



A GUIDE FOR PLANNING AND MANAGING THE EVALUATION OF A TACT PROGRAM



U.S. Department of Transportation
Federal Motor Carrier Safety Administration



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INTRODUCTION

The Federal Motor Carrier Safety Administration (FMCSA) is committed to reducing crashes caused by the unsafe interaction of passenger vehicles (PVs) with commercial motor vehicles (CMVs). One goal of FMCSA's safety program is to have drivers of PVs share the road more safely with CMVs. In order to achieve this goal, FMCSA, together with the National Highway Traffic Safety Administration (NHTSA), funded a pilot project for a Selective Traffic Enforcement Program (STEP) named *Ticketing Aggressive Cars and Trucks* (TACT).



A STEP program combines intensive, high-visibility enforcement of a specific traffic law with extensive communication, education and outreach intended to inform the public about the ongoing enforcement. Such a program can produce a *general deterrence* effect that reduces the prevalence of unsafe behaviors. A widespread STEP project that is familiar to most people is NHTSA's *Click It or Ticket* campaign that is used to convince people to wear their seat belts.

TACT was initially developed, pilot tested and evaluated in the State of Washington.¹ Based on the success of the Washington TACT pilot project, FMCSA is expanding TACT to other States. The goals are to further refine the techniques used and to obtain additional evidence to support promoting TACT as a productive STEP for nationwide implementation. FMCSA has published guidelines to assist States in developing a TACT Program.²

¹ For more information on the Washington TACT Project, see Penny Nerup, Phil Salzberg, Jonna VanDyk, Lowell Porter, Richard Blomberg, F. Dennis Thomas, and Linda Cosgrove, *Ticketing Aggressive Cars and Trucks in Washington State: High-Visibility Enforcement Applied to Share the Road Safely*, Final Report, DOT HS 810 603, May 2006.

² Federal Motor Carrier Safety Administration, *Guidelines for Developing a High-Visibility Enforcement Campaign to Reduce Unsafe Driving Behaviors among Drivers of Passenger and Commercial Motor Vehicles: A Selective Traffic Enforcement Program (STEP) Based on the Ticketing Aggressive Cars and Trucks (TACT) Pilot Project*, DOT HS 810 851, October 2007.

Purpose of this Guide

This Guide provides information on how to ensure that a TACT Program contains an effective and efficient evaluation component. It is **not** a textbook or manual on evaluation techniques. Rather, it is a primer for project managers on the importance of including an appropriate level of evaluation in a TACT project and the different ways that evaluation support can be obtained. After reading this Guide, a TACT project manager should understand and appreciate the need to acquire effective evaluation services, the types of activities a TACT evaluation should include and the characteristics of a productive and supportive evaluation component.

Before addressing the notion of what constitutes an appropriate, effective and efficient evaluation, it is important to understand the STEP model and how TACT follows it.

The STEP Model

Highway safety depends on people behaving appropriately when they are on the road. The vehicle and traffic law and local, State, and Federal regulations delineate those behaviors that have been shown to be desirable for safety and prohibit others that are known to increase the risk of a crash or the severity of injury when a crash occurs. Research has shown that enforcement of traffic laws can be an effective way to promote good driving behavior. Even when people know what they should do, many will not comply unless the **perceived risk** of a sanction is sufficiently high. When drivers behave in a safe manner because they believe the risk of being stopped and ticketed for a violation is significant, **general deterrence** has been achieved.



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The reality is that routine enforcement sometimes cannot achieve general deterrence of unsafe driving acts simply because there are not enough law enforcement personnel engaged in traffic patrols. This results in an enforcement presence that is not sufficiently visible to cause people to believe that the risk of a ticket is high if they violate. This is where the STEP approach comes in. By combining high-visibility enforcement with extensive paid and earned media³ **about the enforcement**, a significant increase in a driver's perceived risk of a ticket for a specific violation can be generated. This, in turn, creates the desired general deterrence of unsafe behaviors and improves safety.

The Washington State TACT Project

The Washington State TACT project successfully followed the STEP model. Several “blitzes” of enforcement, focused on two intervention corridors, were combined with paid media, including radio, innovative road signs and wrapped trucks, and extensive earned media coverage through TV, radio, and newspapers. The high-visibility enforcement, even though only mounted for several weeks, gave credibility to the media message that police were aggressively giving tickets to drivers who failed to leave enough space when pulling in after passing a CMV. The increased enforcement and extensive media together convincingly conveyed the impression that the enforcement was pervasive and that the chance of getting a ticket was greatly increased.



The success of the Washington State TACT project was documented by its evaluation component. While evaluation is traditionally thought of only as a project's “report card,” an appropriate evaluation includes much more and supports a STEP project from inception to conclusion.

³ Earned media is free, positive publicity for a TACT project “earned” or generated by the activities of the project such as press conferences, news releases and public appearances by project officials.

The Need to Evaluate New TACT Projects

A reasonable question after the success of the Washington TACT project concerns why there is a need to continue evaluating additional TACT projects. First, as discussed in the next section, evaluation is an inherent part of any action project. It provides the important information that project managers must have to maximize project effectiveness. Second, from a more global perspective, a single TACT success, while encouraging, neither proves the overall concept nor provides sufficient guidance for structuring the most effective TACT approach. States vary in their traffic patterns and the nature of their driving populations—both CMV and PV. Additional and varied experience with the TACT concept is needed to understand more completely the dynamics of what does and does not work for various driving populations and traffic situations. The documentation of this experience is the product of an appropriate evaluation.

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APPROPRIATE EVALUATION

The thought of having their program evaluated often evokes fear among project managers. Most managers have heard stories about evaluations that have siphoned off a major portion of a project's budget to conduct overly elegant and sometimes unproductive research. Managers also often view evaluation as the "final exam" for the project, and no one wants to perform poorly on a final exam.

Despite these potential negative preconceptions, a properly structured, integrated and staffed evaluation can add significantly to a project's success. These concepts of structure, integration and staffing are key to an appropriate evaluation and a better overall project.

Evaluation Structure

Evaluation

Friend or Foe?

Evaluation should be part of taking action and must be based on the intent and scope of the project itself. This means coordinating the extent and focus of the evaluation with the purpose and size of the project. When this is done, the job of the project manager becomes easier, sponsors and project staff are happier, and efficiency is maximized. Trying to run a project without evaluation is akin to driving with the windshield covered. If you can't see where you are going and you do not know where you've been, you will only reach your intended destination by chance.

Establishing the right type and level of evaluation requires building an evaluation structure consistent with the goals, objectives and size of the project's activities. Overall, evaluation has two main purposes—**assessment** and **feedback**. Assessment lets project managers, sponsors, and others interested in the project know the extent to which the project accomplished what it set out to do with respect to its **processes** and its **outcomes**.

Feedback turns the entire project into a closed-loop system in which knowledge about process and outcome performance is used to fine-tune activities and improve results.

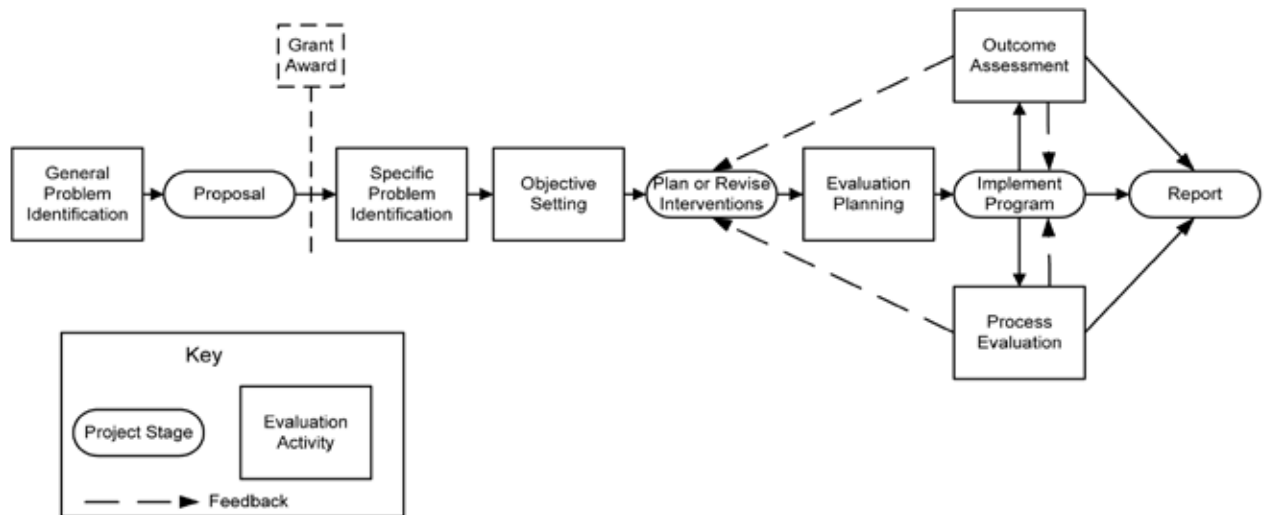
Unfortunately, there is no magic formula to determine how much should be spent on a TACT evaluation, either in absolute terms or as a percentage of the total resources of the project. The best way to establish the scope for a TACT evaluation is for the project manager and evaluator to work together giving careful consideration to the types and novelty of activities to be included in the project, the available budget, and the potential benefits of feedback.

Integrating Evaluation into a TACT Project

Appropriate process and outcome assessments are easiest to produce when an evaluation is integrated into the total TACT project. Just as enforcement and publicity are vital components of a TACT project, so too is evaluation. A key to success is the inclusion of evaluation from the very start of the project. This will provide the project with the benefits of a well-planned evaluation. These benefits include generating useful information that helps fine tune the project at every stage. Figure 1 illustrates the tight coupling of evaluation with the major stages in the life of a TACT project.

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Figure 1.
Flow of TACT Project Activities



PROBLEM IDENTIFICATION. The TACT project sequence begins with the identification of the general nature of the problem the project will address. This is usually a measure of crashes involving CMVs and PVs but can also be a behavioral measure such as the rate of drivers cutting off trucks. It is important to recognize that tickets written for violations by CMV or PV drivers cannot be used as an indication of the level of the problem or as a measure of the success of a TACT project.⁴

There are at least two reasons why the TACT evaluator should be involved in the general problem identification step before the proposal is prepared. First, evaluators are accustomed to working with problem-related data and know how to assess the quality of the information gathered. TACT, like all STEP projects, must be based on stable and valid information. Second, evaluators have the experience to determine whether problem-oriented objectives will be measurable. They typically know the availability of relevant data and the extent to which it can support a valid assessment.

⁴ Ticket rates are profoundly influenced by factors such as the number of police personnel involved in enforcement and the priority given to TACT-related enforcement activities by police commanders. Thus, for example, high ticket rates can be indicative of a problem or simply a reflection of the prevailing enforcement activity level and priorities. The change in ticketing rate over time, however, can be a good measure of process level and whether increased enforcement has, in fact, been achieved.

The need for measurable objectives is discussed more fully below.

PROPOSAL. Once the general problem is identified, a TACT proposal can be prepared. Typically, reduction or elimination of the problem becomes the **goal** of the TACT project and the focus of the proposed approach. Goals are outcome statements that define in general terms what a TACT Program is trying to accomplish. Unlike project objectives, which must be specific, quantifiable, and measurable (see below), goals can be qualitative wishes such as “an improvement in safety when CMVs and PVs interact.”

The evaluator should prepare the evaluation section of the proposal. This will ensure that the proposal describes a realistic and productive evaluation. It also avoids any ambiguity between what the proposal says about evaluation and what the evaluator is committed to do. If the evaluator develops the evaluation approach, he or she will be fully familiar with it which will help avoid problems once the TACT project is awarded.

SPECIFIC PROBLEM IDENTIFICATION. After a TACT grant is awarded and the project team is assembled, evaluation should refine and further specify the nature of the problem that will be addressed. This typically involves taking a more detailed look at crash data as it pertains to the specific corridors or road segments being considered for the project interventions. For example, it might be discovered that male PV drivers are overrepresented in unsafe behaviors around CMVs. By specifying the problem in greater detail, it will be easier to develop specific objectives and associated interventions.

OBJECTIVE SETTING. After a TACT project begins, its managers must set measurable **objectives** that address specific problems. Objectives are precise, time-based, and measurable outcomes or conditions that support the completion of the defined TACT goal.

Involve the evaluator early in the project timeline

Goal = qualitative, e.g., improve safety

Objective = quantitative, e.g., reduce PV/CMV crashes by 20%

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Identifying problems and related specific objectives is best accomplished with the assistance of the project evaluation team. With good problem identification data, objectives can be focused on the specific problem to be solved. Instead of trying to “reduce unsafe driving behaviors around CMVs,” a noble *goal*, the TACT project can address a specific unsafe behavior such as cutting off CMVs by adopting an *objective* such as “reducing interactions in which PVs cut off CMVs by 25% in one year.” The choice of which specific behaviors to address can be made based on analysis of crash data or, possibly, because they are the behavior of most concern to law enforcement personnel or CMV drivers in the State.

Grandiose goals masquerading as objectives such as “reducing traffic deaths” or “making the roads safer” often sound impressive but really cannot be evaluated. A TACT pilot project is not likely to be able to demonstrate a reduction in fatalities based on a few test corridors. Likewise, everyone would like to have safer roads, but demonstrating the achievement of that goal requires a focus on one or more measurable components of crash risk that the TACT project is trying to reduce, such as PVs tailgating CMVs.

**Enforcement and
media specialists
define the
interventions**

DETAILED PLANNING. Once measurable and reasonable objectives have been established for a TACT project, the next stage is the detailed planning for the project interventions. This is the only part of the project where there should be minimal input from the evaluator. Instead, the evaluator should closely monitor the planning activities as part of the process evaluation.

Each TACT project should have enforcement and media specialists to act as the leaders in formulating countermeasures in their specialty. Countermeasure development should be conducted without regard to the ability of the approach to be evaluated.

That is why the evaluator should not have a lead role in deciding on the inclusion of any particular approach. If evaluation is permitted to dictate what actions a TACT project can take, a situation of “the tail wagging the dog” will exist, and the project will be compromised. To be sure, the evaluator should be consulted as needed such as when the intervention specialists have more than one approach they believe will work equivalently. In this situation, the evaluator can act as the “tie breaker” based on which approach might be more amenable to an in-depth evaluation with the available evaluation resources. When the intervention specialists have a preferred approach, however, it should be the one selected for implementation. It is up to a skilled and experienced evaluator to find a valid way to assess the approach considered best.

EVALUATION PLANNING. After the interventions are planned and scheduled, the details of the evaluation can also be planned. The experienced evaluator will work within the established evaluation budget to define:

- **Measures of effectiveness** (MOEs) for each objective. An MOE is a quantifiable comparison of results obtained under specific external conditions and decisions. For example, the Washington State TACT project used the rate of observed violations around CMVs (per hour of observation) as one MOE.
- **The data** needed to construct each MOE including its source and data collection approach.

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- **The benchmark** to be used to determine if the MOE changed after the intervention. Typical types of benchmarks include pre-intervention (baseline) measurements, MOEs obtained from comparison locations that are similar to the TACT intervention areas but did not receive any countermeasures, and absolute benchmarks such as a target rate of violations.
- **Analyses** that will determine if the MOE as measured at the TACT intervention site is significantly different than the benchmark(s).

This all sounds very complicated, and it can be. That is why a TACT project needs the services of a professional evaluation team. This is their specialty and something they do all the time. They can handle the evaluation details and make sure the TACT project is properly evaluated.

**TACT
interventions
and evaluation
must be
coordinated**

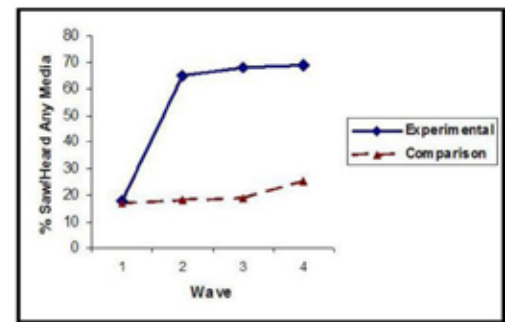
IMPLEMENTATION. The TACT interventions and the evaluation are implemented together and must be coordinated. In most TACT Programs, the evaluation design will require a baseline (“before”) measure that is uncontaminated by any of the interventions. This will permit the evaluation to examine pre/post changes in the measures of interest. If implementation and evaluation are not in sync, there is a risk that interventions will begin before an adequate baseline is collected and verified. For example, if the TACT Program announces its plans to the press prior to the completion of a baseline knowledge, attitude, and awareness measure such as a survey, it may be impossible to establish an uncontaminated baseline of these measures. This is why it is essential to involve the evaluator in all TACT project planning activities. An experienced evaluator will highlight potential schedule or sequencing problems and other issues that might compromise the quality or validity of the evaluation.

REPORTING. The last stage in a TACT project is reporting. Some of the reports may be interim requirements, and there is typically a final report summarizing the entire project and its evaluation results. TACT reports that include process or outcome evaluation findings are best produced as a joint effort of project management and the evaluator.

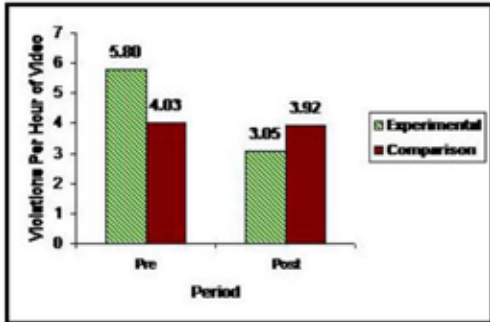
Process and Outcome Evaluations

An evaluation has two main components. The **process evaluation** (sometimes referred to as an administrative evaluation) involves an assessment of the extent to which a TACT Program was implemented or conducted according to its plan. Process evaluations are useful to establish that a TACT Program's interventions actually were accomplished and reached their intended audience. They also provide feedback on the performance of project activities, such as the number of TV spots played, which permits a comparison of planned and achieved levels. If necessary, a TACT process evaluation can also help in troubleshooting unsuccessful programs. Basically, an evaluation of a TACT project must demonstrate that the project activities were actually accomplished in order for the project to be able to take credit for any observed improvements in the situation between CMVs and cars on the road.

The **outcome evaluation** is an assessment of the extent to which the TACT project achieved its objectives (sometimes referred to as a "product" evaluation). That is why it is so important to begin a TACT project with clear, quantifiable and measurable objectives. Outcome measures indicate whether desirable changes were achieved according to plan. By interpreting them in association with process evaluation results, it can be determined if the outcome changes achieved can be confidently attributed to the TACT project.



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It is important to remember that TACT will always be a work in progress, and properly conducted process and outcome evaluations are particularly important should a TACT project fail to achieve its objectives. An approach that worked in one State may not work in a different environment or at a different time. An appropriate evaluation can identify where a TACT project went astray and thereby focus attention on approaches that require modification or simply do not work in particular environments. This leads to an understanding of why an intervention failed to work and possible ways to make it better.

From the foregoing, it is clear that an appropriate evaluation requires a suitable evaluator. The next section will discuss how a TACT project can go about finding the right evaluator, often in its own backyard.

Evaluation is a specific discipline. It requires training in experimental design and statistical analysis as well as experience in developing MOEs and collecting field data to form the measures. As with most technical areas, it is not something that can be conducted simply by following a checklist or “cookbook.” This is why a TACT project requires the services of a professional evaluator. Fortunately, there are competent evaluation specialists in every State, many of whom have evaluated at least some highway safety projects.

Some managers are reluctant to delegate responsibility for a critical project activity such as evaluation to someone they do not work with on a regular basis. Given that evaluation is a specialty, the manager realizes that he or she cannot just step in and take over the evaluation if there is a problem. This situation should never materialize, however, if the TACT evaluator is carefully selected. Criteria to look for when selecting an evaluation specialist include:

- **Availability of an evaluation team with broad capabilities.** It is not necessary for a single individual to possess all of the needed evaluation skills as long as his or her organization can provide the necessary support. A TACT evaluation will certainly require data collectors, database managers, statistical analysts and report/briefing preparers. Your evaluation team should possess all of these skills.
- **Someone who explains things in understandable terms.** Evaluation is a technical specialty, but it need not be mysterious. A good evaluator can present designs and results in lay terms that everyone can understand.

FINDING AN EVALUATOR

**TACT
projects need
professional
evaluators**

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- **An understanding of the characteristics and limitations of traffic safety data.** A TACT evaluation will likely involve some data collected directly on the roadway as well as some secondary source data such as crashes and citations. Each type of data has its strengths and weaknesses. An evaluator with experience in traffic safety research will be aware of these and will avoid overextending the conclusions of the evaluation. It is also beneficial, but not absolutely necessary, for the evaluator to have experience accessing traffic safety data in your State. This will simplify the task of acquiring information such as crashes and citations. A well-qualified evaluator who has worked in other States should not have any problems obtaining similar data in your State. State agencies responsible for maintaining relevant databases are typically very cooperative and want the data they collect to be put to good use.
- **Previous evaluation experience.** A TACT evaluation, as discussed below, will likely involve behavioral observations, public opinion questionnaires, and analysis of secondary source data. It is important that the evaluation team is familiar with all of these data types.
- **An understanding of research design and statistical techniques and when they should and should not be applied.** A TACT evaluation is neither a doctoral dissertation nor an article in a tabloid. It is field research that requires a reasonable amount of rigor and the ability to highlight the possible threats to the validity of the results arising from the inability to control all possible biasing factors.

- **Someone who can present results clearly, both verbally and in writing.** Since evaluation is a specific discipline, a TACT project should rely on its evaluator to document the details of the evaluation design and findings. It is particularly beneficial to have someone who is skilled in presenting quantitative information graphically so that it highlights key findings and issues.

The first place to look for an evaluator is within your State organization. Many States have research groups in their motor vehicle or transportation departments whose staff is experienced in evaluation. These people are usually close at hand and readily accessible through assignment or inter-agency agreement.

If a State does not have an available research department, there are at least two other reliable sources for an evaluation team. Colleges and universities often have study programs that include evaluation, and sometimes even highway safety evaluation, as a focus. These are often located within the psychology or engineering departments. Frequently, one or more professors with extensive evaluation experience will direct students who provide much of the labor.

Some colleges and universities even maintain institutes or separate research departments devoted to highway safety research. These institutes are a hybrid between university departments and private consultants. They have the resources of the university at their disposal and the oversight of the university administration, but, like a consultant, their staffs tend to be less transient than students in an academic department.

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Many private consultants specialize in highway safety evaluation. Some may have even evaluated another State's TACT project. Consultants are typically accustomed to working on a project-oriented basis as defined by a detailed statement of work. They do not have the schedule limitations caused by semester breaks and summer vacations at universities.

Any of these alternatives—State groups, colleges/universities, institutes or private consultants—can work well as an evaluator. The important thing is to make the evaluator an integral part of the TACT team. It must be remembered that the evaluator should be examining both the process by which the TACT interventions were conducted and the outcomes of those activities. Including the evaluator in key milestone events and planning meetings is essential to keep him or her “in the loop.” Simply, the best way to assess a process is to witness it first hand.

TACT EVALUATION COMPONENTS AND TECHNIQUES

All TACT evaluations must have the same basic set of components, although the extent to which each is implemented will vary as a function of the size and objectives of the project. These components are implemented using a set of techniques that can range from those widely used in evaluation research to novel approaches designed within an individual TACT project to address an unusual evaluation need. This section discusses the basic components and techniques relevant to a TACT evaluation.

Evaluation Components

The components of an appropriate TACT evaluation include:

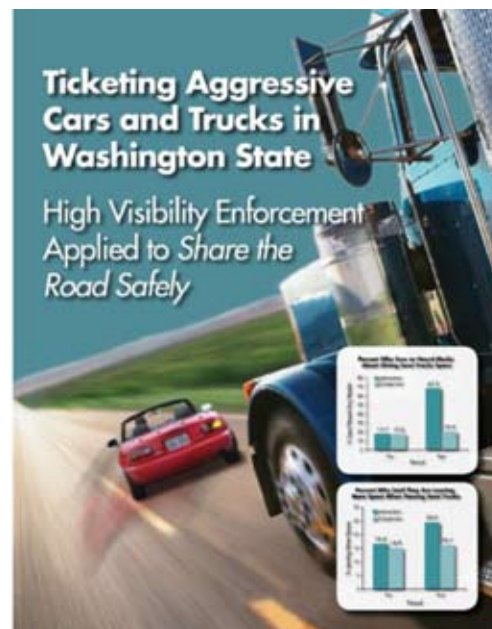
- **Measures of effectiveness.** As discussed earlier, MOEs should be based on the specific, measurable objectives of each TACT project. The objectives define the scope of the project and, by implication, the nature of the MOEs that are most appropriate. For example, a statewide TACT project might reasonably use crashes as one MOE. A TACT pilot project focused on one or two highway corridors, on the other hand, would rely more on behavior, knowledge and exposure measures since these would be capable of displaying change in response to the limited scope of the TACT intervention.
- **Data.** MOEs are constructed from data. The data may be routinely collected information such as crash reports, or the product of specially executed data collection efforts specifically for the purpose of the TACT evaluation. In either case, an experienced evaluator will know how to assess data quality in terms of validity and reliability.

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Validity refers to the extent to which the data actually represent what they are supposed to. For example, a valid count of citations for following CMVs too closely should not include miscoded tickets for other offenses. **Reliability** addresses the extent to which a repeated collection of the same data would produce the same result. Reliability is particularly important when multiple observers or raters are involved in data collection since people tend to see the same event differently.

- **An experimental design** chosen to provide the maximum ability to determine whether the TACT project achieved its objectives. The most often used experimental designs for STEP project evaluations are pre/post and pre/post with comparison sites. A pre/post (sometimes called a before and after or baseline/program) design collects data at the intervention sites before any program interventions and repeats the data collection one or more times after the interventions begin. Any changes in the measures constructed from the data are interpreted as the effect of the TACT Program. A threat to the validity of this interpretation is the possibility that the observed change was occurring everywhere and therefore was not the result of the TACT effort. This threat can be eliminated by adding one or more comparison sites. These sites do not receive the TACT interventions but are examined with the same data collection techniques and timing as the intervention sites. If there is a change in the desired direction at the intervention sites that is significantly greater than any change observed at the comparisons, the effectiveness of TACT is confirmed.

- **Analyses.** The construction of measures from data according to the chosen experimental design is accomplished by analyses. These can range from simple counts over time to complex inferential statistical approaches that are capable of assessing the extent to which various factors contributed to the observed results. The choice of analytical technique depends on the objectives of the TACT project and the nature and precision of the data. An appropriate TACT evaluator will possess the necessary analysis training and experience or will make sure it is available from a specialist on the evaluation team.
- **Reporting.** In order to be interpreted correctly, evaluation results must be clearly and accurately reported. As with the other evaluation elements, a TACT report can vary in length and complexity depending on the objectives of the project. The important point is to attempt to eliminate the possibility of the evaluation results being misconstrued because they are not clearly documented. This is why it is important to check the quality of previous reports written by potential evaluators.



TACT Evaluation Techniques—Focusing the TACT Evaluation

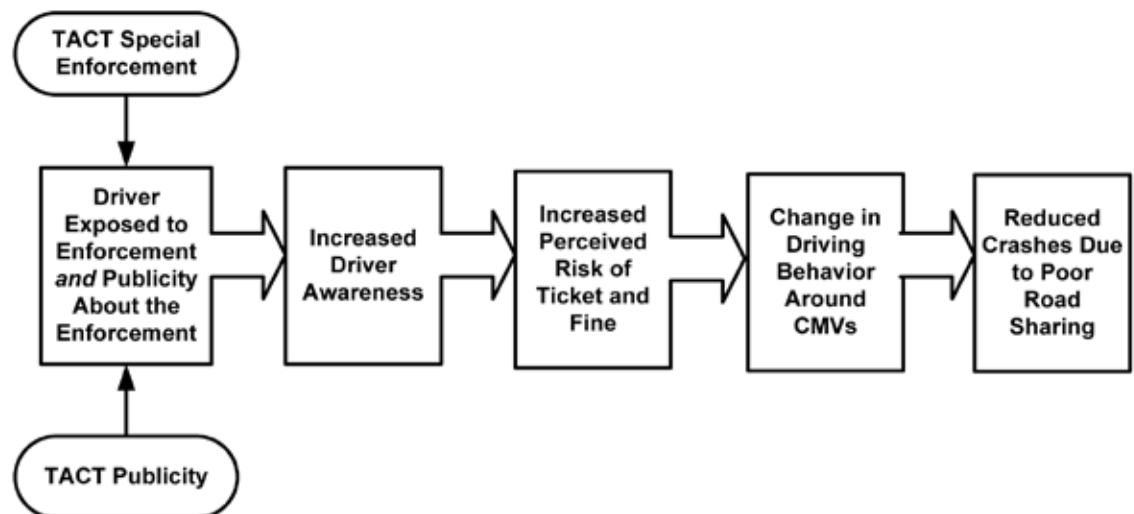
A TACT project, like all STEPs, attempts to improve highway safety by creating general deterrence among drivers. In the case of TACT, the goal is to deter PV and CMV drivers from engaging in unsafe and often prohibited behaviors while sharing the road. Examples of these behaviors include cutting a CMV off when passing it and following a CMV too closely (tailgating).

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General deterrence theory is based on several premises. First, human behavior (at least the behavior that can be influenced by the interventions in a TACT Program) is rational. Simply put, people will decide to do what is in their own best interest based on the information available to them. Second, undesirable behavior can be deterred by the prospect of sanction or punishment if that sanction is certain, swift and sufficiently severe (or inconvenient). Third, there is actual policing and punishment that leads to consequences that discourages potential offenders.

As a general deterrence program, TACT has a goal of increasing a driver's perceived risk of receiving a traffic citation for engaging in high-risk behaviors when PVs and CMVs share the road. The general deterrence model, as embodied in a TACT Program, is shown in Figure 2. Each of the steps in the model also provides a specific evaluation focus that requires the selection of appropriate data collection techniques. Each of the seven blocks in the model shown in Figure 2 is discussed below both with respect to its role in a TACT Program and its implications for evaluation. The goal of this discussion is to provide project managers with an overview of evaluation needs and an appreciation for the range of data needed by an appropriate TACT evaluation. Appendix A outlines the main TACT evaluation techniques in more detail.

Figure 2.
Model of TACT
General Deterrence



Enforcement and Publicity

The desired increase in perceived risk requires that drivers are exposed to both enforcement of behaviors related to sharing the road safely and publicity about the enforcement. The enforcement itself provides credibility to the entire TACT campaign and also generates additional earned publicity by word-of-mouth. The publicity encompasses both paid and earned media. The messages about enforcement are intended to increase the effectiveness of the police activity and spread its influence for a longer period of time than just the special enforcement period.

Since the effectiveness of TACT interventions in creating general deterrence depends on maximizing driver exposure to the project's enforcement and publicity, TACT evaluation must measure this "input" function. This must be accomplished as part of both the process and outcome evaluations. From a process standpoint, it is essential to document the extent of enforcement and publicity. Enforcement process measures of interest include:

- Police patrol hours paid for or prompted by the TACT project
- Changes in citations for the violations the TACT project is addressing from before to during to after the special enforcement periods.

If these measures are positive, there is indication that the TACT enforcement process was active, but not necessarily effective. Positive activity is a necessary but not sufficient condition for showing that TACT had an effect.

**Enforcement
makes publicity
credible**

**Publicity
increases the
impact of
enforcement**

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In a similar fashion, a TACT evaluation must verify that the planned project publicity was actually made available. For example, if the local TV station promised to provide news coverage, it must be determined if that coverage was actually broadcast. This is the enabling process measure. Clearly, if the publicity was not mounted, drivers could not be exposed to it.

Driver Exposure

The first sequential step in the deterrence model in Figure 2 involves drivers, both PV and CMV, being exposed to the enforcement and publicity. Once the process measures indicate that both interventions were in operation, it is necessary to determine if the audience of interest actually had the opportunity to be exposed to the TACT activities and messages. This is a difficult measure to collect directly. For example, just because a radio spot was played during rush hour on a particular station does not mean that a specific driver heard it. Drivers may not have been listening to the radio, may have been tuned to another station or may have ignored the message even though it was played in their car.

In general, the best way to assess whether the intended audience was exposed to an intervention is to ask them. A survey of a random sample of drivers concerning what they have seen and heard about PVs and CMVs sharing the road safely is a good and cost effective way to measure level of exposure to TACT enforcement and media. This survey can be accomplished in several ways. One of the simplest and least expensive to implement is a one page questionnaire administered in driver licensing offices when people come in to renew their license. If all drivers must appear for renewal and everyone is offered the questionnaire, there is virtually no sampling bias in the approach. Its other strength is that a large sample can be collected at relatively low cost.

The primary weakness of the driver licensing office survey is that there is no opportunity to clarify responses. The Washington State TACT Program employed this approach successfully using the questionnaire shown in Appendix B of this Guide.

In some States, surveys in driver licensing offices are not possible. This may be because license renewals are handled by mail or on the Internet or simply because the offices are unavailable. In this case, an intercept or telephone survey can be used to collect the same type of information.

An intercept survey involves stopping people randomly at some location such as a gas station, shopping mall, or highway rest area, where a reasonably unbiased sample of drivers might be found. The suitability of the intercept location has to be determined based on the local conditions and the population of drivers desired. For example, if the interest is in drivers making short trips, a highway rest area would probably not be appropriate since people on short trips would not tend to stop there. Likewise, a mall might not be desirable if the population of interest were drivers using interstate highways. Once the driver is stopped, he or she can be interviewed or given a questionnaire to complete.

The strength of intercepts is the ability of an intercepting interviewer to clarify questions and probe for more detail in responses. For example, the interviewer can follow up on questions to make a better determination if the driver was actually exposed to the TACT interventions. It is even possible to show the person some of the publicity materials and ask if they had been seen or heard.

One weakness in the use of intercepts is the relatively high cost per interview since personnel are needed to make the stop and to interview the driver. A second weakness is the inability to obtain a large, virtually random sample of drivers.

**Surveys are
versatile and
inexpensive**

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Telephone surveys can also be used to assess driver exposure. These typically involve random digit dialed telephone calls in which an interviewer first makes sure that the individual meets the sampling criteria, e.g., is a licensed driver that uses the roadway corridors where the TACT project is implemented, and then administers the questionnaires. While telephone surveys are potentially capable of obtaining the same types of in-depth information as intercept surveys, they typically suffer from three significant implementation problems. They are expensive, have low compliance rates (a majority of people typically refuse to participate), and it is not possible to verify respondent characteristics. Nevertheless, telephone surveys can be a useful tool for determining exposure when other methods are not readily available.

Increased Awareness

If it can be shown that drivers were exposed to the TACT enforcement and publicity, the general deterrence model indicates there should be increased driver awareness of the correct behaviors and/or the risk of getting a ticket. This needs to be verified in the evaluation since it is possible that drivers were exposed to the TACT interventions but did not perceive, believe or understand them. A survey of drivers is an excellent way to determine if drivers are more aware of the correct behavior for cars and trucks sharing the road. A separate survey for this point is not needed. The same survey described above for exposure can be used. All that is necessary is the development and inclusion of an appropriate question or questions that focus on awareness. These can then be tracked over time to see if there was an increase. Experienced evaluators know how to develop and analyze these types of questions.

**A change to
safer behaviors
is the goal**

Increased Perceived Risk

Theoretically, increased awareness that enforcement of unsafe driving behaviors is elevated should result in an increased perceived risk of a ticket or fine. In actuality, the impact of the awareness of TACT interventions and the knowledge of the correct behavior might be negligible for some drivers. To verify the extent to which perceived risk of a ticket and/or fine has increased, additional questions can be included on the exposure/awareness survey. Questions about the perceived strictness of enforcement or the likelihood of being stopped for a violation can be used to make the necessary determination. Thus, a single survey can easily cover exposure, awareness and perceptions.

Change in Driving Behavior

It is hoped that an increase in general deterrence will lead to improved driving behavior. TACT evaluation should be concerned both with self reports of behavior and the measurement of actual behavior. Self-reported behavior, although often exaggerated, can still be used as a valuable measure of change. For example, in Washington State, the percentage of survey respondents who said their behavior around CMVs had changed in the last month and who indicated they left more space when passing a CMV increased significantly at the TACT intervention sites but not at the comparison sites. This strongly suggests that driver behavior changed as a result of the TACT project, but this cannot be used to estimate the rate of improved behavior on the road.

**TACT
evaluations
need behavioral
measures**

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Actual measurement of behaviors is the best way to determine the extent to which behaviors have or have not changed. Taking valid behavioral observations of drivers on the road can be a labor intensive task, but some type of behavioral measurement is essential in a TACT evaluation. In the Washington State TACT Program, police officers followed CMVs in the intervention and comparison corridors and videotaped PV driver actions while describing any violations on the audio track of the video. These tapes were then reviewed to create a database of violations which, in turn, was analyzed and showed a significant decrease in violation rate at the intervention sites but not at the comparisons.

The Washington State approach of using video supported a detailed and in-depth behavioral analysis because tape segments could be reviewed multiple times and by more than a single coder. This approach may be too complex and expensive for some future TACT evaluations. Other behavioral measurement techniques that count violations in real time either from vehicles or aircraft platforms can also be used. If the corridors being used for the TACT project have fixed traffic cameras installed, the tapes from these cameras may be usable for the rating of behaviors.

As with surveys, a professional evaluator will have experience in the collection of behavioral observations and will be able to assess the available resources for acquiring them. The important point is that each TACT project evaluation includes some measure of behavior change as a key outcome measure.

Crash Reduction

The ultimate goal of TACT projects is to reduce crashes caused by improper road sharing between CMVs and PVs. TACT grants typically involve demonstrating the approach in a limited geographic area and for a relatively short time period. The limited scope of the current TACT interventions makes it unlikely that a sufficient sample of relevant crashes will be available upon which to make an evaluation judgment. An experienced evaluator can examine crash histories for any intervention corridors being considered and determine if the rate of crashes can support a crash-based evaluation. It is always desirable to use the ultimate measure, crashes in this case, when performing an evaluation. Small sample sizes, however, lead to statistical instability and the possibility of erroneous results. If a professional evaluator determines that crash sample sizes are too small to support a valid evaluation, the TACT project will have to rely on the measurement of behaviors to indicate that the desired outcome has been achieved.

**Safer behavior
leads to fewer
crashes**

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KEY POINTS



- Evaluation should be an integral part of a TACT project. Evaluation can contribute to an improved project from the proposal to the final report.
- A TACT evaluation requires the involvement of a trained and experienced evaluator or evaluation team. It is important that project managers understand the role of evaluation and its approaches, but the manager need not be an evaluation specialist.
- There is no way to provide a “cookbook” for a TACT evaluation. Each evaluation must be tailored to the objectives, scope, approach, and resources of the particular project. The basic principles in this Guide can help structure the evaluation, but the final decisions must be made in the context of each project’s operations.
- The Washington State TACT project evaluation is a good **example**, but it is not a fixed **model** that must be repeated by all other TACT projects.
- There are many sources for obtaining an experienced evaluator for each TACT project. As long as the chosen evaluator is trained, experienced and can perform within budget, it does not matter if he or she is a State employee, associated with a university, or is a private consultant. The important thing is that the evaluator is viewed and performs as an integral member of the TACT project team.
- TACT is a STEP. TACT projects and their evaluations should be fully consistent with the STEP approach to traffic safety countermeasure programs. A significant deviation from the STEP approach will result in a different type of program, the results of which will not add to the overall TACT knowledge base.
- The fundamental goal of a TACT project is to increase general deterrence and lead to reduced unsafe behaviors and a decrease in crashes. The general deterrence model provides good guidance for selecting appropriate TACT evaluation MOEs and data collection techniques.

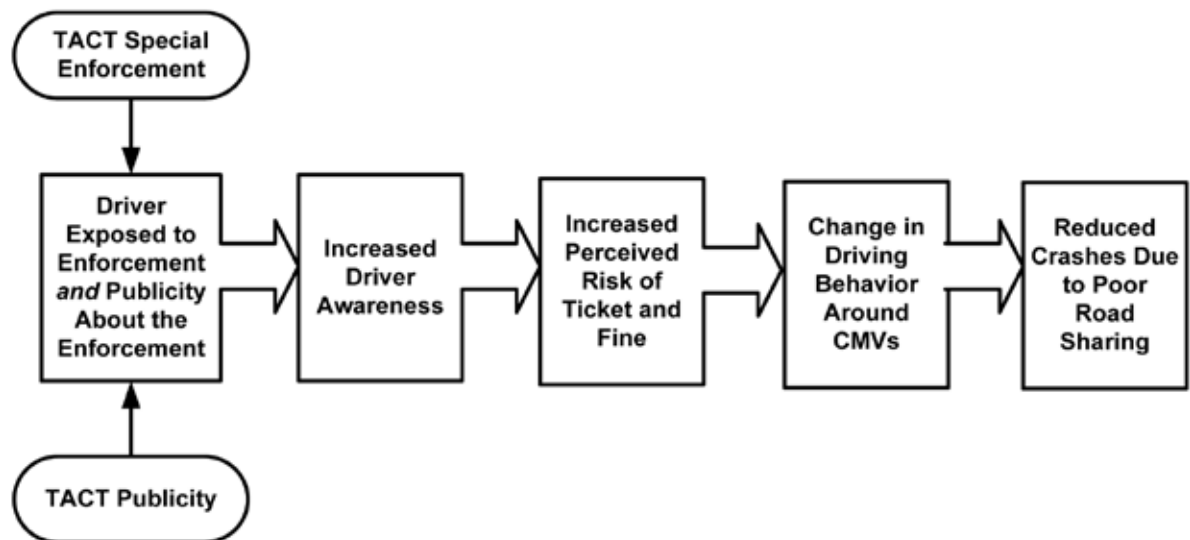
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APPENDIX A Evaluation Measurement Techniques

As discussed in the Guide, it is not possible to specify exact data collection techniques or individual data items that would apply universally to all TACT projects. TACT projects will vary with respect to both the nature of their interventions and the ability to implement specific data collection techniques.

Although individual data items cannot be specified, it is possible to provide outlines of the desirable characteristics for the various types of information needed to verify that TACT has achieved an increase in the general deterrence of unsafe road sharing between CMVs and PVs. This Appendix contains outlines for each of the steps in the general deterrence model presented as Figure 2 of the Guide and repeated below for convenience.

The General Deterrence Model as Applied to TACT



PROCESS MEASURES—ENFORCEMENT INPUT

Purpose:

To determine if enforcement against the specific violations or behaviors covered by the TACT Program has been elevated and the extent of the increase.

Possible Measures:

- Patrol hours for special patrols paid for by the TACT Program on the intervention corridor
 - ◆ Percentage increase on intervention corridors pre/post
 - ◆ Difference in pre/post on intervention and comparison corridors
- Patrol hours for all other law enforcement personnel on the TACT intervention and comparison corridors
 - ◆ Percentage increase on intervention corridors pre/post
 - ◆ Difference in pre/post on intervention and comparison corridors
- Patrol miles on the intervention (and comparison if used) corridors by law enforcement before, during and after the intervention periods.
- Citations and warnings written for violations related to the TACT objectives pre/post in the intervention and comparison corridors
 - ◆ Percentage increase on intervention corridors pre/post
 - ◆ Difference in pre/post on intervention and comparison corridors

PROCESS MEASURES—ENFORCEMENT INPUT

- Focus groups with law enforcement personnel who work the TACT corridors
 - ◆ Have you noticed a change in PV driver behavior? If so, has it improved? What signs make you think so?
 - ◆ Is law enforcement stricter? Did the police officers learn anything?
 - ◆ Have police managers changed their view of the importance of addressing share the road concepts?
 - ◆ Did drivers you stopped know about the TACT campaign?
 - ◆ How did the courts handle any increase in tickets?

Important Considerations:

- Most law enforcement agencies do not keep a record of the time individual officers spend on particular activities. Therefore, some type of supplemental data collection, such as a log for members of TACT blitz patrols, may have to be implemented. Unless supplemental forms are completed by everyone and training in their use is provided, the quality of the resulting data may be poor.
- Rates of stops and ticketing can be affected by factors such as weather, other demands for police time (e.g., crashes) and the level of commitment of individual officers. The assumption should not be made that assigned officer time for TACT enforcement was, in fact, fully devoted to TACT.

PROCESS MEASURES—ENFORCEMENT INPUT

Important Considerations Continued:

- Citations are a better measure of the actual behavior on the road than are convictions. Many tickets are plea bargained to a lesser offense, particularly when the volume of tickets increases as part of a STEP. Also, citations can be accessed almost immediately for the times of interest whereas adjudication of the tickets may spread over many months and be heard in multiple courts within the jurisdiction.
- If actual copies of citations can be obtained, they can be used to expand the analysis to examine many additional characteristics of the violator that are not typically available otherwise.
- If law enforcement agencies are receiving grants for increased TACT enforcement, data collection can be added as a grant requirement. The needed data must be clearly specified. Straightforward and easy to use forms or other data collection mechanisms must be provided.

PROCESS MEASURES—PUBLICITY INPUT

Purpose:

To determine the extent to which the message(s) included as part of the TACT campaign were disseminated and the details (time, location, medium) of the exposures.

Possible Measures:

- Counts provided by the media of the number of exposures (plays, advertisements, handouts), e.g., gross rating points, total rating points
- Counts provided by independent monitoring/clipping services (not available everywhere and can be expensive)
- Bills for paid media
- Pseudo-bills for public service announcements
- TACT-paid monitors hired to watch/listen to the media during blitz times
- Discussions and focus groups with media news and public service directors
 - ◆ Were they aware of the TACT messages?
 - ◆ What importance did they give the TACT messages?
 - ◆ What is their impression of how much exposure the TACT publicity got?
 - ◆ Do they have a subjective or quantitative estimate of the size of the audience that was exposed to the TACT publicity?
 - ◆ Do they have a subjective or quantitative estimate of the nature (demographics, socioeconomics) of the audience that was exposed to the TACT publicity?
- Planned versus actual publicity exposure.

PROCESS MEASURES—PUBLICITY INPUT

Important Considerations:

- Media monitoring is a difficult and boring task. Accuracy can be low if a TACT project attempts to monitor the broadcast media itself. Print media are easier to monitor.
- Professional broadcast media monitoring is expensive and may involve significant limitations in terms of the time of day and day of week monitored.
- Print clipping services are relatively accurate and can be affordable, especially if part of a State contract.
- Bills for paid media are typically accurate. TACT Programs should ask for itemizations of the dates and times of all plays as input to the process evaluation.
- Zero-due bills for public service announcements can be as accurate as paid bills if a particular station uses them.
- Broadcast media news coverage can be difficult to quantify. For example, a TV station may repeat a news item several times. Qualitative information on plays, e.g., three of the four local network affiliates covered the story, can also be used as part of the process evaluation.

OUTCOME MEASURES—SURVEYS

Purpose:

To assess target audience:

- Exposure to and cognizance of TACT enforcement activities
- Exposure to and recall of TACT publicity messages and themes
- Changes in the perceived risk of receiving a violation and sanction for unsafe behaviors covered by TACT
- Self-reported behaviors related to CMVs and PVs sharing the road safely
- Attitudes towards increased police enforcement of sharing the road violations

Possible Measures:

- Motor vehicle/driver license office surveys
 - ◆ Paper and pencil
 - ◆ One side of one sheet of paper
 - ◆ Distributed by office personnel or dedicated person placed in the office
 - ◆ Should include important classification data focused on identifying any specific target audience of the TACT Program
 - ◆ Age
 - ◆ Gender
 - ◆ Miles driven annually (or other measure of exposure)
 - ◆ Zip code

OUTCOME MEASURES—SURVEYS

- ◆ Vehicle type, make and/or age driven most often
- ◆ Education level
- ◆ Seat belt use
- Intercept surveys
 - ◆ Can be self-administered or involve interview and response (depends on whether there is an interest in probing for depth on the answer)
 - ◆ Choice of intercept location can profoundly influence the population of drivers obtained. In general, an unbiased, random sample is desired, although special groups might be of interest if the TACT Program is focused on a subset of drivers
 - ◆ Gas stations—location is critical
 - ◆ Shopping malls—good because drivers are already out of their cars and generally have time
 - ◆ Highway rest areas—typically excludes drivers on local trips
 - ◆ Restaurants—may produce a bias based on the type and scale of the restaurant
 - ◆ It is often necessary to pay people or give them a premium such as a gas coupon to participate
 - ◆ Interceptor/interviewer training is important
 - ◆ Must understand how to make an unbiased selection of people to intercept
 - ◆ Must be fully aware of the objectives of each question and possible follow-up probes
 - ◆ Must be able to move the interview along
 - ◆ Must know how to interview

OUTCOME MEASURES—SURVEYS

- Telephone surveys
 - ◆ Need to be conducted by experienced, professional survey organizations
 - ◆ Typically get low response rate with no way to get much information on those who refuse
 - ◆ Can be relatively unbiased if random dialing techniques are used
 - ◆ Difficult to determine the characteristics of the respondent (e.g., age)
 - ◆ Expensive and therefore sample size is limited
 - ◆ Particularly expensive to examine a subset of drivers
 - ◆ Can ask most of the same questions as in an intercept and can probe for follow-up responses
- Mail surveys
 - ◆ Usually very low response rates and no information about refusals
 - ◆ Impossible to know who actually completed the survey
 - ◆ Becoming more expensive as postage costs increase
 - ◆ Difficult to target to TACT corridors
 - ◆ Not really suitable for TACT

Important Considerations:

- In any type of survey data collection, it is important to minimize the refusal rate since refusals can bias results. A request from an official (e.g., in a driver license office) is often sufficient motivation, but sometimes payment is needed (\$5 or \$10 is typical). Since there will always be refusals, it is important to learn and record as much information about people who refuse as possible (e.g., gender, estimate of age, vehicle description).

OUTCOME MEASURES—SURVEYS

Important Considerations Continued:

- Surveys are good for looking at trends over time. An increase or decrease in the number of people giving a particular response is indicative of change. Surveys are not strong at estimating the true level of any particular exposure, attitude, or behavior. Typically, estimates of those exposed to TACT publicity will be lower than the actual exposure if the survey uses an unaided recall question (e.g., “What have you seen or heard recently about highway safety?”). Conversely, exposure estimates can be inflated if an aided recall question is asked (e.g., “Have you heard a TV commercial that says...?”).
- Questionnaires must be carefully developed and then held constant if trends are to be measured.
- If relatively small changes in exposure, knowledge, attitudes, awareness or self-reported behavior are of interest, licensing office surveys are the preferred method. They can collect a large representative sample thereby providing high statistical power at low cost.
- When response categories are provided on the questionnaire, analysis time and cost are reduced. Open-ended questions (e.g., “Please tell me everything you’ve seen or heard on TV and radio about traffic safety in the last month?”) require post-coding which is time consuming and somewhat subjective.
- Some subjective judgments are typically required when analyzing a TACT survey. This is perfectly fine as long as these judgments are unbiased and consistent.

OUTCOME MEASURES—BEHAVIORAL OBSERVATIONS

Purposes:

- Problem identification—to ascertain the level of unacceptable behavior on the road
- Corridor selection—to select problem locations as a supplement to crash data
- Evaluation—to assess target audience behavior (violations and acceptable actions) when CMVs and PVs share the road

Possible Measures:

- Direct observation by data collectors who record data on the scene
 - ◆ Relatively inexpensive
 - ◆ Difficult task because things happen quickly—no chance for second review
 - ◆ May require a two-person team—one to observe and one to record
 - ◆ May require recording equipment (video and/or audio)
 - ◆ Limits detail that can be obtained in the observation (e.g., driver gender, vehicle type)
 - ◆ Difficult to get consistent coding across observers
 - ◆ Requires observers with knowledge concerning what constitutes a violation—usually law enforcement personnel
- Video observations for later analysis
 - ◆ Requires time consuming data reduction
 - ◆ Permits multiple reviews of each behavior by one or a team of analysts
 - ◆ Preserves the data for additional analysis if desired
 - ◆ Allows for the collection of detail up to the limit of what the camera can resolve
 - ◆ Can be accomplished from fixed installations, in-vehicle cameras or from airborne platforms

OUTCOME MEASURES—BEHAVIORAL OBSERVATIONS

Possible Measures Continued:

- ◆ Use of in-vehicle cameras can permit the observer to record comments on the audio track
- Automated vehicle following distance measurement using fixed or portable video or loop detectors
 - ◆ Following distance is not the only violation of interest
 - ◆ Fixed loop detectors limit the location of TACT interventions because measurement is best made at the site of interventions
- ◆ Data access and analysis can be complicated

Important Considerations:

- If crash measures are not feasible due to small numbers, behavioral observations are the only way to demonstrate a definitive TACT outcome.
- The behaviors of interest are relatively infrequent so behavioral observation can be time consuming.
- Valid behavioral measurement requires discipline, an appropriate experimental design, and careful analysis.
- Behavior must be examined per unit of observation (e.g., hour) because the extent of observation time will vary with each measurement cycle.
- Mixing behavioral observations from different collection modes (e.g., direct, video) should not be attempted as they have varying precision. When multiple behavioral measures are collected, each should be analyzed separately.

OUTCOME MEASURES—CRASHES

Purpose:

- To demonstrate that a TACT Program achieved its ultimate goal of improving safety by reducing crashes

Possible Measures:

- Police crash reports for the roadways (intervention and comparison as applicable) covered by the TACT Program
 - ◆ Vehicle-to-vehicle crashes involving CMVs
 - ◆ With PVs
 - ◆ With other CMVs
 - ◆ Single vehicle crashes
 - ◆ CMVs
 - ◆ PVs

Important Considerations:

- If the TACT corridors are relatively short (e.g., 20 miles or less), the expected number of crashes per unit time will be small.
- The number of police-reported crashes can change over time because of the influence of external factors
 - ◆ Mandated reporting limits
 - ◆ Police patrol levels
 - ◆ Changes in exposure (the number of CMVs and cars using the TACT corridors)
 - ◆ Report form changes.

OUTCOME MEASURES—CRASHES

Important Considerations Continued:

- High crash areas tend to return to more average crash levels even without interventions (“regression to the mean”). When using crash measures, a TACT project must examine the long-term pre-intervention crash trend on the studied corridors, not just one or two years before the project. At least five years of “pre” crash data should be collected.
- Crashes must be examined by crash type (e.g., CMV struck car, PV struck CMV, CMV ran off road due to car). These types should be descriptive rather than judgmental concerning fault. Most attempts to assess behavioral fault from police crash reports are unreliable. The issuance of a citation to one or both drivers is noteworthy but does not confirm fault.
- Crash measures are essential for any statewide or nearly statewide TACT project. An ongoing State-level TACT project should include a built-in crash report acquisition component.
- The project evaluator should check periodically to make sure that the crash reporting criteria and storage and retrieval procedures have not changed.

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APPENDIX B – WASHINGTON STATE TACT SURVEY

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 semi truck?
 - Never
 - A few times total
 - Used to drive a semi truck regularly
 - Drive semi trucks now
 10. In the past two months, have you changed your driving behavior around semi 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 semi 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