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# **The 2015 North Carolina Seat Belt Survey and Other Analyses**

## **Final Report**

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# **1. THE NORTH CAROLINA SEAT BELT SURVEY**

Annual seat belt surveys are conducted by the State of North Carolina to fulfill the requirements of the National Highway Traffic Safety Administration (NHTSA). The survey is conducted in June after the Governor's Highway Safety Program's (GHSP's) Click It or Ticket program is completed. The Click It or Ticket program in North Carolina has served as a successful pilot project for similar programs nationally, and has been conducted annually since October 1993 as an enforcement and education campaign dedicated to reducing injuries and deaths in motor vehicle accidents by increasing seat belt use.

## **1.1 NHTSA Seat Belt Survey Certification for 2015**

RTI International will submit the required documents detailing that the 2015 North Carolina Seat Belt Survey was compliant with Federal Register's final rule, published on April 1, 2013 (2127-AK41).<sup>1</sup> The report will describe the data collection dates, quality check information, weights, and data used to create estimates of state seat belt use.

## **1.2 NHTSA 120-Site Results**

In addition to the 120 sites selected in accordance with the NHTSA-certified plan, the North Carolina Governor's Highway Safety Program opted to include an another 80 sites in 10 additional counties for the June 2015 sample, bringing the final total number of sites observed to 200 sites. Because the 200-site sample generally reflected the trends shown by the 120-site sample with minimal differences between estimates, the overall estimates from the 200-site sample will be discussed later in this report to represent the statewide estimates. However, the 120-site sample estimates can be directly compared to the June 2014 estimates.

Table 1-1 presents the overall results of 120-site sample of the June 2015 North Carolina Seat Belt Survey that can be compared with results from the 2014 June survey. Within the 120-site sample, the June 2015 weighted statewide seat belt usage rate for drivers (D) is 89.8%, compared with 90.9% of drivers who were observed using seat belts in the June 2014 survey. This year's weighted statewide usage rate for right front-seat passengers (RF) is 90.3%, which is up from 89.7% in June 2014. The 2015 weighted usage rate for drivers and front-seat passengers combined (D+RF) is 89.9%, which is down slightly from the 2014 rate of 90.6%.

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<sup>1</sup> <http://www.gpo.gov/fdsys/pkg/CFR-2013-title23-vol1/pdf/CFR-2013-title23-vol1-sec1340-10.pdf>

**Table 1-1. North Carolina Seat Belt Usage Rates, Unweighted and Weighted: 120-Site June 2015 Survey**

Category	Unweighted	Weighted		Sample Size
	Use %	Use %	SE %	
<b>Overall</b>				
Driver	91.0	89.8	0.8	26,807
Passenger	91.7	90.3	1.3	6,693
Combined	91.1	89.9	0.7	33,500
<b>Urban/Rural</b>				
Urban	92.1	91.5	0.6	22,056
Rural	86.0	84.6	1.7	4,751
<b>Region</b>				
Mountain	91.0	90.0	0.5	11,228
Piedmont	92.2	91.9	1.1	7,511
Coast	89.9	88.0	1.7	8,068
<b>Vehicle Type</b>				
Car	91.8	90.2	0.8	12,912
Van	87.1	85.7	2.8	675
Minivan	94.6	94.7	1.0	1,620
Pickup Truck	87.7	86.3	1.3	5,175
Sport-Utility Vehicle	92.5	92.0	0.9	5,700
<b>Sex of Driver</b>				
Male	89.5	87.8	1.0	7,339
Female	92.8	93.0	0.5	5,395
<b>Race/Ethnicity of Driver</b>				
White	91.4	90.3	0.9	9,671
Black	88.9	89.2	1.3	2,195
Hispanic	89.3	90.4	2.1	628
Native American	83.7	82.7	5.1	98
Asian	96.6	97.3	1.7	116
<b>Age of Driver</b>				
16-24	85.4	80.9	3.0	656
25-64	91.2	90.8	0.7	10,881
65+	91.1	89.7	1.8	1,234
<b>Cell Usage</b>				
Cell	5.6	6.1	0.3	1,509
Text	1.6	2.5	0.7	430



### 1.3 Overall Results

Table 1-2 presents the overall results from the 200-site June 2015 North Carolina Seat Belt Survey. As mentioned in Section 1.2, the sample was expanded to include 10 additional counties; these were Brunswick, Buncombe, Cumberland, Davidson, Durham, Forsyth, Gaston, Rockingham, Sampson, and Wayne counties.

**Table 1-2. North Carolina Seat Belt Usage Rates, Unweighted and Weighted: 200-Site June 2015 Survey**

Category	Unweighted	Weighted		Sample Size
	Use %	Use %	SE %	
<b>Overall</b>				
Driver	90.8	<b>90.0</b>	1.2	46,039
Passenger	91.3	<b>90.5</b>	1.8	11,453
Combined	90.9	<b>90.1</b>	1.3	57,492
<b>Urban/Rural</b>				
Urban	91.3	<b>90.1</b>	1.1	33,117
Rural	89.5	<b>89.9</b>	2.1	12,922
<b>Region</b>				
Mountain	91.3	<b>89.2</b>	1.4	16,276
Piedmont	91.2	<b>90.4</b>	2.7	16,553
Coast	89.9	<b>90.4</b>	1.2	13,210
<b>Vehicle Type</b>				
Car	91.7	<b>90.4</b>	1.1	22,021
Van	86.7	<b>84.3</b>	2.1	1,230
Minivan	93.9	<b>91.4</b>	2.4	2,821
Pickup Truck	87.6	<b>87.3</b>	2.8	8,637
Sport-Utility Vehicle	92.5	<b>93.2</b>	1.0	9,911
<b>Sex of Driver</b>				
Male	89.7	<b>88.7</b>	1.7	12,483
Female	92.4	<b>90.6</b>	1.1	8,992
<b>Race/Ethnicity of Driver</b>				
White	91.1	<b>89.4</b>	1.3	16,185
Black	90.1	<b>90.2</b>	1.0	3,845
Hispanic	89.6	<b>86.0</b>	3.7	1,120
Native American	84.8	<b>83.1</b>	5.1	105
Asian	95.6	<b>95.8</b>	2.6	181

(continued)

**Table 1-2. North Carolina Seat Belt Usage Rates, Unweighted and Weighted: 200-Site June 2015 Survey (continued)**

Category	Unweighted	Weighted		Sample Size
	Use %	Use %	SE %	
<b>Age of Driver</b>				
16-24	84.9	<b>79.4</b>	3.1	1,121
25-64	91.1	<b>90.2</b>	1.1	18,346
65+	91.3	<b>87.3</b>	2.7	2,075
<b>Cell Usage</b>				
Cell	5.8	<b>6.4</b>	0.6	2,664
Text	1.7	<b>2.0</b>	0.2	799

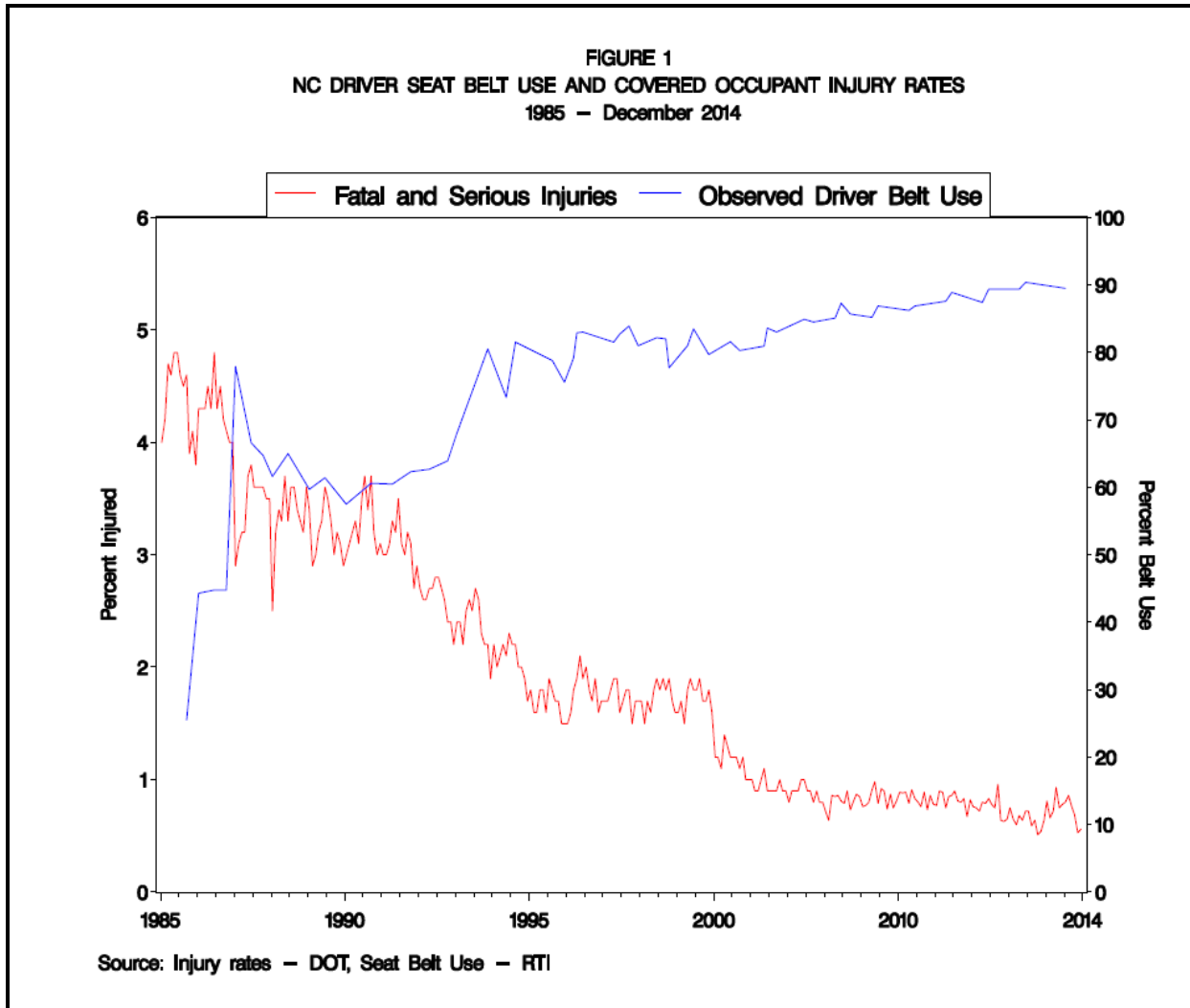
The June 2015 weighted statewide seat belt usage rate for drivers (D) is 90.0%. This year’s weighted statewide usage rate for right front-seat passengers (RF) is 90.5%, and the 2015 weighted usage rate for drivers and front-seat passengers combined (D+RF) is 90.1%. Although overall results from the larger 200-site sample reflect most of the same trends as the 120-site sample, the estimates from the larger sample indicate a slightly higher rate of combined driver and right front passenger seatbelt use statewide (89.9% overall combined seatbelt use in the 120-site sample versus 90.1% in the 200-site sample).

**1.3.1 June 2015 Comparisons and Trends**

Figure 1-1 presents noteworthy historical data for driver belt-usage trends versus serious or fatal injury rates for drivers. Note the continuing strong relationship between increasing driver belt-usage rates and decreasing serious and fatal injury rates, especially after the implementation of Click It or Ticket in October 1993. As driver belt use rose from 25% to 90%, driver injury rates fell from a high of nearly 5% in 1985–1986 to a rate of less than 0.75% in 2009.

Some general trends (see Table 1-1) have not continued into recent survey years. For example, since the passage of the North Carolina seat belt law in October 1985, combined usage rates generally have been highest among drivers and passengers of minivans. More recently, the highest combined seat belt use was observed among SUV drivers and passengers. This type of trend change is likely reflective of the increase in popularity of the SUV as a family vehicle, as well as the significant increase in crossover vehicles on the market.

**Figure 1-1. North Carolina Driver Seat Belt Use versus Serious and Fatal Injury Rates, 1985–2014**



Source: Prepared by RTI International—Revised September 17, 2015.

Note: The North Carolina Click it or Ticket campaign kicked off in 1993.

However, most of the other trends from past surveys are present in the June 2015 survey results. In brief, these include

- higher combined usage rates among drivers and passengers of sport utility vehicles (93.2%), minivans (91.4%), and cars (90.4%), but much lower usage rates for drivers and passengers of pickup trucks (87.3%) and vans (84.3%);
- higher belt usage rates for women (90.6%) than for men (88.7%), although the difference has been decreasing over the years (e.g., in June 2001, the rates were 89.9% and 81.1%, respectively);
- lower usage rates for drivers under 25 (79.4%); and

- higher usage rates for Asians (95.8%) than for whites (89.4%), blacks (90.2%), or Hispanics (86.0%); note the relatively small sample sizes for Asian and Native American occupants.

This report also includes a series of tables that further describe belt usage trends across North Carolina. Table 1-3 shows D, RF, and D+RF belt-usage rates by county for this survey year. The observed combined (D+RF) belt usage rates in June exceed 90% in 13 of the 25 counties surveyed in the 200 site study. Specifically, those are Alamance (93.8%), Buncombe (91.9%), Caldwell (93.9%), Catawba (91.2%), Franklin (90.7%), Guilford (92.5%), Johnston (95.5%), Mecklenburg (90.7%), Nash (95.1%), Onslow (90.2%), Rockingham (96.0%), Wake (92.6%), and Wayne (96.1%) counties. Of these 13 counties, 3 belonged to the group of additional 10 counties added to the June 2015 sample. The counties with the lowest combined seat belt usage rates were Robeson (83.3%) and Harnett (86.4%) counties, part of the original sample. Seat belt usage also lags in Brunswick (87.4%), Cabarrus (89.0%), Columbus (88.2%), Cumberland (87.8%), Davidson (88.7%), Durham (88.4%), Forsyth (89.8%), Gaston (87.9%), Rowan (88.2%), and Sampson (87.9%) counties. Out of the 10 counties added to the sample, 7 had combined seat belt usage rates under 90%. For the counties sampled in both 2014 and 2015, Nash county had the highest increase from the previous year in combined seat belt usage rate (86.9% to 95.1%), and Harnett and Robeson counties had the largest decreases in combined seat belt usage rates from 2014 to 2015 (92.2% to 86.4% and 88.6% to 83.3%, respectively).

**Table 1-3. North Carolina Seat Belt Usage Rates by County, Weighted: 200-Site June 2015 Survey**

County	Driver (D)	Passenger (RF)	Combined (D+RF)	Sample Size
Overall	90.0	90.5	90.1	57,492
Alamance	93.7	94.3	93.8	2,722
Brunswick*	88.0	84.8	87.4	2,549
Buncombe*	91.9	91.8	91.9	3,926
Cabarrus	89.0	88.8	89.0	2,072
Caldwell	93.3	91.6	93.0	2,886
Catawba	91.8	88.6	91.2	3,097
Columbus	87.7	90.1	88.2	1,641
Cumberland*	89.1	82.5	87.8	1,428
Davidson*	89.1	87.1	88.7	2,907
Durham*	90.1	81.6	88.4	1,607
Forsyth*	89.4	91.7	89.8	4,243
Franklin	90.4	91.8	90.7	1,247

(continued)

**Table 1-3. North Carolina Seat Belt Usage Rates by County, Weighted: 200-Site June 2015 Survey (continued)**

County	Driver (D)	Passenger (RF)	Combined (D+RF)	Sample Size
Gaston*	87.1	91.9	87.9	2,413
Guilford	92.4	93.6	92.5	2,227
Harnett	86.9	84.4	86.4	1,419
Johnston	96.4	91.8	95.5	1,799
Mecklenburg	89.5	96.6	90.7	2,682
Nash	95.1	95.0	95.1	1,279
Onslow	90.2	90.6	90.2	2,459
Robeson	82.1	86.5	83.3	3,246
Rockingham*	95.2	98.8	96.0	2,461
Rowan	87.7	90.3	88.2	3,241
Sampson*	87.4	90.2	87.9	1,083
Wake	93.1	88.1	92.6	1,483
Wayne*	96.0	96.3	96.1	1,375

\*Excluded from NHTSA sample.

Table 1-4 provides weighted D, RF, and D+RF seat belt use estimates for a series of surveys dating back over to 2007. There are increased belt-usage rates over the 8 years for all groups. Drivers increased from 80% in 1999 to 90.0% in 2015. RF passengers increased from 76% in 1999 to 90.5% in 2015, and the combined rate increased from 79% in 1999 to 90.1% in 2015. For the first time in 2015 there was an observed belt use of 90% for both drivers and RF passengers resulting in a combined statewide belt use rate of 90.1%. This could be due to the increased sample size and is within the expected margin of error for survey estimates. Future survey years will tell if passengers will continue buckling up at a rate closer to that of drivers.

Table 1-5 presents longitudinal data on observed belt use overall (D+RF) by region; vehicle type; and sex, age, and race/ethnicity of drivers. Again, note the general consistency of the trends across the surveys from 2007 through June 2015, with the exception of driver age in the June 2009 survey. Also note that overall seat belt use has plateaued in recent years, and the small variation is likely due to the natural variance that occurs when selecting a sample.

**Table 1-4. Observed Seat Belt Use in North Carolina (%), Weighted**

Survey Periods	Driver (D)	Passenger (RF)	Combined (D+RF)
2007			
June <sup>a</sup>	89.4	84.7	88.8
2008			
June <sup>a</sup>	90.4	85.5	89.8
2009			
June <sup>a</sup>	89.8	88.8	89.5
2010			
June <sup>a</sup>	90.4	86.7	89.7
2011			
June <sup>b</sup>	90.8	84.8	89.5
2012			
June <sup>b</sup>	88.0	85.7	87.5
2013			
June <sup>b</sup>	89.6	84.9	88.6
2014			
June <sup>b</sup>	90.9	89.7	90.6
2015			
June <sup>c</sup>	90.0	90.5	90.1

<sup>a</sup> This survey was conducted at 121 sites.

<sup>b</sup> This survey was conducted at 120 sites.

<sup>c</sup> This survey was conducted at 200 sites.

**Table 1-5. Seat Belt Use Trends in North Carolina (%), Weighted**

	June								
	2007 <sup>1</sup>	2008 <sup>1</sup>	2009 <sup>1</sup>	2010 <sup>1</sup>	2011 <sup>2</sup>	2012 <sup>2</sup>	2013 <sup>2</sup>	2014 <sup>2</sup>	2015 <sup>3</sup>
<b>Overall (D+RF) Rate</b>	88.8	89.8	89.5	89.7	89.5	87.5	88.6	90.6	90.1
<b>Region</b>									
Mountain	90.6	91.3	89.3	89.5	91.6	90.3	90.3	93.1	89.2
Piedmont	88.7	91.0	91.2	91.1	91.5	87.4	88.2	89.8	90.4
Coast	90.9	88.0	86.2	88.8	87.1	84.6	87.5	90.0	90.4

(continued)

**Table 1-5. Seat Belt Use Trends in North Carolina (%), Weighted (continued)**

	June								
	2007 <sup>1</sup>	2008 <sup>1</sup>	2009 <sup>1</sup>	2010 <sup>1</sup>	2011 <sup>2</sup>	2012 <sup>2</sup>	2013 <sup>2</sup>	2014 <sup>2</sup>	2015 <sup>3</sup>
<b>Vehicle Type</b>									
Car	90.4	91.4	91.2	91.4	92.2	90.6	90.3	91.6	90.4
Van	87.1	84.4	75.7	79.9	80.9	77.3	83.8	86.8	84.3
Minivan	96.0	93.6	91.1	94.5	94.4	92.7	93.9	94.4	91.4
Pickup Truck	84.0	86.1	85.5	84.1	86.1	82.0	84.5	86.7	87.3
Sport-Utility Vehicle	90.2	91.0	90.8	91.6	91.8	91.0	92.8	94.1	93.2
<b>Sex of Driver</b>									
Male	87.4	88.9	88.1	87.8	89.5	85.5	87.9	89.2	88.7
Female	94.7	91.9	92.9	93.5	93.2	92.3	92.4	93.1	90.6
<b>Age of Driver</b>									
16–24	88.8	86.9	92.2	86.6	88.0	89.4	85.5	89.1	79.4
25–44	89.6	90.5	89.6	90.1	90.9	88.3	90.2	90.6	90.2
45–64	91.7	89.5	92.5	90.1	90.9	88.3	90.2	90.6	90.2
65+	87.7	98.0	81.0	96.8	93.6	88.2	87.5	95.2	87.3
<b>Race/Ethnicity</b>									
White	90.9	91.2	91.1	90.3	91.3	89.2	91.0	91.8	89.4
Black	87.4	85.8	83.6	89.6	89.1	85.8	85.7	88.0	90.2
Hispanic	99.3	96.0	96.2	95.4	93.5	89.6	86.5	91.2	86.0

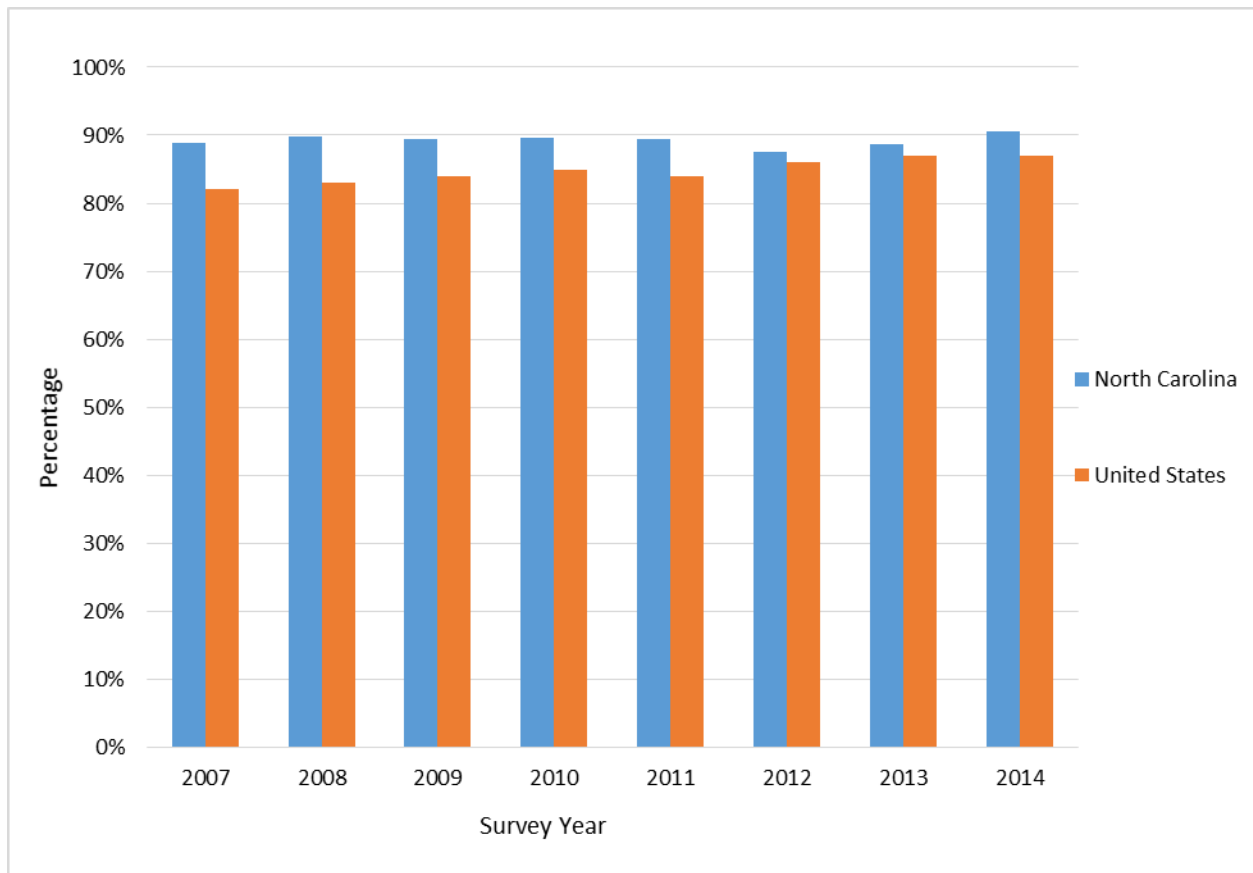
<sup>1</sup> This survey was conducted at 121 sites.

<sup>2</sup> This survey was conducted at 120 sites.

<sup>3</sup> This survey was conducted at 200 sites.

The results discussed previously are shown graphically in Figure 1-2. In particular, Figure 1-2 and Table 1-5 show the upward trend of the combined (D+RF) belt usage rate in North Carolina from about 89% in 2007 to 90% in 2015. The rate of belt use in North Carolina has been consistently between five and 15 percentage points higher than the national rate, with the national rate increasing from 82% in 2007 to 87% in 2014.

**Figure 1-2. Longitudinal View of North Carolina’s Combined Seat Belt Usage Compared with National Combined Seat Belt Usage, 2007–2014**



## 1.4 Discussion

Trends, figures, and tables in this report are based on the weighted rates of seat belt use. The weighted rates are the best estimators of seat belt use for the entire state and for reported subgroups (e.g., male vs. female drivers). Estimates for the Asian subgroup with only 116 drivers and Native Americans with only 98 drivers should be used with caution when extrapolating these results to the entire Asian or Native American population of North Carolina.

The 2015 seat belt survey continued to assess statewide use of cell phones while driving. The 2014 seat belt survey was the second statewide survey in North Carolina to assess the use of cell phones to talk and text while driving. The weighted rates of both texting and talking on a cell phone while driving increased from 2014 to 2015 among the 120-site NHTSA sample. The rates of texting in North Carolina increased from 1.2% in 2014 to 2.5% in 2015, and the rates of cell phone use to talk while driving increased from 5.5% to 6.1%. The use of cell phones for talking or texting can occur on and off multiple times throughout a trip, making observational and self-reported usage rates vary. It is important to note that



the trend associated with using a cell phone while driving shows the rates of use increasing. Over time, it will be important to pay attention to this trend as cell phone use while driving can be a transportation safety hazard.

## 1.5 Recommendations

The various usage rates (D, RF, and D+RF) observed in North Carolina have plateaued in the 87%–90% range since 2007. Many states struggle to reach the most resistant groups in the population. However, 10 states with primary laws like North Carolina (California, Hawaii, Illinois, Iowa, Maryland, Michigan, Nevada, Oregon, Texas, and Washington) have consistently maintained reported combined usage rates of 90% or more from 2007 to 2014.<sup>2</sup>

These states employ survey methodologies different from North Carolina, and they may have lower rates in future years because of the required changes in the survey procedures. What might North Carolina do to increase its seat belt wearing rates? Recommendations continue to be the following:

- **Assign driver license points for seat belt infractions.** If North Carolina is indeed similar to other areas, then this measure should be effective among drivers with lower seat belt usage rates (e.g., young male drivers, pickup truck drivers, and van drivers) who generally have poorer driving records and cannot afford to gain additional points.<sup>3,4</sup>
- **Raise the fine** (currently \$161 when combined with court costs).
- **Impose community service hours for infractions.**
- **Publicize local seat belt tickets by jurisdiction** (to motivate local drivers and police agencies).

## 1.6 Conclusion

The June 2015 survey was successful in providing updated estimates of seat belt usage following the Click It or Ticket campaign for drivers and passengers statewide and within geographic areas, by vehicle type and by important driver and passenger characteristics. Many of the previously observed seat belt usage trends have continued through the 2015 survey. For example, female drivers have consistently worn their seat belts more often than male drivers. However, trends of belt use within region and age group are changing and require monitoring in future years. Appendix A contains more detailed tables, which may be

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<sup>2</sup> Chen, Y. Y. (2015, June). Seat belt use in 2014—use rates in the states and territories. (Report No. DOT HS 812 149). Washington, DC: National Highway Traffic Safety Administration.1-3.

<sup>3</sup> Williams, A. F., Reinfurt, D. & Wells, J. A. (1996). Increasing seat belt use in North Carolina. *Journal of Safety Research*, 27(1), 33-41.

<sup>4</sup> Manduca, P. L. (1983). *Raising the seat belt wearing rate in the Province of British Columbia*. Insurance Corporation of British Columbia.

useful to North Carolina in planning future campaigns. Information on the Seat Belt Survey methodology can be found in Appendix B.

Over the years in which the Click It or Ticket program has been in place (since October 1993), there have been diminishing returns for the increasing seat belt usage rates; that is, there have been only very small increases from year to year. For the past few years, we have seen pre-campaign April survey results for a given year that reflected usage rates very similar to those observed in the preceding post-campaign June survey. Accordingly, these years have also seen very small increases in usage rates between pre- and post-campaign April/June survey results. Although there is great statistical power to detect small changes in usage rates, recent years' changes usually have been statistically significant, but not of any practical use in shaping traffic safety policy. For this reason, North Carolina terminated the April pre-campaign survey and currently only conducts a June post-campaign survey.

We continue to recommend enhancements to the sanctions for failure to wear a seat belt while driving, including increases to fines and issuance of driver license points, as well as looking to other particularly successful state programs for ways to improve belt-wearing rates. With no current expectations of meaningful improvements in state seat belt usage rates in North Carolina, there is also the possibility of moving some Click It or Ticket occupant restraint funding to other programs, based on an investigation of how much funding is needed to maintain current seat belt usage levels. North Carolina seat belt rates have plateaued at about 90%, and the Click It or Ticket program, per se, does not appear to be the solution to influencing the remaining 10% of drivers to use their seat belts. We believe it is time to give serious consideration to other options.

## **2. THE NIGHTTIME SEAT BELT SURVEY**

### **2.1 2015 Study & Methods**

In 2015, RTI staff conducted a third nighttime data collection study. Following recommendations and lessons learned from the previous nighttime studies, RTI continued to use tablet devices, as well as more sophisticated night-vision technology.

This study tested several aspects of nighttime data collection that were implemented in the 2015 Nighttime Seat Belt Survey. The results of this pilot study informed the standard operating procedures for field observer training, including lighting conditions conducive to data collection, the feasibility of more sophisticated night-vision technology, the use of electronic data collection forms on tablet devices, relations with police departments, and data quality. Prior to data collection, letters were sent to the police department notifying officers of the study. Field observers carried authorization letters on their persons at all times. Field observation for all nighttime data collection used the same tablet application developed for the June seat belt survey, with the addition of nighttime-specific features. Data collection was performed specifically with Samsung Galaxy Tab 7.0 Plus tablets, and pairs of field observers collected data from the regular 120-site sample selected in compliance with NHTSA and described in Section 1.2. Though the same sample was used, the nighttime data collection was stratified by 3 time periods: 10:00pm to 11:59pm, 12:00am to 1:59am, and 2:00am to 5:00am.

### **2.2 Nighttime 120-Site Results**

As demonstrated in Tables 2-1 and 2-2, and Figure 2.1, seat belt wearing rates varied between the day and night observations. The sample size was relatively small (n=3,138) in this study, giving the preliminary statistical tests between night and day belt use low power to detect differences. The small sample size should also be taken in consideration when discussing the results of the 2015 nighttime survey, as the low traffic volume at night can contribute to sampling error. Figure 2.1 displays slightly higher combined seatbelt usage rates during the nighttime for Alamance, Caldwell, Catawba, Harnett, Nash, and Robeson counties. Although it appears there is higher belt use in these counties during the nighttime hours, this is likely due to sampling error, and the rates are within the expected margins of error.

**Table 2-1. North Carolina Seat Belt Usage Rates, Unweighted and Weighted: 120-Site Nighttime 2015 Survey**

Category	Unweighted	Weighted		Sample Size
	Use %	Use %	SE %	
<b>Overall</b>				
Driver	91.0	<b>91.5</b>	0.8	2,606
Passenger	79.7	<b>85.1</b>	3.2	532
Combined	89.1	<b>90.5</b>	1.0	3,138
<b>Urban/Rural</b>				
Urban	91.3	<b>92.2</b>	0.8	2,197
Rural	89.7	<b>87.3</b>	3.1	409
<b>Region</b>				
Mountain	91.4	<b>92.2</b>	1.3	1,181
Piedmont	92.2	<b>91.8</b>	0.8	976
Coast	87.3	<b>89.2</b>	3.5	449
<b>Vehicle Type</b>				
Car	89.6	<b>89.8</b>	1.4	1,504
Van	94.2	<b>98.9</b>	0.8	52
Minivan	95.3	<b>95.7</b>	2.8	107
Pickup Truck	91.0	<b>93.2</b>	1.5	343
Sport-Utility Vehicle	94.1	<b>95.2</b>	1.7	512
<b>Cell Usage</b>				
Cell	4.0	<b>4.7</b>	0.8	105
Text	2.0	<b>1.7</b>	0.5	53

**Table 2-2. North Carolina Seat Belt Usage Rates by County, Weighted: Nighttime 2015 Survey**

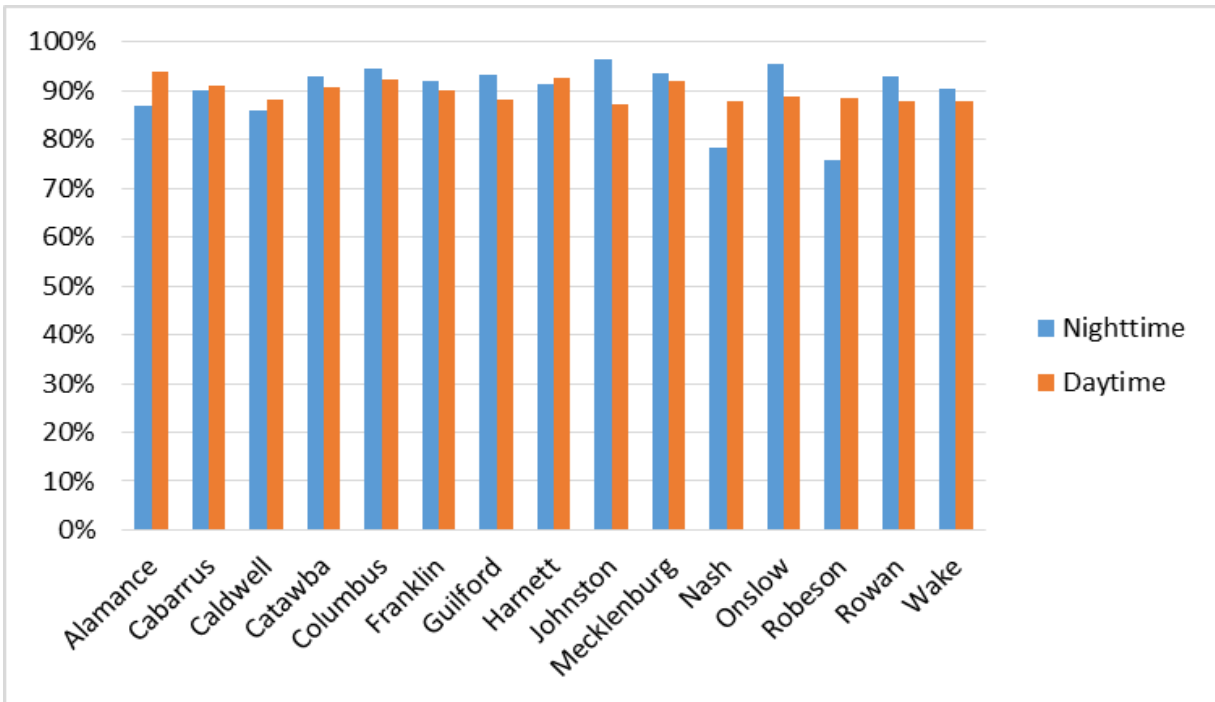
County	Driver (D)	Passenger (RF)	Combined (D+RF)	Sample Size
Overall	91.5	85.1	90.5	3,138
Alamance	87.7	81.4	86.8	170
Cabarrus	91.5	83.9	90.1	277
Caldwell	87.1	79.3	86.1	236
Catawba	92.6	96.1	92.9	346
Columbus	95.4	86.3	94.7	41
Franklin	92.3	89.6	91.9	130
Guilford	96.8	66.7	93.3	92
Harnett	94.3	83.9	91.5	329

(continued)

**Table 2-2. North Carolina Seat Belt Usage Rates by County, Weighted: Nighttime 2015 Survey (continued)**

County	Driver (D)	Passenger (RF)	Combined (D+RF)	Sample Size
Johnston	97.7	87.5	96.5	173
Mecklenburg	93.2	95.9	93.6	368
Nash	84.5	58.7	78.2	148
Onslow	96.9	83.8	95.5	37
Robeson	79.0	64.6	75.7	181
Rowan	92.9	94.3	93.0	136
Wake	90.6	89.8	90.4	474

**Figure 2-1. Night and Day Combined Seat Belt Use in NC Counties, 2015**





### **3. FOR THE FUTURE**

The 2016 survey year will bring a few key changes to the North Carolina Seat Belt Survey. The first major change will be a newly selected sample of observation sites. After selecting the new 15 sample counties compliant with the National Highway Traffic Safety Administration's guidelines, RTI will work with the NC Governor's Highway Safety Program (GHSP) to determine additional counties of interest. From the final list of counties, RTI will sample sites within each county and ensure each site is appropriate for data collection (e.g. intersection is controlled) via field staff visits. This process will result in final sample of 200 sites.

In addition to an expanded June sample, the second major change to the 2016 survey year will be the introduction of a series of focus groups with North Carolinians that have been ticketed in 2015 for personally not wearing a seat belt. These focus groups will provide a better insight into the usage-resistant population, the nearly 10% that refuse to wear their seat belts, and perhaps uncover potential sources of motivation for these individuals. This could lead to more informed seat belt campaigns, additional legislature, or other incentives to drive up North Carolina's seat belt usage rates.

The third and final major change in 2016 will be the temporary discontinuation of the nighttime data collection portion of the NC Seat Belt Survey due to the trend stagnation of nighttime seat belt usage over time. RTI will continue to conduct the statewide survey of daytime seat belt use in June.





## Appendix A: Detailed Tables from the 2015 NC Seat Belt Survey

**Table A-1. 2015 Seat Belt Use by Time Period, Weighted**

Time Period	Percent Seat Belt Use (Standard Error)		
	Driver (D)	Passenger (RF)	Combined (D + RF)
Morning Rush	93.0 (0.7)	92.1 (1.9)	92.8 (0.9)
Evening Rush	89.5 (2.6)	88.4 (3.8)	89.3 (2.8)
Nonrush	89.9 (1.5)	91.2 (1.0)	90.1 (1.3)
Weekend	89.6 (2.3)	93.1 (2.3)	90.4 (2.1)

**Table A-2. 2015 Driver Seat Belt Use for Race by Sex, Weighted**

Race	Percent Seat Belt Use (Standard Error)	
	Male	Female
White	88.6 (1.7)	90.8 (1.0)
Black	89.2 (2.0)	91.2 (2.0)

**Table A-3. 2015 Driver Seat Belt Use for Vehicle Type by Sex, Weighted**

Vehicle Type	Percent Seat Belt Use (Standard Error)	
	Male	Female
Car	89.9 (1.6)	89.5 (1.6)
Pickup Truck	87.6 (3.5)	85.2 (5.4)
Sport-Utility Vehicle	90.2 (2.6)	93.6 (1.4)
Other	87.9 (2.6)	95.6 (1.9)

**Table A-4. 2015 Driver Seat Belt Use for Vehicle Type by Urbanicity, Weighted**

Vehicle Type	Percent Seat Belt Use (Standard Error)	
	Urban	Rural
Car	90.2 (1.4)	90.6 (1.8)
Pickup Truck	90.0 (0.9)	85.0 (4.8)
Sport-Utility Vehicle	91.4 (1.9)	94.5 (0.8)
Other	89.0 (2.6)	90.2 (2.0)

**Table A-5 2015 Driver Seat Belt Use for Vehicle Type by Region, Weighted**

Vehicle Type	Percent Seat Belt Use (Standard Error)		
	Mountain	Piedmont	Coast
Car	89.3 (1.8)	91.1 (2.1)	90.9 (1.6)
Pickup Truck	88.5 (2.0)	83.7 (5.8)	91.2 (1.6)
Sport-Utility Vehicle	90.2 (2.2)	94.8 (0.9)	94.3 (1.3)
Other	88.4 (3.7)	92.3 (0.8)	87.2 (1.7)

## **Appendix B: Survey Methodology**

### **Sampling and Weighting**

#### ***Sampling***

The 120-site sample used for the 2015 survey was drawn by RTI International in 2010 under the new proposed federal guidelines. See Section 1 for more details about the revised sample design. The counties representing the lowest 15% of the fatalities were ineligible for selection. The survey sites were selected on the basis of road segments clustered within eligible counties. The road segments were selected with probability proportional to the average annual daily traffic (AADT) and the vehicle miles traveled (VMT). Site collection times were then randomized to ensure data collection was randomly distributed across the days of week and times of day. As detailed in Section 1, the 2015 June survey sampled an additional 10 counties, selected by the NC Governor's Highway Safety Program as special counties of interest. The sites in these counties were selected using the same methods at the sites selected in 2010 for inclusion in the original 120-site sample.

There are three categories of site data collection times:

1. Rush hour sites are those that are observed on weekdays between 7am and 9am or between 3:30pm and 6pm.
2. Non-rush sites are those that are observed on weekdays between 9am and 3:30pm.
3. Weekend sites are those that are observed between 7am and 6pm on Saturday or Sunday.

#### ***Weighting***

Design weights were calculated as the inverse of the probability of selection. These design weights were then adjusted by multiplying by an adjustment factor based on traffic and population statistics to represent the population of North Carolina. The weights were trimmed to reduce the unequal weighting effect (UWE), which tends to reduce the effective sample size and reduce the precision of the seat belt usage rate estimates.

#### **Data Collection**

Data collection for the Seat Belt Study is conducted by certified field observers (FOs) who are trained to collect and record information through direct observation. These observers are stationed at the sample sites to monitor seat belt usage among drivers and front-seat passengers. Only traffic on the sampled road segment is observed. Observers attempt to collect data for each passing vehicle; however, data collection is limited to information from stopped (or nearly stopped) vehicles, for which reliable observations of seat belt usage can

be made. Observations at each site are made over a period of 60 minutes during a preselected time of the day.

Observers work in pairs to monitor the sample sites; under no circumstances is it acceptable for an observer to work a site alone. Therefore, each observer must be able and willing to coordinate his or her schedule with the other team member assigned to his or her sites.

## **Training**

For the 2015 survey, training was held at RTI in late May, prior to the start of data collection. During the survey training, FOs are given a detailed data collection manual. This manual contains instructions for data collection, data editing, form return protocols, safety, billing, and other topics. This manual serves as a reference and helps to ensure quality throughout the data collection period.

Training serves as a refresher course for returning observers and as primary instruction for new recruits. It also allows RTI and the Governor's Highway Safety Program staff to go over any changes to the project. Training begins with an overview of the project, discussion of key details, and the background of the study. This portion is followed by a review of data collection procedures, observer requirements, equipment, and site details.

Once the observers have been instructed on how the project will be conducted, they are given a series of photos depicting various drivers, passengers, vehicles, and seat belt usage. The class reviews these together to clarify what the observers might see when in the field. This review session also allows observers to gain practice using tablets for data collection and transmission.

Following this practice session, RTI staff review administrative procedures and answer any questions that may arise. Once this portion is complete, the staff and observers break into teams and conduct a field test at a local intersection. RTI staff monitors the observers for quality of performance and provide constructive feedback during and after the field test.

In 2010, GPS units and clustered data collection assignments were introduced, which resulted in increased efficiency of data collection efforts and site-to-site travel. In 2013, RTI adapted these advancements to the electronic tablet, which provided observers with an all-in-one data collection device. Prior to training, the GPS coordinates of all 120 sites were captured and stored in a Google Earth document. Sites are stored by county and then converted into the appropriate file version for the navigation application on the tablet devices. Each tablet device was then loaded with the location of each site. This addition enhanced the cost effectiveness and efficiency of the overall data collection effort. It also decreased human error by allowing each observer the ability to locate a site without having to reference printed maps and directions, or handle multiple devices for tracking data collection efforts. In 2014, the previous advancements were carried forward, and electronic

tablets were used for data collection, storage, transmission, site information storage, and navigation. This continued for the June 2015 data collection effort, and RTI updated the GPS coordinate files to include the sites for the additional 10 counties.

As in previous years, site clusters were used to enhance cost efficiency. Mapping each site in Google Earth allows the data collection team to cluster sites. Prior to entering the field, observers were given a list of sites, which were grouped in clusters of three or four sites. Based on location and the time (rush or non-rush) and day (weekday or weekend), each cluster served as a recommendation as to which sites should be completed in the same day of work. Observers were instructed to notify their supervisor of any anticipated deviations from this cluster schedule.

### **Field Work and Scheduling**

Prior to entering the field, observers work in pairs to create a tentative schedule. This allows RTI staff to better track field work. Throughout the data collection period, the field supervisor remains in contact with each pair of observers on a weekly basis to ensure all data collection is completed on schedule.

Once observers are in place, data are collected for 60 minutes. The first 30 minutes are spent completing survey data collection Form A (includes demographic information). At the end of that time period, observers switch to survey data collection Form B (does not include demographic information) for the final 30 minutes. Observers record data on all vehicles. It is preferable that observers avoid trying to record vehicles in motion. Thus, observers record information for vehicles that are stopped or moving slowly.

Observers always attempt to record information as completely as possible. "Don't know" is to be used only as a last resort. Following each day of data collection, observers e-mail data to RTI.

### **Quality Control**

Project quality control (QC) is an ongoing effort that includes two key steps.

#### ***Field Observations***

The most direct QC method employed is supervisory site observations. Each team of observers is monitored in the field twice during the survey period. Our objective is to visit each team twice during the survey within the first six sites completed. Previously confirmed schedules allow RTI staff to perform unannounced QCs. RTI staff monitor the FO team, complete a site QC form, and detail any problems or concerns. Field observations also provide an ideal time for FOs to provide feedback on equipment and data collection protocol to RTI staff. This feedback is considered carefully, and any necessary modifications to data collection protocols are implemented.

### **Electronic Quality Assurance Efforts**

All data received by RTI staff are reviewed prior to analysis. The use of electronic tablets allows RTI to passively collect timestamps, which are then used to ensure that data was collected during the approved, randomized timeframe. This review ensures that

- sites were completed during the appropriate time (rush, non-rush) and day (weekday or weekend);
- timestamps for each site match between observer pairs;
- recorded site numbers are correct; and
- no sites are missing and data was collected for the entire hour.

### **Statistical Tasks and Analysis**

#### **SAS Programs**

Modifications to the prior year's SAS programs can be run using the previous year's data for validation. Any changes to the program are documented and clearly explained. All SAS programs follow the DSDS Programming Technical Operating Procedures.

Once the data are in an observation-level SAS data set, the statistical programs are run. The SAS programs are reviewed for programming and technical accuracy. Frequencies and other output are checked for consistency and reasonable output. The SAS program logs must be free of any messages indicating errors before they are considered final.

#### **Table Creation**

The SAS program automatically creates two tables (*Table 1* and *Table 2*). These tables are in a text document and are transferred into a report-worthy table format. The table entries are verified to prevent transcription errors. *Table 3* and *Table 4* are created by using data from the previous year's tables and adding the relevant data from *Table 1*. All tables present weighted results, while *Table 1* presents both weighted and unweighted results to allow comparisons.