Bicycle Helmet Use:

Workbook and Guide for Evaluating Community-Based Programs

California Office of Traffic Safety

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Finally, we would like to acknowledge the reader. Helmet use is extremely important and measuring the effectives of programs to increase use will help public and private agencies promote bicycle helmets in the future. Your use of this guide is greatly appreciated and will further California's goal of increasing youth safety. If you have any questions or comments about this document, please feel free to contact us.

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Introduction and Purpose

Two thirds of bicycle deaths occur as a result of traumatic brain injury; 88% of these injuries can be prevented by a helmet. In 1994, the State of California passed a law requiring all bicyclists under the age of 18 to wear helmets. Despite these legal obligations, many bicyclists still do not wear helmets. The estimates of bicycle helmet use is disparate throughout the state, with some communities reporting up to 80% use and others, especially inner-city areas, reporting less than 10% use.

The California Office of Traffic Safety (OTS) provides grants for bicycle helmet education programs led by local community organizations. The Traffic Safety Center (TSC) at the University of California, Berkeley, contracted with OTS to develop a set of instructions specifically for these community organizations to measure the impact of their safety intervention program. The instructions presented in this guide are designed to be used by these local programs to 1) evaluate the impact of their activities on bicycle helmet use, 2) evaluate results to improve or modify the programs as needed, and 3) meet contractual evaluation requirements.

In order to meet the goals, this document contains a description of important components of roadside observational studies and suggestions for conducting these studies, as well as information on how to analyze and interpret the results of roadside observational studies. Also, the TSC will offer direct support and guidance to those programs utilizing these instructions. As the law only requires persons 18 years old or younger to wear helmets, this guide focuses solely on youth. However, the same principles of roadside observation and analysis apply to adult bicyclists. Also, this guide addresses only helmet use. It does not prescribe methods of evaluating misuse of bicycle helmets.

How to Use This Workbook

This workbook will help you measure current bicycle helmet use in your targeted area and determine how much helmet use changed after your program intervention. The workbook walks you through the basic steps necessary to conduct the before (or base) and after studies to evaluate the impact of your program. It starts with instructions for conducting observations that can be used in planning your program and in training observers. Then, you will find instructions for setting up your study, and for collecting and analyzing your data.

As you complete the workbook, you can refer to, or click on, the corresponding sections of the Guide, which explains each section of the workbook step-by-step. It provides rationales, as well as some optional analyses you can conduct to understand helmet use in your area.

Evaluating Community-Based Bicycle Helmet Programs

Workbook

In order to conduct your *before/*base and after observations, complete Steps 1-9 below. As you complete the following workbook, turn to or click on the corresponding sections of the Guide, which provides additional explanations of the steps below.

1. Who is your target population? *(See Guide, Step 1)*
My target population is _____.
[For example, "San Bernadino County", "Berkeley High School", "Low Income Adolescents in East LA".]

2. At what sites and times will you be conducting your observations? *(See Guide, Step 2)*

Site A: _____ Time 1: _____ Time 2:_____
Date 1: _____ Date 2: _____
Circle: M T W Th F Sa Su Circle: M T W Th F Sa Su

Site B: _____ Time 1: _____ Time 2:_____
Date 1: _____ Date 2: _____
Circle: M T W Th F Sa Su Circle: M T W Th F Sa Su

Site C: _____ Time 1: _____ Time 2:_____
Date 1: _____ Date 2: _____
Circle: M T W Th F Sa Su Circle: M T W Th F Sa Su

Site D: _____ Time 1: _____ Time 2:_____
Date 1: _____ Date 2: _____
Circle: M T W Th F Sa Su Circle: M T W Th F Sa Su

Site E: _____ Time 1: _____ Time 2:_____
Date 1: _____ Date 2: _____
Circle: M T W Th F Sa Su Circle: M T W Th F Sa Su

Site F: _____ Time 1: _____ Time 2:_____
Date 1: _____ Date 2: _____
Circle: M T W Th F Sa Su Circle: M T W Th F Sa Su

3. What is the current estimate of bicycle helmet use in your area? *(See Guide, Step 3)*
3(a). The current estimate is _____.
3(b). What percentage point increase do you expect your program will have on helmet use? _____. (To be determined with your OTS Coordinator)

4. Refer to Table 1 below to determine the number of observations to make. *(See Guide, Step 4)*
4(a). Number of observations _____. (see Table 1 below)
4(b). Number of observations at each site _____.

Table 1 – Determining the number of observations to conduct.

	Percentage point increase in helmet use that you expect to make with your intervention					
Estimated current rate of helmet use in your target area	**2%**	**3%**	**4%**	**5%**	**10%**	**15%**
	Number of Observations					
10%	1,846	779	414	265	120	50
20%	3,468	1,520	831	515	120	50
30%	4,640	2,041	1,136	695	175	75
40%	5,362	2,371	1,327	810	224	100
50%	5,632	2,502	1,406	860	225	100
60%	5,362	2,371	1,327	810	205	95
70%	4,640	2,041	1,136	695	175	75
80%	3,468	1,520	831	515	120	50
90%	1,846	779	414	265	NA	NA

5. Who are your observers? *(See Guide, Step 5)*
You should have two observers for each site observation. Identify observers and their contact information:

Observer 1: _____
Observer 2: _____
Observer 3: _____
Observer 4: _____
Observer 5: _____
Observer 6: _____
Observer 7: _____
Observer 8: _____
Observer 9: _____
Observer 10: _____

6. Prepare for the Observations. *(See "Protocol for Conducting Observations" at the end of this Workbook and in Guide, Step 6)*

For each observer, prepare a packet that includes the "Protocol for Conducting Observations" at the end of this workbook, a site form, a handful of observation forms (Appendix A), and a safety letter (Appendix C).

To each site, bring 1 Site Form and a handful of Observation Forms. The Observation Forms are used to record each observation. The Site Form is used to tally the observation forms for one site.

When you are finished making all of your observations at all of your sites, use the Summary Form to tally the Site Forms.

7. What is the "before" or "base" program use rate? *(See Guide, Step 7)*

7(a). Total Wearing Helmets (*Before/Base* Summary Sheet) _____.
7(b). Total Bicyclists Observed (*Before/Base* Summary Sheet) _____.

7(c). "Before Program" Use Rate ____% (per formula below)

$$\text{Percent(\%) Wearing Helmets} = \frac{TotalWearingHelmets}{TotalBicydistsObserved}$$

8. Grant Activities *(See Guide, Step 8)*
At this point, you will perform your grant activities.

9. What is the "after" program use rate? *(See Guide, Step 9)*

About a month after your intervention, measure helmet use again.
9(a). Total Wearing Helmets (*After* Summary Sheet) _____.
9(b). Total Bicyclists Observed *(After* Summary Sheet) _____.

9(c). "After Program" Use Rate ____% (per formula below)

$$\text{Percent(\%) Wearing Helmets} = \frac{TotalWearingHelmets}{TotalBicydistsObservered}$$

10. OPTIONAL Multiple Observation Periods (See Guide, Step 10)

If you wish to do multiple observation periods (monthly, quarterly, biannual, annual, etc), simply repeat steps 5, 6, 7, 8, and 9.

Protocol for Conducting Observations

1. Choose specific days and times to match the peak hours of the observation sites. Conduct observations for before/base and after activities on the same days/times and at the same sites. Pick sites that are reasonably representative of the community you are targeting.

2. Identify a safe, convenient location from which to make observations (for example, a raised curb with full view of the surveillance area). For safety and security, observers should work in teams of two.

3. Observe approximately the same number of people at each site. For example, if your sample size is 120 and you will observe at four sites, then you should observe about 30 individuals at each site. If you are not able to observe enough people at a site, you will need to re-assess the site and time of observations at that site. You might need to identify a different site.

4. If there is not a lot of bicycle volume, observe all bicyclists in your target population. If there is a high bicycle volume, select the next bicyclist to observe upon completion of the previous observation. As you look at the bicyclist, notice and record whether the individual is wearing a helmet, if a helmet is present but not worn, or if a helmet is not present.

5. A helmet is being *used* if (1) it's on the person's head *and* (2) it appears to be used properly.

6. A helmet is *present but not used* if (1) it is unbuckled or (2) it is on the handlebars.

7. You should spend up to 1 hour at a time to conduct your observations.

8. Counting rule: Many observers will see a child repeatedly over the course of an observation time. The observer should only count the individual's helmet use if the individual had a chance to take off his/her helmet between the observation times. For example, if the observer sees a child ride around a cul-de-sac multiple times without seeing the child dismount the bicycle, the observer should count the child only once. However, if the observer sees a child ride down the street and out of sight, then return 15 minutes later, the observer should count the child twice.

9. Materials to bring to the observations:
    - Observation packet provided by the grant coordinator at the training session
    - Orange vests or similar safety clothing to make the observers more visible and to identify the observer as having an official role
    - Clipboard (you might want to put "Traffic Survey" in bold letters on the back)
    - Pencils or pens for filling in forms
    - Watch
    - Cell phone, if available
    - Sunblock, hat, and/or sunglasses

Appendix A—Data Collection Forms

1. Site Form
2. Observation Form
3. Summary Form

1. SITE FORM

INSTRUCTIONS

Fill in one of these forms for each observation period at each site, and for observations *before* and *after* the intervention.

Agency Name _____
OTS Grant Number _____
Observation Site Name _____
Size of Target Population _____

Observer Names	
Site Location or Description*	
Traffic Volume	
Date	
Day of the Week	
Time of Day	
Weather	
Total Wearing Helmets	
Total Helmets Not Present	
Total Helmets Present But Not Used	
Total Number of Bicyclists Observed	
(If using Form 2: Total Number Worn Incorrectly)	
Comments	

* Name of shopping center, school, bike trail, street location or intersection

2. OBSERVATION FORM 1: Use and Non-Use

INSTRUCTIONS: *Fill in one (or more, if needed) of this form for each observation session.*

Agency Name _____ Page ____ of ____ for this Site & Time
OTS Grant Number _____
DATE _____
DAY (Circle one): M Tu W Th F Sat Sun
START TIME ____:____ am/pm Observation Site Name_____
END TIME ____:____ am/pm Name of Observer #1_____
TOTAL TIME _____ (minutes) Name of Observer #2_____

Check one: ☐ Observation *Before/Base* Intervention ☐ Observation *After* Intervention

OBSERVATION #	HELMET USED	HELMET NOT PRESENT	HELMET PRESENT, BUT NOT USED
1	☐	☐	☐
2	☐	☐	☐
3	☐	☐	☐
4	☐	☐	☐
5	☐	☐	☐
6	☐	☐	☐
7	☐	☐	☐
8	☐	☐	☐
9	☐	☐	☐
10	☐	☐	☐
11	☐	☐	☐
12	☐	☐	☐
13	☐	☐	☐
14	☐	☐	☐
15	☐	☐	☐
16	☐	☐	☐
17	☐	☐	☐
18	☐	☐	☐
19	☐	☐	☐
20	☐	☐	☐
Total			

2. OBSERVATION FORM 2 (OPTIONAL): Use, Non-Use, Miss-Use, Details

INSTRUCTIONS: *Fill in one (or more, if needed) of this form for each observation session.*

Agency Name _____ Page ____ of ____ for this Site & Time
OTS Grant Number _____
DATE _____
DAY (Circle one): M Tu W Th F Sat Sun
START TIME ____:____ am/pm Observation Site Name _____
END TIME ____:____ am/pm Name of Observer #1_____
TOTAL TIME _____ (minutes) Name of Observer #2_____

Check one: ☐ Observation *Before/Base* Intervention ☐ Observation *After* Intervention

OBSERVATION #	HELMET USED	HELMET NOT PRESENT	HELMET PRESENT BUT NOT USED	HELMET USED INCORRECTLY (CITE REASON)	SEX (Circle)	AGE*
1	☐	☐	☐	☐ _____	M F	
2	☐	☐	☐	☐ _____	M F	
3	☐	☐	☐	☐ _____	M F	
4	☐	☐	☐	☐ _____	M F	
5	☐	☐	☐	☐ _____	M F	
6	☐	☐	☐	☐ _____	M F	
7	☐	☐	☐	☐ _____	M F	
8	☐	☐	☐	☐ _____	M F	
9	☐	☐	☐	☐ _____	M F	
10	☐	☐	☐	☐ _____	M F	
11	☐	☐	☐	☐ _____	M F	
12	☐	☐	☐	☐ _____	M F	
13	☐	☐	☐	☐ _____	M F	
14	☐	☐	☐	☐ _____	M F	
15	☐	☐	☐	☐ _____	M F	
16	☐	☐	☐	☐ _____	M F	
17	☐	☐	☐	☐ _____	M F	
18	☐	☐	☐	☐ _____	M F	
19	☐	☐	☐	☐ _____	M F	
20	☐	☐	☐	☐ _____	M F	
Total						

*Depending on the instructions for your grant coordinator, you might indicate exact age or "E/M/H" for elementary, middle, and high school students.

3. SUMMARY FORM

INSTRUCTIONS: *For each OBSERVATION FORM you filled out, place the "Totals" from that form into a row in the following table. If you filled out multiple observation forms for one site, use a separate row for each observation form. Complete another one of these forms for the "after intervention" observations.*
OPTIONAL: *If you completed the optional observation form for your own purposes, please add the "Helmet Used Improperly" column to the "Helmet Not Present" column for the purposes of this summary sheet for OTS data collection. Thank you.*

Agency Name _____
OTS Grant Number _____
Date(s) _____

Check one: ☐ Observation *Before/Base* Intervention ☐ Observation *After* Intervention

SITE (SPECIFY LOCATION)	**TOTAL** HELMET USED	**TOTAL** HELMET NOT PRESENT	**TOTAL** HELMET PRESENT, BUT NOT USED	**TOTAL*** HELMET NOT WORN CORRECTLY
TOTALS				

Total number of bicyclists observed (add the numbers on the bottom line) _____

* **Only if using Form 2, otherwise keep this column blank!**

Appendix B—Guide

Bicycle Helmet Use: Evaluating Community-Based Programs

Guide Step 1—Who or where is your target population?

To conduct a successful program for increasing helmet use, we recommend that you focus your program on youth that will benefit the most from the program, and that your evaluations of helmet use focus solely on the youth addressed in your program.

Get the Most for Your $$$

To make the most of your funding, focus on youth or sites that need bicycle helmet programs the most. If, for example, you have $100,000 for your grant and want to increase use in an entire urban or suburban county, you will have a difficult time showing results, since the resources will be spread over a large geographic area or population. We recommend focusing your efforts on populations that need your program the most. Does a *segment* of your community have lower than average helmet use rates? Consider possibilities such as:

- Middle school children may engage in high risk behavior and show lower use rates than elementary school riders.

- Children may wear helmets to school because parents influence use before the children leave the house, but those same children might not wear the helmet after school because no adult figure is directing use as students leave.

Measure Only the Children Affected by Your Program

Second, you want to design the evaluation to closely match the intervention. Because you want to capture any impact your program might have, you should conduct the observations for the evaluation *at the same site(s)* (e.g., schools or bicycle trails) targeted by your program. For example, if your program focuses on high school students, high schools and other facilities frequented by high school students should be the site of your helmet observations. Pick 3-5 specific sites for program activities, *and then conduct the before and after observations for the evaluation at those same sites*. It is best to choose observation places that are typically used by people living in the area, as opposed to places that attract people from outside the targeted area, such as regional shopping malls.

Determine Your Target Population

The target population is bicyclists under the age of 18. However, the target population is further defined by the focus of the intervention. If the intervention is aimed at a particular area or population segment of your community, then the target population consists of bicyclists from those areas or population groups.

Guide Step 2—Sites and Times for Conducting your Observations

Choose a Logical Observation Site and Make Observations at Multiple Times Per Site

The observation sites must:

- Be frequented by the people that are targeted for grant activities;
- Attract a fairly high number of the target population for efficiency of data collection; and
- Be comfortable and safe for observers.

Often, school yards, bicycle trails, playgrounds, and local child "hangouts" such as ice cream stores are ideal observations sites. The site should be observed at more than one time of day. In the example mentioned in step 1, children might wear helmets while biking to school, but not *from* school. Refer to the Resource Library in Appendix C for sample letters to distribute to affected school principals, business owners, or curious passers-by.

At certain sites, observation time might be one hour or less, due to spikes in bicycle activity during certain times of the day. Experience indicates that 30 minutes before and after school is a good interval at school sites. Two-hour periods after school and three hour periods on weekends are useful intervals for assessing general helmet use.

Be careful about choosing certain days and times of the day.

Be sure to choose specific days and times to match the peak hours and days of the nearby facility. For example, some schools in your area might have a short school day on certain days of the week, so you may need to choose different "after school" observation times for certain days of the week.

If you are making measurements by a park, school, or other facility that attracts young bike riders at certain times, you may wish to research the schedule of that facility. For example, final examination days, holidays, or teacher-in-service days may not be best for observing bike riders at a school.

Be careful about considering the time of year.

Standard time and daylight savings time will influence bicycling behavior due to differences in sunlight. Be sure to take this into consideration as you plan both the before and after observations so that your observations are comparable.

Weather also influences bicycling behavior with fewer riders when it is hot, cold, or rainy. Seasonal weather changes may make your before and after observations incomparable.

Guide Step 3—Current Estimate of Bicycle Helmet Use in Your Area

Estimate Current Helmet Use in Your Area

You will need to estimate the current helmet use in your area in order to complete the next exercise. The better your estimate of current helmet use, the better decision you can make about how many observations you will need. The better the decision about observations, the more conclusive your findings will be.

Perhaps your community has previously determined the helmet use rate in your area. If so, use the previously reported number. Contact local schools, police or sheriff departments, or local health departments and hospitals to research any previously reported use rates. Some community-based organizations, such as a local SAFEKIDS coalition, may also have information. If no estimate is known, you may wish to make "casual" observations. You, or other volunteers, may informally count the number of bicyclists in your target population, and the number wearing helmets. This informal count will yield a reasonable estimate to use.

The Increase Your Program Will Have on Helmet Use

Before your program begins, you will be meeting with your OTS Coordinator to discuss your goals and objectives and the change you want to see in helmet use.

Guide Step 4—Determine the Number of Bicyclists to Observe

Decide How Many Bicyclists to Observe

If you are star-gazing with a telescope, the smaller (farther) the star or planet you want to see, the more powerful telescope you will need. Likewise, the smaller the change in helmet use you want to observe, the more powerful your study needs to be in terms of numbers of observations. Use Table 1 (next page) to select the recommended minimum number of bicyclists to be observed both before and after your intervention. Even though you will be conducting observations to determine the before (or baseline rate) of helmet use, you still need an *estimate* of baseline use to calculate the recommended sample size.

For example, if you have a starting use rate of around 70%, you need to make about 175 observations to detect an increase of 10 percentage points after the intervention, but only about 75 observations to detect an increase of 15% percentage points.

Table 1 – Determining the number of observations to conduct.

	Percentage point increase in helmet use that you expect to make with your intervention					
Estimated current rate of helmet use in your target area	**2%**	**3%**	**4%**	**5%**	**10%**	**15%**
	Number of Observations					
10%	1,846	779	414	265	120	50
20%	3,468	1,520	831	515	120	50
30%	4,640	2,041	1,136	695	175	75
40%	5,362	2,371	1,327	810	224	100
50%	5,632	2,502	1,406	860	225	100
60%	5,362	2,371	1,327	810	205	95
70%	4,640	2,041	1,136	695	175	75
80%	3,468	1,520	831	515	120	50
90%	1,846	779	414	265	NA	NA

But that's too many observations to make!

Does it seem like you need to make too many observations? In some rural communities, or communities with low bicycle use, it may be difficult to make the necessary number of observations.

Note that the higher the current helmet use rate, and the higher the increase you plan to make, the smaller the number of observations you need. Therefore, the best way to reduce the number of observations is to plan to make a higher increase in helmet use! Obviously, time and resource constraints may prevent such goals. In this case, be sure to mention in your summary that you work with a small population (if possible, include the number of children in your area, and the number that ride bikes).

Perhaps the size of your target population is very small, for example less than 100, because you live in a rural area. If this is the case, sample slightly more than 50% of your population. For example, if your target population is only 40 people, sample at least 21; if your target population is 60, sample at least 31. This method should be reserved for extremely small target populations only.

How many observations should you make at each site?

You should aim to make the same number of observations at each site. For example, if you have chosen five sites, and Table 1 indicates that you should make 100 observations, you should try to make 20 observations at each site. (100 / 5 = 20). Although it is ideal to make the same number of observations at each site, it may not be possible. Aim to make the same number of observations at each site, but if this is not feasible, try to get close to that goal, making sure that your total number of observations is still high enough.

Guide Step 5—Who Are Your Observers?

Find Observers

The next task is to identify and train observers. Observers may be interested community members from the PTA or other community group, students from a local community college interested in learning how to conduct a scientific experiment, cross-walk guides positioned near local schools, police cadets, SAFEKIDS Coalition members, and others. For additional advice, refer to the Resource Library in Appendix C.

Train Observers

To train observers, use the "Protocol for Conducting Observations" sheet at the end of the Workbook. Also, the resource library mentioned in Appendix C is a good source for training materials. For additional advice, refer to the Resource Library in Appendix C.

Guide Step 6—Prepare for the Observations

Data Collection Forms

Review the data collection forms provided in Appendix A:

- A **Site Form** is used to record basic information about the observations at a particular site on a particular day. This form tallies the observations you collect on the **Observation Forms**, and it will help document the *before/base* and *after* observations for each particular site.

- An **Observation Form** is used to record each observation conducted during a particular observation session. If you observe more than 20 bicycles at a site, then you will need to use more than one observation form. There are two Observation Forms you may use-you do not need to use both forms. **Form 1** only includes information required by OTS;

Form 2 includes information required by OTS and allows you to record data that you might be interested in for your own organization.

- A **Summary Form** is used to record the totals from each observation session.

Conduct Observations

Again, review "Protocol for Conducting Observations" at the end of the Workbook and the letter concerning safety in Appendix C.

Guide Step 7—Your *"Before Program"* or *"Base"* Use Rate

At this point, you have a number of Observation forms filled out and are ready to calculate the helmet use rate before your intervention.

Fill out the Summary Form

Copy the bottom "Total" row on each Observation Form onto the Summary Form. If you have completed four observation forms, then just four lines of the Summary Form will be filled in. You can now put aside your Observation Form for safe keeping. On the Summary Form, add all the numbers in each column, and enter these totals in the bottom row. Finally, calculate the total number of observations you made.

Calculate the Helmet Use Rate

From the Summary Form, the total in the "Helmet Used" column, and the total number of bicyclists observed will be used to calculate the percent (%) of bicyclists who wear helmets. This is done by the following calculation:

$$\text{Percent(\%) wearing helmets} = \frac{WearingHelmet}{TotalBicyclistsObserved} \times 100$$

For example, if 135 individuals were observed and 75 wore helmets, the conclusion would be that 55% bicyclists wore helmets before the helmet education program. The formula would be:

$$\text{55\% wearing helmets} = \frac{75}{135} \times 100$$

OPTIONAL

Calculate Additional Use Rates

Depending on your program's goals and objectives, you may have chosen to use **Observation Form** 2. In this case, you might choose to repeat the above calculation for bicyclists who had helmets, but did

not wear them. Use the same procedure you used to calculate the *before* or *base* helmet use rate in order to calculate the percentage of bicyclists who had, but did not wear, their helmets.

$$\text{Percent(\%) Helmet Present But Not Worn} = \frac{TotalHelmet\,\text{Pr}esentButNotWorn}{TotalBicyclistsObserved} \times 100$$

Calculate The "Error" in Your Estimate

Often in the newspaper you will read a sentence like "56% support the poll, and this study had a margin of error of +/- 4%". Do you want to write a news article about your program that says "We started with a helmet usage rate of 15% +/- 3%, then we implemented our intervention program and helmet usage doubled"?

This can be done by calculating a "Margin of Error" (MOE) for your estimate. The MOE is a number range (e.g., "plus or minus 3") that represents the degree to which the study results are "true" or happen due to "luck of the draw." You can calculate a rough MOE by consulting Table 2. (This table offers the margin of error with a 90% confidence level.) To use Table 2 you first need the total number of bicyclists observed, and the percent that wore helmets.

Table 2 – Calculating the Margin of Error (MOE)

	Observed % of Helmet Use (#8c)								
Num of Bicyclists Observed (#8b)	10%	20%	30%	40%	50%	60%	70%	80%	90%
50	7	9	11	11	12	11	11	9	7
100	5	7	8	8	8	8	8	7	5
150	4	5	6	7	7	7	6	5	4
200	4	5	5	6	6	6	5	5	4
250	3	4	5	5	5	5	5	4	3
300	3	4	4	5	5	5	4	4	3
350	3	4	4	4	4	4	4	4	3
400	2	3	4	4	4	4	4	3	2
450	2	3	4	4	4	4	4	3	2
500	2	3	3	4	4	4	3	3	2

Table 2. For example: If you observed 100 individuals, and your observed rate of use was 70%, then the margin of error is 70 plus or minus 8%. Helmet use at your grant sites is between 62 (i.e., 70 – 8) and 78 (i.e., 70 + 8). In general, it is better to have a smaller range; a smaller range means that your estimate is more reliable.

(a). Number of Bicyclists Observed (#7b) _____.
(b). Percent of Bicyclists Wearing Helmets (#7c) _____%.
(c). Baseline, or "Before Intervention" Margin of Error +/- (Table 2) _____%
(d). "Before implementation of our helmet education program, (#b)_____% of bicyclists in this area wore helmets; this finding has a margin of error of plus or minus

(#c)_____%."

Guide Step 8—Conduct Your Grant Activities

At this point, you will perform your grant activities.

OPTIONAL

Please comment on your intervention program.

1. What events are you planning for your intervention program (e.g., enforcement, bicycle safety clinics, workshops, etc)? Please list the events, the data they will take place, the intended audience, and the size of the audience.

Event	Description	Date	Audience	Size
1				
2				
3				
4				

2. What surprises or difficulties were there in the implementation of your interventions?

Event	Description	Surprises/Difficulties/Challenges
1		
2		
3		
4		

3. Did any unintended results or activities occur? Please describe.

_____
_____
_____
_____
_____
_____

4. Please provide other comments or anecdotal information about your program.

_____
_____
_____
_____

_____
_____

Guide Step 9— Your *"After"* Program Use Rate

About a month after your intervention, measure helmet use again.

Measuring helmet use after the intervention is done exactly the same way as it was done before the intervention. Pick the same day of the week, the same time of day and the same location, and try to observe approximately the same number of bicyclists. There is no standard amount of time after the intervention for doing the after observation, but it would be advisable to try to conduct the after observations within a month of the conclusion of the intervention.

You should use the same (blank) data forms for the after observations. Calculate totals for each observation form and calculate overall totals using exactly the same steps as for the before observations. The percent using helmets in the after observation is calculated as before (see page 12).

$$\text{Percent(\%) wearing helmets} = \frac{WearingHelmet}{TotalBicyclistsObserved} \times 100$$

OPTIONAL

Statistically comparing the "Before/Base" and "After" use rates

You should now have an estimate of the percent (%) using helmets before the intervention("% Before") and an estimate of the percent using helmets after the intervention ("% After"). The next task is to compare the difference between the two and get a "Difference Score" (or, percentage point difference). The Difference Score represents the impact of your intervention and is determined by subtracting the percent before (% Before) from the percent using helmets after (% After), or:

Difference Score = (% After) – (% Before).

For example, suppose that the percent wearing helmets before the intervention was 70% and the percent using helmets after the intervention was 76%. The Difference Score (or, percentage point difference) would be 6% (e.g., 76-70=6). The calculation guidelines are below:

(a). % Use *After* Program (#12c) _____%.
(b). % Use *Before* Program (#8c) _____%.
(c). Percentage Point Difference ____ = (*a*) _____ – (*b*) _____

Is it a big difference?

It is important to know if the difference in helmet use rates before and after your program is a "true" difference; that is, would you get the same difference if you did this whole guide and your program all over again? This can also be done calculating a margin of error (MOE) using Table 3 (This is also at a 90% confidence level). Unlike the (optional) MOE on page 14, this MOE describes the statistical error in the difference between the helmet use rates before and after your intervention. In other words, it is the margin of error for the impact of the intervention.

Table 3 on page 17 looks like Table 2 on page 13, but its use is slightly different. First, the number of bicyclists observed should be the ***average number of bicyclists*** observed in the "% Before" and "% After" observations (calculated below). Second, it uses the helmet use rate *before* the intervention (the rate you calculated in workbook item #8c).

First, compute the average number of bicyclists. Using the *Before* Summary sheet and the *After* Summary sheet, the average number of bicyclists can be computed like this:

$$\text{Average \# of bicyclists observed} = \frac{TotalBicyclists(before) + TotalBicyclists(after)}{2}$$

Here is the calculation:

(a). Total Bicyclists Observed *After* (#12b) _____.
(b). Total Bicyclists Observed *Before* (#8b) _____.

(c). **Average number of bicyclists** _____ $= \frac{(a)\_\_\_\_\_ + (b)\_\_\_\_\_}{2}$

Now you are ready to use the table on the following page to look up the Difference MOE.

Table 3 – Calculating the Margin of Error (MOE) of the Difference

	Helmet Use Rate *Before* Intervention (#7c)								
AvgNum of Bicyclists Observed (#14c)	10%	20%	30%	40%	50%	60%	70%	80%	90%
50	11	14	15	16	16	16	15	13	9
100	8	10	11	12	12	11	10	9	6
150	6	8	9	9	10	9	8	7	5
200	5	7	8	8	8	8	7	6	4
250	5	6	7	7	7	7	7	6	4
300	4	6	6	7	7	7	6	5	4

400	4	5	5	6	6	6	5	4	3
450	4	5	5	5	5	5	5	4	3
500	3	4	5	5	5	5	5	4	3

Table (3). If the average number of individuals observed was 100, and the pre-intervention helmet use was 70%, then the MOE is plus or minus 10.

What is the MOE corresponding to the average number of bicyclists and the before/base intervention use rate? (Table 3_____).

So What Does this Difference MOE tell you?

Let's say that the helmet use rate after your intervention was 50%, and your margin of error is 5. This MOE means that if you were to repeat these measurement instructions and your intervention all over again, you would probably measure anywhere from 45 to 55% helmet use after your intervention.

(after rate – MOE) = 50 – 5 = 45
(after rate + MOE) = 50 + 5 = 55

Let's look at another scenario. Let's say the helmet use rate after your intervention was 30%, and your margin of error you found in Table 3 is 12. That means that if you were to measure the after-intervention helmet use rates again, you would find anywhere from 18% to 42% of bicyclists wearing helmets.

(after rate – MOE) = 30 - 12 = 18
(after rate + MOE) = 30 + 12 = 42

Suppose that in this example, you had measured the before intervention helmet use rate as 22%. You know that helmet use after your intervention is anywhere between 18% and 42%. Uh-oh! 18 is less than 22! Does this mean that your program decreased helmet use? This finding just means that your data are not statistically very strong. ***Does this mean we didn't do a good job?*** Not at all, it's very difficult to make observations and there are lots of sources of error in measuring helmet usage, and besides, you just measured a "random" sample- maybe you had "strange luck", like rolling 5 dice and having a "6" appear on each of the dice. In your report, you might want to mention the difficulties you encountered while making helmet observations- this would provide invaluable lessons to you and to other programs.

What are your conclusions?
(a) Before Intervention Helmet Use Rate (#8c) _____.
(b) After Intervention Helmet Use Rate (#12c) _____.
(c) Margin of Error in the Difference (MOE, #16) _____.
(d) (after rate – MOE) = (b)_____ - (c) _____ = _____.
(e) (after rate + MOE) = (b)_____ + (c) _____ = _____.

Conclusion: Before your bicycle helmet education program, the helmet use rate in your target population __*(target population)* ___, was (a) _____. After your bicycle helmet

education program, the helmet use rate was (b) _____ plus or minus (c) _____. If (d) are (e) are greater than (a), then you are confident that your education program increased helmet use-congratulations! If (#16d) or (#16e) is equal to or less than (a), then you are not completely confident that your education program increased helmet use; if this is the case, in your written summary to OTS, please describe the difficulties you encountered while conducting your program or making your observations.

Here are some examples:

Case A:

Child Bicyclist Safety Program A proposed to increase helmet use in its city by providing a series of bike rodeos at a park frequented by families of the city. Because there were not sufficient resources to evaluate the impact on the entire community, a particular section of the city with relatively low helmet use was selected for the intervention and the observations. The survey taken before the intervention showed a helmet use rate of 20%. The survey taken after the intervention showed a helmet use rate of 40%. About 150 individuals were observed before the intervention, and about the same number of bicyclists was observed after the intervention.

Interpretation of Case A:

The helmet rate increased from 20% before the intervention to 40% after the intervention. With about 150 bicyclists observed, and with a baseline rate of 20%, the MOE is plus or minus 8% (Table 3). In other words, the helmet use rate after the program is really between 32% and 48% (40% - 8% = 32%; 40% + 8% = 48%). You can conclude that "Helmet use at the selected sites **increased** since the implementation of grant activities."

Case B:

Child Bicyclist Safety Program B proposed to increase helmet use by 5% at 5 local schools. "Before" observations, intervention activities, and "after" observations were conducted at the same five schools. About 40 individuals were observed at each school before the intervention, and about the same number were observed after the intervention. The helmet use rate was 45% before the intervention and 50% after the intervention.

Interpretation of Case B:

With about 200 individuals observed (about 40 at each of five schools), and a baseline rate of 45%, the MOE is plus or minus 8% (see Table 3). That is, the true helmet use rate after Program B is somewhere between 42% and 58% (50% - 8% = 42%; 50% + 8% = 58%). Although a net increase in use was observed in the difference calculation (50 – 45 = 5), the MOE calculations lead us to conclude that the increase could have come about by chance; i.e., was not due to the intervention. Claims about the impact of the program should be made with caution.

Step 10— Multiple Observation Periods *OPTIONAL*

If you wish to do multiple "observations", simply repeat steps 6, 7, 8, 9, and 10. You may copy the worksheet form, including your entries for steps 1,2,3,4 (you do not need to re-measure or re-calculate anything in the first four steps), then fill out the updated information for steps 6, 7, 8, 9, and 10. This procedure will result in periodic (monthly, quarterly, biannual, yearly, etc) reports.

Appendix C—Resource Library

Statewide Integrated Traffic Records System (SWITRS)
http://www.chp.ca.gov/html/switrs2000.html

Their online reports can give you the total number of bicycle injuries and fatalities that occurred in your town and county in 2000, as well as the bicycle fatalities by age group for the state of California.

California Health Interview Survey (CHIS)
http://www.chis.ucla.edu

You can use this source to get an initial estimate of bicycle helmet usage in your area. CHIS 2001 collected health information from adults, adolescents, and children from over 55,000 households in California. CHIS 2003 is currently in progress. The questionnaires included questions about bicycle helmet use.

Note: Self-reports, especially parent reports on a child's behavior, give artificially high rate of helmet usage. Please keep this in mind when reviewing CHIS and other self-report forms.

Your Local Health Department

Contact your local health department to find out about any previous bicycle safety assessments or safety programs that took place in your area.

Your Local Law Enforcement Agency

Contact your local law enforcement agency to learn about any previous bicycle safety assessments or safety programs that took place in your area.

Bicycle Helmet Safety Institute
http://www.bhsi.org/

This website has many suggestions for how to design your bicycle helmet education program, what facts are useful to distribute in program pamphlets, how to tell if a helmet is correctly worn, etc.

National Highway Transportation Safety Administration's Bicycle Helmet Program
http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/index.html

This website has many suggestions for bicycle helmet programs. It also describes national programs, provides fact sheets on bicycle injury, and describes how to obtain their bike safety video.

California Department of Health Services: California Bicycle Helmet Campaign
http://www.dhs.ca.gov/epic/Bike

This document is a how-to guide to providing low-cost helmets to children.

Sample Memo to Observers about Safety

TO: All Bicycle Study Observers
SUBJECT: Your Safety

Thank you for agreeing to serve as an observer in the bicycle helmet use study. I hope that you find this study interesting. The work you are doing is very important.

It is also very important that you conduct your observations according to the instructions provided during the training. However, your safety comes first. It at any time during your observations you feel uncomfortable, unsafe, or an emergency occurs, please leave the observation area and contact _____ by calling _____.

If someone approaches you during the observations and questions your presence, you should offer to show them the letter that explains this study. The letter is included in your observer's packet.

Please return the completed survey materials to _____. (Optional: Payment will be mailed to you according to the guidelines discussed during the training.)

Thank you very much for your participation.

Sincerely,

_____ (Name)

_____ (Office)

Sample Letter for School Principals or Business Owners

Dear *School Principal/Business Owner*,

We are very pleased to be able to report to you that the _____ [your organization] has been funded by the California Office of Traffic Safety to conduct a helmet safety program. The goal of our program is to _____ [refer to grant goals with OTS coordinator]. The proper use of bicycle helmets reduces the risk of injury, disability, and death by 85%.

As a crucial first step to help evaluate our efforts, our staff need to observe bicycle riders in your community during the month of _____ to determine the current rate of helmet use. Your school will serve as a hub to plan the observations. Our research protocol requires the observation of at least _____ [refer to Step 4] bicyclists.

We are sensitive to the area of neighborhood safety. The majority of observers will be recruited from your community and each will have letters of introduction with them should any parents or community members be concerned about their presence. Please **DO NOT** alert your students to the survey activities, we do not wish to artificially increase or decrease the rate of helmet use in your area.

Thank you very much.
Sincerely,

_____ (Name)
_____ (Office)
_____ (Contact)

Sample Letter for Passers-by Explaining the Study

(for use when people ask during the observation)

Dear Community Member,

My name is _____ and I volunteer for _____.

We are working on a bicycle safety study with the California Office of Traffic Safety. The purpose of the study is to make sure that our helmet education programs are reaching our community. As you know, helmets are the most important way to keep bicyclists safe. You can find more information on our grant at http://www.ots.ca.gov/cgi-bin/grants.pl. Our grant name is _____ and our OTS grant number is _____.

We are observing bicyclists under the age of 18 in order to see whether these individuals are using a helmet. Observations will occur on various days of the week for *one hour before school, two to three hours after school, and for three weekend hours in this community*. We are not recording any identifying information. If you are interested, we have a brochure about helmets for you.

If you have further questions, please contact _____ at _____.

Thank you very much.

Sincerely,

_____ (Name)

_____ (Office)