference were found, the nature of the residual violations would provide further information on the effects of the *TACT* program.

A Repeated Measures ANOVA was conducted for each survey item separately to determine if pre/post or group effects occurred in the ratings.<sup>9</sup> Ratings of the

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<sup>8</sup> Factor analysis is a statistical technique that examines the extent to which a group of questions or scales actually consists of "clusters" or "factors" measuring the same or similar things rather than as the set of discrete items scored by the raters.

<sup>9</sup> Repeated Measures ANOVA was used because each rater rated all of the video segments. Repeated Measures ANOVA considers any differences between the mean ratings of the pre and post period video

designated vehicle drivers' behaviors indicated significant improvements between the pre and post periods as follows:

- Crash Risk was rated significantly lower in the post period ( $F[1, 14] = 51.449, p < 0.001$ )
- Behavior was rated as less intentional in the post period ( $F[1, 14] = 14.099, p = 0.002$ )
- Behavior was rated as less illegal in the post period ( $F[1, 14] = 62.481, p < 0.001$ )
- Behavior was rated as less intimidating in the post period ( $F[1, 14] = 7.189, p = 0.018$ )

In addition, the summary rating question indicated that behaviors were "better" and less likely to be a deliberate violation or major error in the post period ( $F[1, 14] = 8.970, p = 0.01$ ). The question relating to whether the police should stop the driver also showed a positive effect indicating that the raters thought it was significantly less necessary for an officer to stop the designated driver in the post period ( $F[1, 14] = 24.570, p < 0.001$ ).

No significant pre/post effect was found for ratings of aggression of the driver of the designated vehicle or any of the three ratings of the semi truck drivers' behaviors. No effects were expected for the ratings of the semi truck drivers' behaviors since the video sequences were selected to demonstrate violations by vehicles interacting with the semi trucks.

Some significant between subjects effects were found as a function of rater group. Truckers rated all video segments as significantly more intimidating and aggressive than the WSP troopers and WTSC staff. Also, the WSP troopers identified significantly more drivers of the designated vehicles as needing to be stopped by a police officer than the WTSC staff. None of these findings are surprising since truckers are more likely to be sensitive to driving behaviors that are intimidating and aggressive around semi trucks, and the patrol officers are more likely to be sensitive to which vehicles a police officer should stop.

**Summary of Video Rating Results.** Overall, the video rating task was successful in identifying differences in behaviors that were likely due to the *TACT* media and enforcement campaigns. Results indicated that violations were "not as bad" in the post period as they were in the pre period, suggesting another way in which the *TACT* intervention was successful. The combination of fewer violations

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segments for each rater and takes into consideration that these ratings came from the same individual. Essentially, each rater acts as his/her own comparison, and effects can therefore be attributed to the time period when the video segments were recorded without being confounded by variability among the raters. Between groups and interaction effects are also obtained; however, these effects are not of particular interest in the present study.

and less severe residual violations indicates that the public was getting and acting on the messages the *TACT* program was publicizing. If violation rates are reduced and the residual violations are less severe, as indicated by the results, an additional safety benefit should be realized.

### ***I-5 Corridor Intercept Survey***

Examination of the videotaped violation rates and media exposure for each site individually led to the realization that one of the comparison sites, Kelso, may not have been as isolated from the *TACT* program as intended. Kelso showed a steady decline in observed violation rates similar to what would be expected at an intervention site (Table 3 in Appendix F). Reviewing the public awareness survey data suggested a possible media spillover. For example, the percentage of respondents at Kelso's driver licensing offices who said they had heard or seen any *TACT* related message increased from 19 percent in Wave 1 to a high of 28 percent in Wave 3. These findings were masked in the general analyses because many more violations were observed at the other comparison site, Spokane, than at Kelso. Spokane's larger numbers biased the combined site violation rates towards the higher levels (seen at Spokane). In turn, results of the DOL survey in Spokane showed lower levels of media exposure compared to Kelso. This served to lower the overall levels of exposure for the comparison sites when data from Kelso and Spokane were combined.

The WTSC conducted a follow-up intercept survey after the conclusion of the *TACT* program in October to explore whether to which drivers in the Kelso I-5 corridor comparison site had been exposed to the *TACT* message. Survey results from the Kelso DOL office indicated a significant increase in the number of people reporting that they had seen or heard something about safety around semi trucks. Also, violation rates, as seen on the video recorded by troopers, dropped at the Kelso site from pre to post periods even though no increased enforcement or media had intentionally been implemented in the area. The focus of the intercept survey was therefore to determine if the *TACT* message had actually penetrated into Kelso.

WTSC conducted the intercept survey at two sites, one at the Kelso rest area on the I-5 corridor in Kelso, and another at the Maytown rest area on the I-5 corridor near Lacey/Olympia. At each of these sites, the WTSC contractor surveyed 100 drivers. Drivers were asked about where their trip began and would likely end, what type of vehicle they drive, how often they drive in the Olympia area, how often they listen to Olympia/Seattle radio stations, whether or not they knew any of the *TACT* messages and if they had seen the *TACT* road signs. See Appendix C for the complete intercept survey.

Responses were analyzed to determine the extent to which people in the Kelso area indicated that they had seen or heard the *TACT* message compared with people at the Maytown rest area. It was expected that people at the Maytown rest area would be aware of the *TACT* program because the rest area was so close to Lacey/Olympia where *TACT* signs and radio messages had been deployed. The effect of interest was whether or not the possible routine movements of the Kelso



population along the I-5 corridor had exposed them to *TACT*, particularly the signs and radio messages.

**Intercept Survey Results.** Results indicated that there was a noteworthy spillover of the *TACT* message to drivers using the I-5 corridor around Kelso. Similar percentages of respondents said that they heard the *TACT* message or saw the road sign. A non-significant difference suggests that people at the Kelso and Maytown rest areas were similarly exposed to the *TACT* messages; 68 percent of the people at Kelso and 76 percent at the Maytown rest area said they saw the road sign. These results suggest that the *TACT* message reached beyond the intended target area. Kelso is 70 miles south of Lacey/Olympia and yet people were saying that they had been exposed to the *TACT* message. This intercept survey was a convenience sample of very small size intended to suggest possible explanations that could be explored in future studies.

**Implications of the Intercept Survey Findings.** There are several implications of the spillover of the *TACT* program into Kelso, a designated comparison site. From the standpoint of planning an intervention project, a lesson to be learned is that interstate interventions may have a more far reaching effect than initially considered. When the *TACT* program was devised, it seemed reasonable to assume that most Kelso drivers would be isolated from the signs 70 miles to their north. In fact, these findings suggest that mobility along the I-5 corridor may be greater than anticipated.

The effect of these findings was to suppress the magnitude of the positive shifts observed in the intervention corridors. In other words, categorizing Kelso as a comparison site when it displayed an intervention effect in the DOL survey and in violation rates made it less likely that a significant intervention/comparison difference would be detected.

**Limitations of Study.** The study design included before, during, and after public awareness data, unsafe driving observations, and law enforcement and media activity data along two intervention corridors and two comparison corridors. This is a reasonably powerful evaluation design because it tracks before and after measures while simultaneously assessing whether those changes might have occurred naturally at the comparison sites.

Analyses conducted after the *TACT* project suggested that motorists near one of the comparison sites (Kelso) may not have been completely isolated from *TACT*'s intervention activities, which is not so unusual in field demonstration projects. The 100-person intercept interview surveys conducted in October gathered information about possible spillover of the media messages in Kelso, which was 70 miles away. The intercept interview technique is a convenience sample and is not intended to be representative of Washington's driving population and further testing would be necessary to confirm the preliminary suggestions of the intercept interviews. If, however, Kelso's data were removed as one of two comparison corridors, the effect would be to increase the magnitude of *TACT*'s positive effects

in increasing motorist's awareness about leaving more space around trucks and in reducing the instances of unsafe driving around large trucks.

## **LESSONS LEARNED**

Based on the results achieved, the WTSC and its Steering Committee reviewed the process and procedures for implementing this project, and offer the following thoughts:

### **Planning Process**

The partnership with NHTSA, FMCSA (both headquarters and regional offices), and the various State and local organizations on the Steering Committee were value added and productive. Collective knowledge and collaboration were important to the success of the project. The partnership between law enforcement and the Washington Trucking Association in conducting enforcement was an unusual approach and is recommended for other States to consider.

It would have been useful to have had three years of crash data instead of the two years that were used in assessing the highest risk corridors. Even so, measuring a change in the crash statistics will be difficult because of the relatively low number of commercial vehicle and passenger vehicle crashes in the State of Washington over the course of a year. Intermediate measures are necessary.

In reviewing the length of the corridors, it would have been better to have law enforcement conduct additional enforcement trials. Had this been done, WTSC would have most likely recommended expanding the Olympia corridor further south to where the highway reduces from three lanes to two. Later observations suggest that this merging from three lanes to two, creates additional aggressive driving violations and would be an interesting situation to evaluate.

### **Communications**

Drafting a creative brief that defines the communication objective, targeted audience, desired response, and other goals was a critical first step. Following the creative brief, market research surveys were important to the success of the project as they assessed how people perceived the message. WTSC received a few complaints about the radio message because it may have suggested too close of a partnership between law enforcement and the trucking industry. Motor vehicle drivers perceive that it is the commercial vehicle drivers who are the ones who are most often at fault in collisions, while truck drivers believe it is the passenger vehicle driver. In future projects, it is suggested that that the media message more clearly define that both cars and trucks will be ticketed for not leaving enough space – a message that reflects the actual enforcement plan of *TACT*.

Competing Statewide messages may have detracted from the effectiveness of the *TACT* Campaign. More careful consideration should have been given to several other highway safety initiatives that were being conducted during the emphasis periods.

Initially, while it appeared to be a good idea linking the kickoff of the *TACT* program with the 4<sup>th</sup> of July holiday (the press event was held on Tuesday, July 5, 2005), other events during the holiday may have overshadowed its impact. The kickoff should have been conducted as a stand alone event, not linked to the holiday.

## **Enforcement Plan**

An unanticipated benefit of the *TACT* pilot project was the camaraderie that developed between members of the State and local law enforcement agencies while working together. Enforcement worked well because of good relationships between the State and local law enforcement. Even more local law enforcement agencies and officers (at least three per agency) participating during the enforcement period would have been helpful. More local Chiefs and Sheriffs on the local news stories would have helped "put a face" on the project to the community.

The WSP aviation unit played a very important role in the intervention corridors, identifying passenger and commercial vehicle violators. Participating law enforcement mentioned aircraft use as the single most effective enforcement tool during the project. For those States that can apply air patrol to the campaign, it is highly recommended.

In determining the optimal number of enforcement waves to achieve the maximum impact, a general rule would be, more is better. However, given weather conditions, competing demands on law enforcement and limited resources, it was decided that three emphasis periods would be conducted as part of this demonstration effort. These emphasis periods were to occur in April, July and September 2005. However, due to delays in production of media materials and road signs, the April wave was cancelled.

Examples of how the project could have been refined include: 1) adding an identifier on the citation form to document when aircraft identified the violator; 2) dedicating an alternate radio frequency. An entire day of enforcement was lost to competing SWAT activity; 3) varying the hours of enforcement from 6 a.m. to 2 p.m. to a more traditional rush hour schedule of 6-10 a.m. and then 3-6 p.m.; and 4) insuring that each intervention corridor has someone in authority to make decisions.

## **Evaluation Process**

As a condition of the grant award, this project included a comprehensive evaluation design that was to assess key measures of effectiveness including pre to post changes in awareness and behavior of several high risk driving behaviors.

In the final analysis of the data, it was determined that the countermeasures were perceived and recalled by a significant portion of the intended audience. There was also a measurable reduction in both violation rates and in the seriousness of the remaining violations.

Having an experienced evaluation team who can develop and implement a comprehensive evaluation design was critical to the success of the project.

### **General Comments**

In developing and implementing a high visibility enforcement project that addresses the interaction of passenger and commercial vehicles, it is essential to develop an action plan. This plan should include among other things, a detailed schedule for each emphasis period, enforcement and communication strategies and activities, an evaluation plan, and resources needed.

One example of where further planning would have been helpful was in selection of the intervention and comparison corridors. In setting up the corridors, there were a variety of problems encountered such as trying to arrange for posting of road signs at the end of the State fiscal year, interruptions with road maintenance, work zone projects and other complicating factors.

As other States conduct similar projects it is important to secure the skills and expertise of law enforcement, communication specialists, evaluators and critical State and local partners to insure success. It is also critical that sufficient resources be allocated for the program to be able to communicate the correct message to the target audience and insure the commitment of law enforcement to the program.

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## CONCLUSIONS

The evaluation results provide a consistent picture of *TACT* effectiveness. Success was demonstrated at every step of the process—messages were received and understood; knowledge was changed in the intended direction; self-reported behavior improved and observed behavior confirmed the self reports. Thus, it is reasonable to conclude that the *TACT* intervention achieved its objectives and thereby improved safety in the intervention corridors.

The *TACT* program evaluation was broad and provided evidence that the process worked at each necessary step. Because the evaluation was limited in time, however, there is little information about the likely persistence of the positive behavioral changes. The strong effectiveness of the road signs suggests that there should be a continued effect as long as they are in place. Additional drivers will see these signs that imply that enforcement continues even after the selective traffic safety project ended (regular enforcement continues). Whether this results in drivers' ignoring the message or ingraining it further cannot be determined at this time. It is an interesting research question for a future effort.

The use and effectiveness of the road signs suggests the further exploration of this medium as a highway safety countermeasure. The WTSC used these signs for *Click It or Ticket* safety belt messages with documented success. Their impact with the *TACT* message further supports their efficacy. Certainly, theory suggests that the delivery of a safety message at or near the point of behavior for a driver should enhance its benefit, especially when a message is a sign erected by the State's highway department as opposed to an advertising message. It is unknown, however, how much the relatively novel nature of the *TACT* message contributed to the positive response to the signs.

Finally, it is not known to what extent fear of a citation, i.e., general deterrence produced by the *TACT* countermeasures, contributed to the positive results. The survey finding that respondents in the intervention sites thought that law enforcement had become significantly stricter about violations around semi trucks suggests that general deterrence was created by the media and enforcement interventions. The number of citations documents that the enforcement effort was real and constant during each enforcement period.

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## REFERENCES

Agresti, A. (2002). Categorical Data Analyses. John Wiley & Sons: Hoboken, NJ.

Solomon, Mark G., Ulmer, Robert G., Preusser, David F. (2002). Evaluation of Click It or Ticket Model Programs. U.S. Department of Transportation, National Highway Traffic Safety Administration DOT HS 809 498. Washington, DC.

SPSS (2004). SPSS Advanced Statistics 13.0, SPSS Inc.: Chicago, IL.

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**APPENDIX A**  
**Media and Communications**

## RADIO TEXT

As Produced: 06/22/05  
Client: Washington Traffic Safety Commission  
Project: Truck Safety Radio  
Title: Bandit

### RADIO

#### "Bandit"

(Spoken word song a la Convoy)

Not long ago I was on I-5, well maybe it was one-oh-one,  
But it was head-to-toe in the granny lane and I was hauling about twenty-five ton

When a little roller skate with a bright red wrapper, tries to put the hammer down,  
He cuts me off and he hits the brakes and I nearly mow him down,

Now you ought to give rigs one car length for every 10 miles per hour,  
We need braking room with 18 wheels and 600 ponies of power,

If you cut us off or you ride our tail you'll surely be pressing yer luck,  
You see Smokey is a friend of mine, and the ticket is a hundred, one bucks

Well my ride along, "the man in blue" calls ahead to mama bear,  
And that little red rover, he's now pulled over, spending money like a millionaire,

Now a hundred one bucks ain't no chicken feed, but in truth it could be worse,  
It's a better price to pay than havin' to ride home in a hearse,

So when you find yourself on the road with trucks, be sure to give us plenty of  
room.

Cause extra patrols are going on now, and you might meet a bear real soon, ten-  
four.

A message from the Washington Traffic Safety Commission.

# AIR BUY DETAILS

WASHINGTON TRAFFIC SAFETY  
Safety Around Trucks  
7/4/05-9/30/05  
A18-54  
RADIO

Total reach = 1,187,100 Adults 18-54 Total frequency = 32.5 times (number of times listener heard the spot)

STATION	STATION REACH	FREQ	# OF PD SPOTS	GROSS \$ ORDERED	# OF N/C SPOTS ORD	VALUE OF N/C SPOTS ORD	# OF N/C SPOTS AIRED	VALUE OF AIRED SPOTS	WEBSITE VALUE	OTHER VALUE*	ADDED VALUE \$ AMOUNT	PROMOTION/ INTERVIEW	WEBSITE INFO
<b>Seattle - Reached 1,031,100 Adults 18-54 12.6 times</b>													
KIRO-AM	M18-34 109,300	9.9	69	278,500 \$15,100	70	\$11,375	52	\$8,450	\$3,000	\$500	\$11,950	Ran mentions during traffic updates on 7/5 @ 2p, 3p, 4p, and 6p. Have aircheck	Logo on events page 7/15-8/15 Hits-92,000/month
KMPS-FM	266,400	8.2	94	\$25,050	45	\$8,100	45	\$8,100	\$6,000	\$4,500	\$18,600	Interview with Don Riggs on Introspect Northwest show on 8/2 with Trooper Ken and Jonna. Have aircheck. Interview on Ictabod morning show 9/23 with Trooper Ken and Jonna. Have aircheck. Stubbs in midday will do website mention. Had news coverage 1-2x/week for a 3 weeks.	Banner 7/11-8/21 Hits-914,438/month
KMTT-FM	161,600	5.8	73	\$9,640	75	\$6,617	124	\$10,940		\$1,500	\$12,440	Interview with Lee Callahan in the Mountain Magazine show 7/31 at 7:30a with Jonna. Have aircheck. Done.	
KOMC-AM	86,700	8.7	80	\$14,800	80	\$10,000	79	\$9,875		\$500	\$10,375	A feature ran 7/5 on the hour 5a-12mid (excluding Mariner blackout 4p-9:30p) plus the on-air talent teased the story on live-cards. Could not get aircheck.	
KPLZ-FM	178,600	5.7	99	\$8,880	78	\$5,880	74	\$5,428	\$3,000	\$1,500	\$9,928	Interview with Kerf and Allan 9:00a 7/8. Have aircheck. Done.	Logo in STAR club section 7/7-9/30 Hits-40,000/month
KRWM-FM	169,300	7.1	78	\$12,600	26	\$5,750	26	\$5,750	\$6,000	\$1,660	\$13,430	Interview with Kate Daniels on Sunday Morning Magazine 8/2 at 11:30am, 30 mn produced show on KKNW, KWJZ, and KRWM. Also running 14x 10 Sun 6a-7p. Have aircheck. Done.	Logo on business directory page 7/11-9/30 Hits- 80,000/month
KWJZ-FM	117,000	6.4	47	\$7,960	47	\$7,960	52	\$8,840	\$3,000	\$1,260	\$13,100	Interview with Kate Daniels on Sunday Morning Magazine 8/2 at 11:30am, 30 mn produced show on KKNW, KWJZ, and KRWM. Also running 14x 10 Sun 6a-7p. Have aircheck. Done.	Banner and logo 7/6-9/30 62,000/month
<b>Bellingham - Reached 42,800 Adults 18-54 77.2 times</b>													
KAFE-FM	14,100	31.0	285	\$17,575	468	\$10,560	426	\$9,612	\$6,500		\$16,112		Banner 7/11-9/30 Hits 135,129/month
KGMI-FM	13,200	31.7	285	\$14,725	468	\$9,960	448	\$9,534	\$6,500	\$500	\$16,534	Real Life Interview with Amanda 4p-6p with Lowell Porter Thurs, 7/14, 4:10p. Can not get aircheck. Done.	Banner 7/11-9/30 Hits 146,382/month
KISM-FM	10,800	28.6	285	\$15,200	468	\$9,960	460	\$9,790	\$6,500		\$16,290		Logo on weblinks on 'cool links' 7/11-9/30 Hits 131,750/month
KWPZ-FM	5,000	28.0	259	\$14,245	259	\$14,245	180	\$9,900			\$9,900		
<b>Olympia - Reached 113,200 Adults 18-54 8.9 times</b>													
KGY-FM	1,000	19.3	280	\$8,550	280	\$8,550	418	\$12,764			\$12,764		
KXXO-FM	10,300	26.1	285	\$12,825	285	\$12,825	257	\$11,565	\$200		\$11,765	Message from WTSC during traffic report, does not know how many times they will run	Emailed Brian to make sure this ran as promised.
KFMY-FM	5,000	1.7	285	\$8,360	285	\$8,360	285	\$8,360			\$8,360		
KRXY-FM	2,700	21.4	285	\$8,835	285	\$8,835	285	\$8,835			\$8,835		
<b>TOTALS</b>			<b>2,789</b>	<b>\$194,425</b>	<b>3,219</b>	<b>\$139,007</b>	<b>3,211</b>	<b>\$137,743</b>	<b>\$40,500</b>	<b>\$12,160</b>	<b>\$190,403</b>	<b>98%</b>	<b>Percentage of bonus to paid</b>

\*OTHER VALUE = VALUE OF INTERVIEWS, PROMOTIONS, ETC.

# FREQUENCY

WASHINGTON TRAFFIC SAFETY  
Safety Around Trucks  
7/4/05-9/30/05  
A18-54  
RADIO

Frequency numbers may be higher than listed since \$0 were not figured into the overall frequency number.

Total reach = 878,840 Adults 18-54 Total frequency = 22 (number of times listener heard the spot)

STATION	# OF PD SPOTS	GROSS \$ ORDERED	# OF N/C SPOTS ORD	VALUE OF N/C SPOTS ORD	WEBSITE VALUE	OTHER VALUE*	ADDED VALUE \$ AMOUNT	
<b>Seattle - Reached 828,440 Adults 18-54 5.3 times</b>								
KIRO-AM	25	\$5,525	30	\$4,875	\$3,000		\$7,875	Yes, when they do what airs will be separate from what they contract to do, due to talent fees
KMPS-FM	40	\$10,670	15	\$2,700	\$6,000	\$4,000	\$12,700	No
KMTT-FM	52	\$7,230	46	\$4,941			\$4,941	Yes, when they do what airs will be separate from what they contract to do, due to talent fees
KOMO-AM	30	\$5,550	30	\$3,750			\$3,750	Yes, not free
KPLZ-FM	66	\$5,920	38	\$2,865	\$3,000		\$5,865	No
KRWM-FM	52	\$8,400	34	\$2,280	\$6,000	\$1,400	\$9,680	No
KWJZ-FM	35	\$5,950	35	\$5,950	\$3,000		\$8,950	No, when they do what airs will be separate from what they contract to do, due to talent fees
<b>Bellingham - Reached 36,800 Adults 18-54 35.4 times</b>								
KAFE-FM	285	\$17,575	468	\$10,560	\$6,500		\$17,060	No
KGMI-FM	285	\$14,725	468	\$9,960	\$6,500	\$500	\$16,960	No
KISM-FM	285	\$15,200	468	\$9,960	\$6,500		\$16,460	No
KWPZ-FM	259	\$14,245	259	\$14,245			\$14,245	No
<b>Olympia - Reached 13,600 Adults 18-54 25.4 times</b>								
KGY-FM	280	\$8,550	280	\$8,550			\$8,550	
KXXO-FM	285	\$12,825	285	\$12,825		\$200	\$13,025	No, but can launch audio via a banner click \$500/qr.
KFMY-FM	285	\$8,360	285	\$8,360			\$8,360	
KRXY-FM	285	\$8,835	285	\$8,835			\$8,835	Yes
<b>TOTALS</b>	<b>2,549</b>	<b>\$149,560</b>	<b>3,026</b>	<b>\$110,656</b>			<b>\$157,256</b>	

\*OTHER VALUE = VALUE OF INTERVIEWS, PROMOTIONS, ETC.

105%  
Percentage of bonus to paid

PRINT ADVERTISEMENT

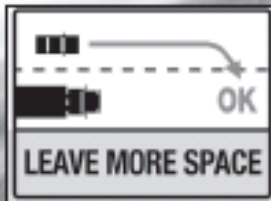
# LEAVE MORE SPACE FOR TRUCKS

Big trucks need big space to maneuver and stop in emergencies. Leaving more space for trucks will not only help save lives and reduce injuries, it could save you from getting a ticket.

Numerous government agencies are collaborating on a major law enforcement project with the goal of reducing collisions involving big trucks and smaller vehicles. State troopers will be riding in decoy semi trucks and calling ahead to other law enforcement when they see cars driving aggressively around big trucks.

Speeders, tailgaters, people who cut off semi trucks and aggressive drivers will be ticketed.

So please remember: leave big trucks big space.



## DON'T GET A TICKET

A message from the Washington Traffic Safety Commission

[www.wtsc.wa.gov](http://www.wtsc.wa.gov)

**PHOTO OF PRESS EVENT**



**LETTERS-TO-THE-EDITOR JANUARY 2006**

The Daily Olympian 12/22/05  
**Opinion**  
 4-5464

**YOUR VIEWS ■ LETTERS TO THE EDITOR**

**Truckers aren't the problem on highways**

It's hard to read letters to the editor from readers like Frank Jones regarding trucks and keep from just laughing at his exaggerations and misinformation.

It's a given some truckers do tailgate and fail to signal lane changes, but at 75 to 80 miles per hour? Let's be real. Isn't Jones stretching it a little?

Amnesty by the State Patrol for truckers? Jones must have an uncanny sense of timing since troopers jump on trucks for anything they witness. There are numerous speed limit signs pertaining to truck speed limits.

The closest state with right-lane-only laws for trucks is California, and that is not in metro areas. Washington's lane law for trucks keeps us from the left lane in three-or-more-lane sections of highway. The right lane is the most dangerous for us in metro areas due to constant exiting and entering from other vehicles.

I use the second lane from Tumwater to Everett legally and safely to avoid people who can't comprehend merging or exiting safely. Technically, the left lane is for passing only for ALL VEHICLES, not just trucks.

Jones needs to get his facts straight and not embellish his story. If the general public was as safe as 95 percent of the truckers, the highways would be a lot safer.

Bob Stewart, Lacey

The Daily Olympian  
 11/30/2005 ↷

**Why aren't truck drivers held accountable?**

So I pass by multiple highway signs on Interstate 5 every day telling me that I risk getting a ticket if I don't leave enough space when passing a truck.

I even hear jingles about it on the radio which say, "Smokey is a friend of mine."

My question is this: What is the Washington State Patrol doing to protect us four-wheelers from aggressive truckers that tailgate within a few feet of our rear bumper?

I think that the same physics are in play, with one major difference — truckers can pretty much do this with impunity as long as they do not decide to tailgate a Crown Victoria (pick your favorite color) with a searchlight on the driver's side.

Where are the added patrols to address this?

Ed Groden, Tumwater

The Daily Olympian  
 12/9/2005 ↓

**Truckers are guilty of tailgating**

I share letter writer Ed Groden's frustration with the inconsiderate drivers of 18-wheelers and the lack of response by the Washington State Patrol.

So often I have looked in my rear-view mirror to see only the grill of a big rig, too close to even get a glimpse of the windshield or wheels. Many miles may be driven before I am forced to change lanes only to see the same trucker climb up on the bumper of the car that was in front of me.

Worst of all, state troopers are sometimes in the vicinity, and not yet have I seen a truck driver stopped for it.

In hopes of a remedy, when I notice extremely rude and unsafe driving practices, I report it first to 9-1-1. After I have made that call, I contact the company the driver works for and report it to them as well. It is important to note the license plate and fleet number, as well as time and location of the occurrence. The companies have very strict guide-

TACOMA News  
 Tribune 8/2/2005

**TRUCKS**  
**Big rigs should also observe rules of the road**

Re: "Better give that 18-wheeler more room" (TNT, 7-29)

It's just as important for trucks to follow the same rules when it comes to passing passenger vehicles. In the past two days alone, I have been nearly creamed (quite literally in one case) by a milk tanker and an empty car carrier.

If a cop wants to ride with me in the mornings and evenings to keep tabs on truckers, I would be more than pleased to let him see things from my perspective.

LANCE ATCHLEY  
 Olympia

## **TELEVISION STATIONS THAT CARRIED THE STORY**

Television news coverage of the project has been extensive. There are seven commercial television stations in the project areas; they all carried the story, some of them numerous times.

Bellingham:

KVOS T.V. – three stories (all aired twice)

Seattle:

KING T.V. -- the story aired on three separate dates, a total of five times.

Northwest Cable News – one story aired twice.

KONG T.V. – one story aired two times.

KOMO T.V. -- Two stories aired a total of five times.

KIRO T.V. -- One story aired twice.

KCPQ – one story aired once.

Portland:

KATU T.V. – one story aired two times.

## **RADIO COVERAGE**

The radio news coverage was most extensive and included:

- 16 radio stations (10 of them in Seattle) aired news stories about the project.
- Extra coverage included live, on-air interviews (KMPS, KXXO, KMTT and KGMI).
- Extra coverage also included a 30-minute long public affairs program that aired on four Seattle stations (KWJZ, KKNW, KLSY, and KRWM).
- The most extensive reach of any one radio interview was an interview of Lowell Porter, WTSC Director, on satellite radio (XM radio) reaching 5 million subscribers, many of them truckers.
- Radio stations carrying the story include:
  - In Seattle: KIRO, KOMO, KMTT, KPLZ, KMPS, KIXI, KWJZ, KKNW, KLSY, and KRWM.
  - In Olympia: KGY and KXXO (both carried the story on two separate occasions).
  - In Skagit and Whatcom counties: KABS, KRBC, and KGMI radio.



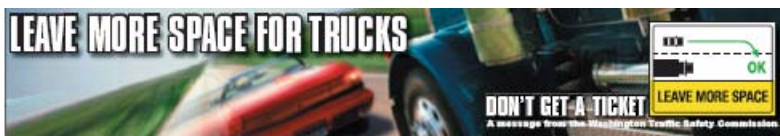
**ROAD SIGN**



**POSTERS, BANNERS, AND FLYERS**



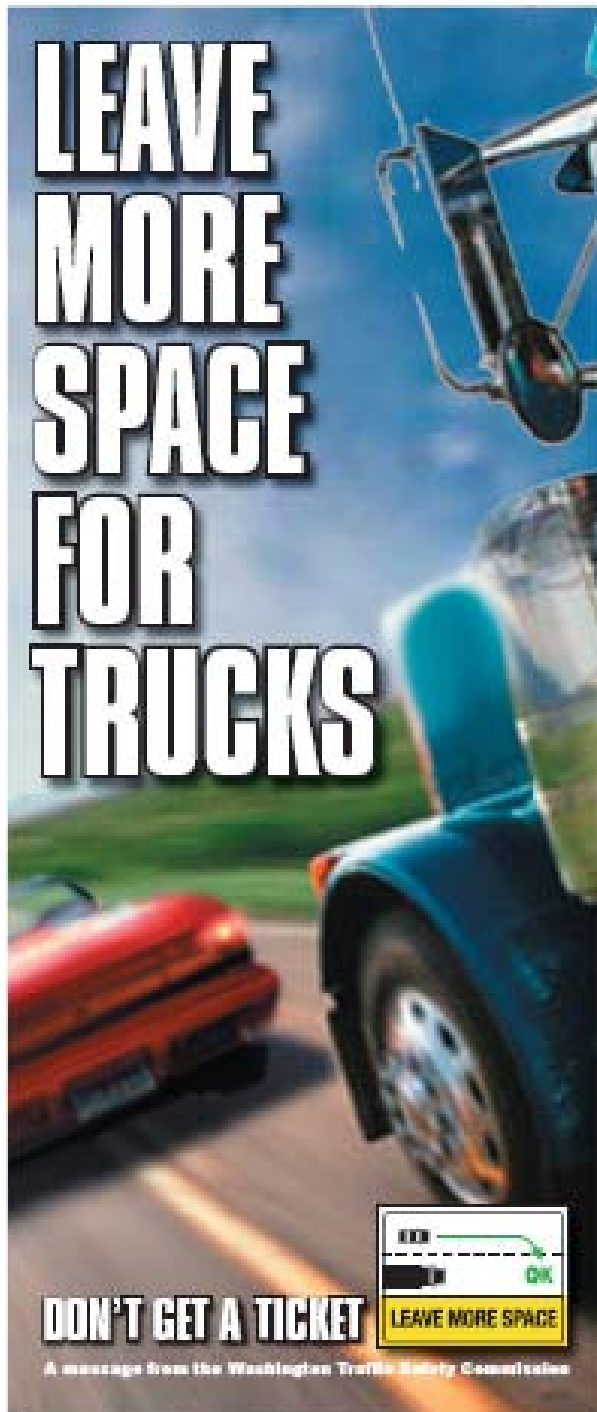
**BANNERS**




[BANNER: 5' x 30']



FLYER



# LEAVE MORE SPACE FOR TRUCKS



**DON'T GET A TICKET** LEAVE MORE SPACE

A message from the Washington Traffic Safety Commission

## THE WASHINGTON STATE TACT PROJECT

### Ticketing Aggressive Cars & Trucks

When cars and semi-trucks collide, cars get the brunt of it, no matter which vehicle is at fault. Over the last ten years, 3 out of 4 people who died in these collisions were riding in passenger cars.


Semi-trucks need at least twice the time and room to stop as cars.

Law enforcement is stopping people who drive unsafely around semi-trucks, whether the person is driving a car or a semi-truck.

#### What to do to avoid getting a ticket:

- **Don't cut off semi-trucks.** For safety, one car length for every 10 miles per hour of speed is recommended.
- **Don't tailgate.** Unlike cars, semi-trucks have big blind spots behind them. Also, car drivers who tailgate semi-trucks can't see traffic ahead. If the semi-truck brakes suddenly, you have no time to react and no place to go.
- **Don't speed.** Last year, speeding caused one out of every 4 car/semi-truck collisions in Washington.
- **Allow semi-trucks plenty of room.** Be careful when you or the semi-truck are entering a highway or merging with traffic.

For further information, contact the Washington Traffic Safety Commission at 360.753.6197



**DON'T GET A TICKET** LEAVE MORE SPACE

A message from the Washington Traffic Safety Commission

## **PRESENTATIONS**

- Whatcom County Traffic Safety Task Force Meeting (speaker: Jonna VanDyk)
- Thurston County DUI Task Force Meeting (speaker: Jonna VanDyk)
- Statewide Community Traffic Safety Task Force Coordinators (speaker: Jonna VanDyk)
- Washington State Patrol statewide meeting of public information officers (speaker: Jonna VanDyk)
- Whatcom County Sheriff and Police Chiefs meeting (speaker: Jerry Amato)
- Washington Association of Sheriffs and Police Chiefs Conference (speaker: Penny Nerup)
- Washington Trucking Associations annual conference (speaker: Jonna VanDyk)
- The Oregon Child Passenger Safety Teams Conference (speaker: Rosemary Nye)
- The Conference of Western Regional Administrators OFMCS (speaker: Jerry Amato)
- The Washington Department of Transportation statewide safety conference (speaker: Rosemary Nye)
- The Federal Highway Administration National Conference (speaker: Don Peterson)
- Washington Governor Christine Gregoire's GMAP meeting of executive cabinet directors (speaker: Steve Lind)
- The Governor's Conference on Safety and Health (speaker: Trooper Rod Sharpe)

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**APPENDIX B**  
**Citation Data**

## CITATION DATA - SUMMARY OF BOTH ENFORCEMENT WAVES

<b>Corridor</b>		
	Frequency	Percent
south corridor	1,869	39.5
north corridor	2,268	47.9
Total	4,137	87.3
MISSING	600	12.7
Total	4,737	100.0

<b>Residence</b>		
	Frequency	Percent
other States	694	14.7
western wa	1,060	22.4
eastern wa	40	0.8
Canada	597	12.6
north corridor	1,338	28.2
south corridor	1,007	21.3
Total	4,736	100.0
MISSING	1	0.0
Total	4,737	100.0

<b>Date</b>		
	Frequency	Percent
7/11/2005	140	3.0

<b>Date cont.</b>		
	Frequency	Percent
7/12/2005	206	4.3
7/13/2005	258	5.4
7/14/2005	258	5.4
7/15/2005	260	5.5
7/18/2005	210	4.4
7/19/2005	232	4.9
7/20/2005	265	5.6
7/21/2005	261	5.5
7/22/2005	222	4.7
9/19/2005	249	5.3
9/20/2005	258	5.4
9/21/2005	263	5.6
9/22/2005	238	5.0
9/23/2005	251	5.3
9/26/2005	235	5.0
9/27/2005	258	5.4
9/28/2005	266	5.6
9/29/2005	180	3.8
9/30/2005	227	4.8
Total	4,737	100.0

**Time**

	Frequency	Percent
5	29	0.6
6	546	11.5
7	790	16.7
8	666	14.1
9	631	13.3
10	444	9.4
11	371	7.8
12	577	12.2
13	542	11.4
14	60	1.3
15	13	0.3
Total	4,669	98.6
MISSING	68	1.4
Total	4,737	100.0

**Wave**

	Frequency	Percent
FIRST WAVE	2,312	48.8
SECOND WAVE	2,425	51.2
Total	4,737	100.0

**Ticket/Warning**

	Frequency	Percent
TICKET	3,422	72.2
WARNING	1,315	27.8
Total	4,737	100.0

**Marked/Unmarked**

	Frequency	Percent
MARKED	1,632	34.5
UNMARKED	1,703	36.0
UNK	1,401	29.6
MISSING	1	0.0
Total	4,737	100.0

**Commercial/Passenger**

	Frequency	Percent
COMMERCIAL	646	13.6
PASSENGER	4,079	86.1
Total	4,725	99.7
MISSING	12	0.3
Total	4,737	100.0

**Gender**

	Frequency	Percent
FEMALE	1,253	26.5
MALE	3,471	73.3
Total	4,724	99.7
MISSING	13	0.3
Total	4,737	100.0

**Age**

	Frequency	Percent
14.00	1	0.0
16.00	4	0.1
17.00	15	0.3
18.00	59	1.2
19.00	104	2.2
20.00	124	2.6
21.00	118	2.5
22.00	139	2.9
23.00	138	2.9
24.00	153	3.2
25.00	127	2.7
26.00	129	2.7
27.00	130	2.7
28.00	120	2.5
29.00	126	2.7
30.00	109	2.3
31.00	105	2.2
32.00	101	2.1
33.00	122	2.6
34.00	143	3.0
35.00	125	2.6
36.00	111	2.3
37.00	98	2.1
38.00	116	2.4
39.00	97	2.0
40.00	111	2.3
41.00	120	2.5
42.00	103	2.2
43.00	101	2.1
44.00	112	2.4
45.00	118	2.5
46.00	93	2.0
47.00	108	2.3
48.00	81	1.7
49.00	88	1.9
50.00	94	2.0
51.00	97	2.0
52.00	91	1.9
53.00	75	1.6
54.00	70	1.5



55.00	59	1.2
56.00	52	1.1
57.00	53	1.1
58.00	53	1.1
59.00	44	0.9
60.00	38	0.8
61.00	40	0.8
62.00	41	0.9
63.00	39	0.8
64.00	27	0.6
65.00	24	0.5
66.00	24	0.5
67.00	22	0.5
68.00	14	0.3
69.00	10	0.2
70.00	14	0.3
71.00	11	0.2
72.00	6	0.1
73.00	6	0.1
74.00	8	0.2
75.00	9	0.2
76.00	5	0.1
77.00	9	0.2
78.00	4	0.1
79.00	4	0.1
80.00	5	0.1
81.00	2	0.0
82.00	2	0.0
83.00	1	0.0
85.00	2	0.0
86.00	1	0.0
87.00	1	0.0
89.00	1	0.0
93.00	1	0.0
Total	4,708	99.4
MISSING	29	0.6
Total	4,737	100.0

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**APPENDIX C**  
**Public Awareness Survey Form**

*This Department of Licensing office is assisting the Washington Traffic Safety Commission in a study about highway safety in Washington. Your answers to the following questions are voluntary and anonymous. Please complete the survey and then put it in the drop box or hand it back to the agent*

---

1. Your sex:  Male  Female      2. Your Zip Code: \_\_\_\_\_
3. Your age:  Under 21  21-25  26-39  40-49  50-59  60 Plus
4. Your race:  White  Black  Asian  Native American  Other
5. Are you of Spanish/Hispanic origin?  Yes  No
6. About how many miles did you drive last year?  
 Less than 5,000  5,000 to 10,000  10,001 to 15,000  More than 15,000
7. What type of vehicle do you drive most often?  
 Passenger car  Pickup truck  Semi truck  Sport utility vehicle  Mini-van  Full-van  Other
8. How often do you use seat belts when you drive or ride in a car, van, sport utility vehicle or pick up?  
 Always  Nearly always  Sometimes  Seldom  Never
9. Have you ever driven a truck?  
 Never  A few times total  Used to drive a truck regularly  Drive trucks now
10. In the past two months, have you changed your driving behavior around trucks?  
 Yes  
    If yes, what did you change? (Check all that apply):  
     I leave more space when passing  I don't follow as closely  I stay out of the truck driver's blind spots  
     Other \_\_\_\_\_  
 No
11. How strictly do you think the Washington State Patrol enforces unsafe driving acts around trucks?  
 Very strictly  Somewhat strictly  Not very strictly  Rarely  Not at all
12. Have you ever been stopped by the police for tailgating or cutting off a semi truck?  
 Yes, I got a ticket  Yes, I got a warning  No
- For Questions 13 and 14, please answer in either feet or car lengths but not both***
13. When I pass a car on an interstate highway, I leave \_\_\_\_\_ feet or \_\_\_\_\_ car lengths before I pull back in.
14. When I pass a semi truck on an interstate highway, I leave \_\_\_\_\_ feet or \_\_\_\_\_ car lengths before I pull back in.
15. Have you recently read, seen or heard anything about giving semi trucks more space when you pass them?  
 Yes  
    If yes, where did you see or hear about it? (Check all that apply):  
     Newspaper  Radio  TV  Road sign  Brochure  Police  Billboard  Poster  Banner  
    If yes, what did it say? \_\_\_\_\_  
 No
16. Do you know the name of any programs related to safety around semi trucks in Washington? (check all that apply):  
 Share the Road  Click It or Ticket  TACT  Give Big Rigs Big Space  Leave Room When Passing

**APPENDIX D**  
**DVD Rating Instructions/DVD Rating Form**

Washington Traffic Safety Commission  
*TACT* pilot project

Instructions for DVD Raters

Thank you for agreeing to help the *TACT* pilot project by rating interactions between semi trucks and other vehicles. This rater's kit includes a DVD and a set of sheets for your responses. Please keep them together and return them as a unit when you are done.

The DVD contains 99 scenes of interactions between a **designated vehicle**, marked by a yellow arrow (←) at the opening of the scene, and a semi truck (tractor-trailer, pole truck, tanker truck, etc.) in front of the camera car. **Please note that the designated vehicle may be any vehicle type including a semi truck.** Therefore, you may be rating a semi truck as the **designated vehicle** interacting with another semi truck.

The DVD menus have scenes numbered from 1 to 99 in groups of 25, and this book contains a separate numbered sheet for each scene. There are also several blank response sheets at the back of the book that you can use if one of the response forms is missing or damaged. In this case, please be sure to write your rater number (from the front of the book) and the scene number you are rating at the top of the blank form.

Please rate the scenes in numerical order from 1 to 99. You may start and stop rating as many times as you want, but **please do not confer with anyone about your ratings.** A few Post-It notes have been included in the book for you to use as place markers when you take breaks.

Inserting the DVD will take you to the main menu. It contains four choices—Scenes 1-25, Scenes 26-50, Scenes 51-75 and Scenes 76-99. Clicking on one of these choices will open another menu with the individual scene numbers and a choice to return to the Main Menu.

To play a scene, just click on the number of the scene (with the mouse if you're using a computer or the remote if it's a DVD player) and the scene will start. At the end of the scene, you will be returned to the sub-menu that includes that scene number. **It is OK to watch a scene more than once.** However, once you complete rating a scene, move on to the next highest numbered scene. **Do not go back and re-rate an earlier scene.**

The response form is the same for each scene and consists of 10 items. The first seven items relate to the behavior of the driver of the **designated vehicle** (the vehicle identified with the yellow arrow). The last three items address the behavior of the driver of the semi truck.

In items 1-4, please circle the number on each dimension that best indicates how close your assessment is to the concepts at each end of the five-point scale. For example, if you were asked how much you liked chocolate ice cream and you liked it, but it is not your favorite, you might select a "4" on the following scale and circle it as follows:

Hate it                      1      2      3      ④      5      Love it

The four dimensions in the scales in questions 1-4 are:

- Low crash risk/High crash risk – What is the likelihood that the behavior of the driver of the **designated vehicle** could result in a crash between his vehicle and the semi truck, or among any other vehicles in the scene?

- Unintentional/Intentional – To what extent did the driver of the **designated vehicle** plan to act as shown, or were his behaviors forced by some outside factor (i.e. by other drivers, roadway design, etc.)?
- Legal/Illegal – To what extent was the behavior of the driver of the **designated vehicle** legal or illegal?
- Defensive/Intimidating – To what extent was the driver of the **designated vehicle** acting in a defensive/self-protective or intimidating manner?

For Questions 5, 6 and 7, please mark an “X” or a ✓ for the **one** category that best expresses your opinion with respect to the driver of the **designated vehicle** after you view the scene.

For Questions 8, 9 and 10, please mark an “X” or a ✓ for the **one** category that best expresses your opinion with respect to the driver of the **semi truck** after you view the scene.

**There are no wrong or right answers.** We want your impressions based on the information that is available in the scenes. We know that some of them may be hard to see because of weather, lighting or the camera angle. Please do your best. We would prefer that you provided a rating on each item for each scene and did not leave anything blank. Just give your best impression from the available information.

If you have any additional comments on a scene, please write them directly on the form or on the back if you need extra room.

When you have completed your ratings of the 99 scenes, please return the entire rating package to:

Dr. Philip Salzberg  
 Research Director  
 Washington Traffic Safety Commission  
 1000 S. Cherry Street  
 P.O. Box 40944  
 Olympia, WA 98504

We would appreciate receiving your ratings by January 4, 2006.

**Many Thanks!**

## Before Starting

Please check which group of raters you are affiliated with:

Washington Patrol \_\_\_\_\_

Trucking Association \_\_\_\_\_

WTSC \_\_\_\_\_



## DVD Rating Form

Rater #1

Scene 1

In this section you will be evaluating the behavior of the **designated vehicle's** driver.

Circle the number between each word pair that you believe best describes the behavior of the designated vehicle's driver.

- |                   |   |   |   |   |   |                 |
|-------------------|---|---|---|---|---|-----------------|
| 1. Low crash risk | 1 | 2 | 3 | 4 | 5 | High crash risk |
| 2. Unintentional  | 1 | 2 | 3 | 4 | 5 | Intentional     |
| 3. Legal          | 1 | 2 | 3 | 4 | 5 | Illegal         |
| 4. Defensive      | 1 | 2 | 3 | 4 | 5 | Intimidating    |

**5. Which of the following best summarizes the behavior of the designated vehicle's driver? Select one.**

Not a problem \_\_\_\_\_

Suffered a lapse; a minor attention or vehicle handling problem \_\_\_\_\_

Committed an error; a failure of planned action to achieve an intended outcome \_\_\_\_\_

Committed a violation; deliberately performed unsafe/illegal driving behavior \_\_\_\_\_

**6. Would you characterize the designated vehicle's driver as aggressive? Select one.**

Definitely \_\_\_\_\_ Probably \_\_\_\_\_ Probably not \_\_\_\_\_ Definitely not \_\_\_\_\_

**7. Should a police officer stop the designated vehicle's driver? Select one.** Yes \_\_\_\_\_ No \_\_\_\_\_

In this section you will be evaluating the behavior of the **semi truck's** driver.

**8. Which of the following best summarizes the behavior of the semi truck's driver? Select one.**

Not a problem \_\_\_\_\_

Suffered a lapse; a minor attention or vehicle handling problem \_\_\_\_\_

Committed an error; a failure of planned action to achieve an intended outcome \_\_\_\_\_

Committed a violation; deliberately performed unsafe/illegal driving behavior \_\_\_\_\_

**9. Would you characterize the semi truck's driver as aggressive? Select one.**

Definitely \_\_\_\_\_ Probably \_\_\_\_\_ Probably not \_\_\_\_\_ Definitely not \_\_\_\_\_

**10. Should a police officer stop the semi truck that was involved? Select one.** Yes \_\_\_\_\_ No \_\_\_\_\_

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**APPENDIX E**  
**Intercept Interview Survey**

## TACT Rest Area Intercept Survey

### Sampling

- Kelso rest area (comparison corridor #1) for southbound traffic at approx milepost 54 (Toutle River rest area).
- Maytown rest area (near intervention corridor #2) for southbound traffic at approx milepost 91.
- Sample 100 **Southbound** drivers at each location.

### Recruiter Questions

- Are you a licensed driver? **If not, terminate the recruitment.**
- Are you a Washington resident? **If not, terminate the recruitment.**
- What type of vehicle do you drive most often on I-5? **If large truck, terminate the recruitment.**

### Survey Questions

- Standard opening identifying WTSC and purpose of the survey

#### **Read all response options except where noted**

1. In what city do you live? \_\_\_\_\_
2. Where did you start your trip on I-5 that brought you to this rest area? \_\_\_\_\_
3. Where do you plan to exit I-5 on this trip? \_\_\_\_\_
4. How often do you drive on I-5 in the Olympia area?  
Daily \_\_\_ Weekly \_\_\_ Monthly \_\_\_ Other (*Specify*) \_\_\_\_\_
5. What type of vehicle are you driving today?  
Car \_\_\_ Pickup \_\_\_ SUV \_\_\_ Van \_\_\_ Large truck \_\_\_ Other \_\_\_\_\_
6. How often do you watch Seattle TV stations? \_\_\_\_\_
7. How often do you listen to radio stations from Olympia/Seattle? \_\_\_\_\_
8. Since last summer, would you say the Washington State Patrol enforcement of speeding on I-5 is:  
Less \_\_\_ About the same \_\_\_ Greater \_\_\_
9. Since last summer, would you say the State Patrol's enforcement of driving violations around semi-trucks (such as not leaving enough room when you pass) is:  
Less \_\_\_ About the same \_\_\_ Greater \_\_\_

10. Have you seen or heard any of these messages on radio or TV since last summer:

- a. "Give big rigs more space" Yes \_\_\_ No \_\_\_
- b. "Tickets are 101 bucks for cutting off a truck" Yes \_\_\_ No \_\_\_
- c. "There are extra troopers out enforcing the rules around trucks" Yes \_\_\_ No \_\_\_

11. Have you seen this road sign? (**Show picture of sign**) Yes \_\_\_ No \_\_\_

**If Yes:**

12. Where did you see it? (**Do not read responses**)

I-5 in Olympia area \_\_\_ I-5 in Bellingham / Mt. Vernon area \_\_\_

On the side of a truck/trailer \_\_\_\_\_

Other (*specify*) \_\_\_\_\_

13. How many times have you seen the sign in the last 3 months? \_\_\_\_\_

**(Estimate, do not ask)**

• Male \_\_\_ Female \_\_\_

Age Under 21 \_\_\_ 21-39 \_\_\_ 40-59 \_\_\_ 60 Plus \_\_\_

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**APPENDIX F**  
**Video Coding Data – Observed Violations**

**Table 1. Officer observed violations per hour of video record at intervention (Bellingham and Lacey) and comparison (Kelso and Spokane) sites.**

		Wave					
Site		1	2	3	4	5	Total
Bellingham	Hours Video <sup>1</sup>	6:53:27	7:10:23	7:01:26	7:05:32	6:59:30	35:10:18
	Violations <sup>2</sup>	69	39	41	14	25	188
	Violations/Hour <sup>3</sup>	10.01	5.44	5.84	1.97	3.58	5.35
Lacey	Hours Video	7:34:57	7:24:49	4:55:20	8:06:03	7:24:22	35:25:31
	Violations	15	20	7	9	16	67
	Violations/Hour	1.98	2.70	1.42	1.11	2.16	1.89
<b>Intervention</b>	Hours	14:28:24	14:35:12	11:56:46	15:11:35	14:23:52	70:35:49
	Violations	84	59	48	23	41	255
	Violations/Hour	5.80	4.04	4.02	1.51	2.85	3.61
Kelso	Hours Video	7:23:49	7:29:02	7:18:10	6:37:03	7:16:24	36:04:28
	Violations	24	11	9	6	4	54
	Violations/Hour	3.24	1.47	1.23	0.91	0.55	1.50
Spokane	Hours Video	8:00:00	7:33:32	7:02:46	7:32:14	7:04:14	37:12:46
	Violations	38	43	45	58	51	235
	Violations/Hour	4.75	5.69	6.39	7.70	7.21	6.32
<b>Comparison</b>	Hours	15:23:49	15:02:34	14:20:56	14:09:17	14:20:38	73:17:14
	Violations	62	54	54	64	55	289
	Violations/Hour	4.03	3.59	3.76	4.52	3.83	3.94

<sup>1</sup>Hours Video = Total amount of video record for each wave at each site (hours:minutes:seconds)

<sup>2</sup>Violations = Number of possible violations indicated by officer in video record for each wave at each site

<sup>3</sup>Violations/Hour = Violations per hour of video record for each wave at each site (Violations divided by Hours Video)



**Table 2. Officer observed possible violation types in video record (as stated by officer appearing in video record) at intervention and comparison sites.**

			Wave					Total
			One	Two	Three	Four	Five	
Bellingham	Speed	Count	66	29	39	12	21	167
		Column N %	95.7%	74.4%	95.1%	85.7%	84.0%	88.8%
	Improper lane change	Count	1	0	0	0	0	1
		Column N %	1.4%	.0%	.0%	.0%	.0%	.5%
	Fail to signal	Count	0	7	1	2	2	12
		Column N %	.0%	17.9%	2.4%	14.3%	8.0%	6.4%
	Follow too close	Count	2	0	1	0	1	4
		Column N %	2.9%	.0%	2.4%	.0%	4.0%	2.1%
	Reckless driving	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Negligent driving 2nd degree	Count	0	3	0	0	1	4
		Column N %	.0%	7.7%	.0%	.0%	4.0%	2.1%
	Other	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	3rd lane	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Unknown	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Total	Count	69	39	41	14	25	188
		Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Lacey	Speed	Count	1	0	0	2	3	6
		Column N %	6.7%	.0%	.0%	22.2%	18.8%	9.0%
	Improper lane change	Count	10	11	5	6	5	37
		Column N %	66.7%	55.0%	71.4%	66.7%	31.3%	55.2%
	Fail to signal	Count	0	0	0	0	2	2
		Column N %	.0%	.0%	.0%	.0%	12.5%	3.0%
	Follow too close	Count	1	9	1	1	3	15
		Column N %	6.7%	45.0%	14.3%	11.1%	18.8%	22.4%
	Reckless driving	Count	2	0	1	0	1	4
		Column N %	13.3%	.0%	14.3%	.0%	6.3%	6.0%
	Negligent driving 2nd degree	Count	0	0	0	0	1	1
		Column N %	.0%	.0%	.0%	.0%	6.3%	1.5%
	Other	Count	1	0	0	0	0	1
		Column N %	6.7%	.0%	.0%	.0%	.0%	1.5%
	3rd lane	Count	0	0	0	0	1	1
		Column N %	.0%	.0%	.0%	.0%	6.3%	1.5%
	Unknown	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Total	Count	15	20	7	9	16	67
		Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Intervention	Speed	Count	67	29	39	14	24	173
		Column N %	79.8%	49.2%	81.3%	60.9%	58.5%	67.8%
	Improper lane change	Count	11	11	5	6	5	38
		Column N %	13.1%	18.6%	10.4%	26.1%	12.2%	14.9%
	Fail to signal	Count	0	7	1	2	4	14
		Column N %	.0%	11.9%	2.1%	8.7%	9.8%	5.5%
	Follow too close	Count	3	9	2	1	4	19
		Column N %	3.6%	15.3%	4.2%	4.3%	9.8%	7.5%
	Reckless driving	Count	2	0	1	0	1	4

		Wave						
		One	Two	Three	Four	Five	Total	
	Negligent driving 2nd degree	Column N %	2.4%	.0%	2.1%	.0%	2.4%	1.6%
		Count	0	3	0	0	2	5
	Other	Column N %	.0%	5.1%	.0%	.0%	4.9%	2.0%
		Count	1	0	0	0	0	1
	3rd lane	Column N %	1.2%	.0%	.0%	.0%	.0%	.4%
		Count	0	0	0	0	1	1
	Unknown	Column N %	.0%	.0%	.0%	.0%	2.4%	.4%
		Count	0	0	0	0	0	0
	Total	Column N %	.0%	.0%	.0%	.0%	.0%	.0%
		Count	84	59	48	23	41	255
		Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	
Kelso	Speed	Count	3	3	3	4	2	15
		Column N %	12.5%	27.3%	33.3%	66.7%	50.0%	27.8%
	Improper lane change	Count	5	4	1	1	0	11
		Column N %	20.8%	36.4%	11.1%	16.7%	.0%	20.4%
	Fail to signal	Count	4	0	1	0	1	6
		Column N %	16.7%	.0%	11.1%	.0%	25.0%	11.1%
	Follow too close	Count	9	2	3	1	0	15
		Column N %	37.5%	18.2%	33.3%	16.7%	.0%	27.8%
	Reckless driving	Count	0	1	0	0	0	1
		Column N %	.0%	9.1%	.0%	.0%	.0%	1.9%
	Negligent driving 2nd degree	Count	0	0	1	0	1	2
		Column N %	.0%	.0%	11.1%	.0%	25.0%	3.7%
	Other	Count	1	1	0	0	0	2
		Column N %	4.2%	9.1%	.0%	.0%	.0%	3.7%
	3rd lane	Count	2	0	0	0	0	2
		Column N %	8.3%	.0%	.0%	.0%	.0%	3.7%
	Unknown	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Total	Count	24	11	9	6	4	54
		Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Spokane	Speed	Count	23	19	20	34	21	117
		Column N %	60.5%	44.2%	44.4%	58.6%	41.2%	49.8%
	Improper lane change	Count	4	5	4	2	6	21
		Column N %	10.5%	11.6%	8.9%	3.4%	11.8%	8.9%
	Fail to signal	Count	6	13	15	15	14	63
		Column N %	15.8%	30.2%	33.3%	25.9%	27.5%	26.8%
	Follow too close	Count	4	6	4	3	8	25
		Column N %	10.5%	14.0%	8.9%	5.2%	15.7%	10.6%
	Reckless driving	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Negligent driving 2nd degree	Count	1	0	0	1	0	2
		Column N %	2.6%	.0%	.0%	1.7%	.0%	.9%
	Other	Count	0	0	2	3	2	7
		Column N %	.0%	.0%	4.4%	5.2%	3.9%	3.0%
	3rd lane	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Unknown	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Total	Count	38	43	45	58	51	235
		Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Comparison	Speed	Count	26	22	23	38	23	132

		Wave							
		One	Two	Three	Four	Five	Total		
Total	Improper lane change	Column N %	41.9%	40.7%	42.6%	59.4%	41.8%	45.7%	
		Count	9	9	5	3	6	32	
		Column N %	14.5%	16.7%	9.3%	4.7%	10.9%	11.1%	
		Fail to signal	Count	10	13	16	15	15	69
			Column N %	16.1%	24.1%	29.6%	23.4%	27.3%	23.9%
		Follow too close	Count	13	8	7	4	8	40
			Column N %	21.0%	14.8%	13.0%	6.3%	14.5%	13.8%
		Reckless driving	Count	0	1	0	0	0	1
			Column N %	.0%	1.9%	.0%	.0%	.0%	.3%
		Negligent driving 2nd degree	Count	1	0	1	1	1	4
			Column N %	1.6%	.0%	1.9%	1.6%	1.8%	1.4%
		Other	Count	1	1	2	3	2	9
			Column N %	1.6%	1.9%	3.7%	4.7%	3.6%	3.1%
		3rd lane	Count	2	0	0	0	0	2
			Column N %	3.2%	.0%	.0%	.0%	.0%	.7%
		Unknown	Count	0	0	0	0	0	0
			Column N %	.0%	.0%	.0%	.0%	.0%	.0%
		Total	Count	62	54	54	64	55	289
			Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Speed	Count	93	51	62	52	47	305
			Column N %	63.7%	45.1%	60.8%	59.8%	49.0%	56.1%
		Improper lane change	Count	20	20	10	9	11	70
			Column N %	13.7%	17.7%	9.8%	10.3%	11.5%	12.9%
		Fail to signal	Count	10	20	17	17	19	83
			Column N %	6.8%	17.7%	16.7%	19.5%	19.8%	15.3%
		Follow too close	Count	16	17	9	5	12	59
			Column N %	11.0%	15.0%	8.8%	5.7%	12.5%	10.8%
		Reckless driving	Count	2	1	1	0	1	5
			Column N %	1.4%	.9%	1.0%	.0%	1.0%	.9%
		Negligent driving 2nd degree	Count	1	3	1	1	3	9
		Column N %	.7%	2.7%	1.0%	1.1%	3.1%	1.7%	
	Other	Count	2	1	2	3	2	10	
		Column N %	1.4%	.9%	2.0%	3.4%	2.1%	1.8%	
	3rd lane	Count	2	0	0	0	1	3	
		Column N %	1.4%	.0%	.0%	.0%	1.0%	.6%	
	Unknown	Count	0	0	0	0	0	0	
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%	
	Total	Count	146	113	102	87	96	544	
		Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

**Table 3. Possible officer actions that would be taken against vehicle committing violation in video record (as stated by officer appearing in video) at intervention and comparison sites.\***

			Wave					Total
			One	Two	Three	Four	Five	
Bellingham	Unsafe/illegal/undesirable but would not stop	Count	8	0	0	0	0	8
		Column N %	12.1%	.0%	.0%	.0%	.0%	5.6%
	Warning	Count	27	6	0	2	1	36
		Column N %	40.9%	23.1%	.0%	33.3%	11.1%	25.2%
	Ticket	Count	31	20	36	4	8	99
		Column N %	47.0%	76.9%	100.0%	66.7%	88.9%	69.2%
Total	Count	66	26	36	6	9	143	
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Lacey	Unsafe/illegal/undesirable but would not stop	Count	0	0	0	0	0	0
		Column N %	.0%	.0%	.0%	.0%	.0%	.0%
	Warning	Count	4	0	3	0	2	9
		Column N %	33.3%	.0%	42.9%	.0%	28.6%	30.0%
	Ticket	Count	8	4	4	0	5	21
		Column N %	66.7%	100.0%	57.1%	.0%	71.4%	70.0%
Total	Count	12	4	7	0	7	30	
	Column N %	100.0%	100.0%	100.0%	.0%	100.0%	100.0%	
Subtotal	Unsafe/illegal/undesirable but would not stop	Count	8	0	0	0	0	8
		Column N %	10.3%	.0%	.0%	.0%	.0%	4.6%
	Warning	Count	31	6	3	2	3	45
		Column N %	39.7%	20.0%	7.0%	33.3%	18.8%	26.0%
	Ticket	Count	39	24	40	4	13	120
		Column N %	50.0%	80.0%	93.0%	66.7%	81.3%	69.4%
Total	Count	78	30	43	6	16	173	
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Kelso	Unsafe/illegal/undesirable but would not stop	Count	0	0	0	0	1	1
		Column N %	.0%	.0%	.0%	.0%	33.3%	4.8%
	Warning	Count	4	0	0	1	0	5
		Column N %	36.4%	.0%	.0%	50.0%	.0%	23.8%
	Ticket	Count	7	2	3	1	2	15
		Column N %	63.6%	100.0%	100.0%	50.0%	66.7%	71.4%
Total	Count	11	2	3	2	3	21	
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Spokane	Unsafe/illegal/undesirable but would not stop	Count	14	13	12	31	23	93
		Column N %	38.9%	31.0%	28.6%	58.5%	47.9%	42.1%
	Warning	Count	5	11	6	5	8	35
		Column N %	13.9%	26.2%	14.3%	9.4%	16.7%	15.8%
	Ticket	Count	17	18	24	17	17	93
		Column N %	47.2%	42.9%	57.1%	32.1%	35.4%	42.1%
Total	Count	36	42	42	53	48	221	
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Subtotal	Unsafe/illegal/undesirable but would not stop	Count	14	13	12	31	24	94
		Column N %	29.8%	29.5%	26.7%	56.4%	47.1%	38.8%
	Warning	Count	9	11	6	6	8	40
		Column N %	19.1%	25.0%	13.3%	10.9%	15.7%	16.5%
	Ticket	Count	24	20	27	18	19	108
		Column N %	51.1%	45.5%	60.0%	32.7%	37.3%	44.6%
Total	Count	47	44	45	55	51	242	
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Total	Unsafe/illegal/undesirable but	Count	22	13	12	31	24	102

		Wave					
		One	Two	Three	Four	Five	Total
would not stop	Column N %	17.6%	17.6%	13.6%	50.8%	35.8%	24.6%
Warning	Count	40	17	9	8	11	85
	Column N %	32.0%	23.0%	10.2%	13.1%	16.4%	20.5%
Ticket	Count	63	44	67	22	32	228
	Column N %	50.4%	59.5%	76.1%	36.1%	47.8%	54.9%
Total	Count	125	74	88	61	67	415
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

\*Counts of officer actions against violating vehicles in Table 3 may differ from counts of officer observed violations in Table 2. This is due to the fact that sometimes officers would not indicate what action they would take against a violator, rather they would just state that a violation occurred (i.e. "That car just cut that truck off").

**Table 4. Events coded per hour of video record at intervention and comparison sites.\***

Site		Wave					Total
		1	2	3	4	5	
Bellingham	Hours Video <sup>1</sup>	6:53:27	7:10:23	7:01:26	7:05:32	6:59:30	35:10:18
	Events <sup>2</sup>	153	94	106	114	103	570
	Events/Hour <sup>3</sup>	22.20	13.10	15.09	16.07	14.73	16.21
Lacey	Hours Video	7:34:57	7:24:49	4:55:20	8:06:03	7:24:22	35:25:31
	Events	91	64	38	35	55	283
	Events/Hour	12.00	8.63	7.72	4.32	7.43	7.99
<b>Intervention</b>	Hours Video	14:28:24	14:35:12	11:56:46	15:11:35	14:23:52	70:35:49
	Events	244	158	144	149	158	853
	Events/Hour	16.86	10.83	12.05	9.81	10.97	12.08
Kelso	Hours Video	7:23:49	7:29:02	7:18:10	6:37:03	7:16:24	36:04:28
	Events	81	44	68	48	60	301
	Events/Hour	10.95	5.88	9.31	7.25	8.25	8.34
Spokane	Hours Video	8:00:00	7:33:32	7:02:46	7:32:14	7:04:14	37:12:46
	Events	137	138	113	135	166	689
	Events/Hour	17.13	18.26	16.04	17.91	23.48	18.52
<b>Comparison</b>	Hours Video	15:23:49	15:02:34	14:20:56	14:09:17	14:20:38	73:17:14
	Events	218	182	181	183	226	990
	Events/Hour	14.16	12.10	12.61	12.93	15.76	13.51

<sup>1</sup> Hours Video = Total amount of video record for each wave at each site (hours:minutes:seconds)

<sup>2</sup> Events = Number of events coded for each wave at each site

<sup>3</sup> Events/Hour = Events coded per hour of video record for each wave at each site (Events divided by Hours Video)

\* This table does not represent a count of the number of vehicles that actually appeared in the video record for each wave and site, and should **not** be taken as a count of traffic volume. The majority of vehicles in the video record did not commit a violation near a semi truck or cross paths with a semi truck. Under the coding rules of the study, these video segments were not coded. The numbers presented here only represent those vehicles that committed a violation (i.e. speeding, cutting-off truck, tailgating) near a semi truck, or crossed paths with a semi truck. The values in this table could be affected by a reduction in speeding and tailgating. A reduction in these types of violations would lead to fewer events being coded because these types of violations do not involve crossing paths with a truck, rather a reduction would lead to more vehicles simply passing semi trucks without committing a violation. For example: a vehicle that was speeding in the immediate vicinity of a semi truck in Wave 1 would have been coded as an event even if it did not cross paths with the truck. This same vehicle, now obeying the law and not speeding and not crossing paths with a truck, would not be coded as an event in subsequent waves. In this case there would be a reduction in the events coded but not in the actual traffic volume.

**APPENDIX G**  
**Evaluation Analysis Models**

## **Statistical Model Selection – Poisson Regression**

The use of Poisson regression to analyze changes in violations as a function of site and time was based on both structural and distributional considerations. The violation data can be viewed as an array in which the counts are cross-tabulated by site and wave.

Since the first wave represents the pre-intervention period, the wave dimension of the array can be collapsed into a binary pre vs. post factor. A variety of log linear models are available for analyzing these types of data but when the cell entries are simple counts and the probability of a violation at any given time and place is low, the probability distribution of the data can usually be closely approximated by the Poisson. Using a Poisson regression log link procedure described in Agresti (2002) and SPSS, the magnitude and statistical significance of the association between period (e.g., pre vs. post wave), site (intervention v. comparison) and their interaction (e.g., site x period) were computed. The resultant parameter estimates are in the form of regression coefficients and odds ratios for the main and interaction effects of site, period and site x period interaction.

The approach also utilizes an “offset” procedure to adjust for the effects of exposure. In the present analysis, this resulted in weighting the violation counts by hours of exposure, thereby transforming the raw counts into rates. Without this adjustment, any differences in the cell counts could be attributed to difference in number of observational hours.

The variance component of central interest in the analysis is the site x period interaction. This interaction tests whether the differences between the intervention and comparison sites are different than would be expected based on the differences in the pre-period.

## **Statistical Model Selection – Repeated Measures Analysis**

These analyses were designed to evaluate qualitative differences in mean scores on several behavioral dimensions measured prior and following the interventions. The factors were period (pre vs. post) and the background of the rater (rater group). The analyses involved three sources of variance: main effect of period, main effect of rater type and rater x period interaction. Since the ratings in the pre and post period involved the same raters, the analysis was formulated as a mixed model involving a within subjects repeated measures factor (the individual raters) and a between groups factor (rater background). By comparing pre vs. post scores within raters, the design controls for differences in rater scoring tendencies and rater bias. At the same time, the inclusion of a rating group factor permitted an evaluation of rater background and rater x period interaction.

The model is considered mixed since the error terms for the variance components are different. The period and period x group interaction components are within subject factors whereas group is a between-subject factor. The precision (mean square error) for measuring the within subjects factor is much higher than the between subjects factor as evidenced by the difference in their mean square errors.

Repeated measures and multivariate analysis of variance design make certain assumptions (sphericity) regarding the distribution of the variance-covariance matrices. There was no evidence that the sphericity assumptions were violated as evidenced by the Greehouse-Geisser and Huynh-Feld tests.











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