



SafeTeens Think First: A Driver's Education Program Evaluation

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Abstract

Background: In the United States (US), motor vehicle crashes (MVCs) represent the leading cause of death among youth 16-19 years of age. Although adolescents comprise only 14% of the US population, they are responsible for 30% (\$19 billion) of motor vehicle crash (MVC) related injury costs incurred by hospitals and 28% (\$7 billion) of MVC-related injury costs incurred by emergency departments. The number of teen MVC-related fatalities and the economic impact of teen MVCs demonstrate the need for effective programs aimed at reducing risky teen driving behaviors. SafeTeens Think First (SafeTeens) is a one time, three-hour safe driving educational program delivered to Cleveland County, North Carolina high school students that provides information on the risks and consequences of unsafe driving. Through a yearlong Capstone experience, a team of students from the UNC Gillings School of Global Public Health partnered with the UNC Department of Surgery and Cleveland County Regional Medical Center to conduct the first process and outcome evaluation of the SafeTeens program. The purpose of the evaluations was to determine whether the SafeTeens program was being delivered as intended and whether it was reducing the number of adolescent MVCs and MVC-related deaths occurring in Cleveland County.

Methods: Throughout the academic year, Capstone team members emphasized community engagement and incorporated feedback from stakeholders and experts. First, the Capstone team created an evidence table in order to explore the literature base on teen driving program evaluations that focus on long-term outcomes. Next, the Capstone team developed a process and outcome evaluation plan. Three process evaluation instruments were developed to measure implementation fidelity, dose delivered, dose received, and participant satisfaction, and a process evaluation user guide was created to standardize measurement across evaluators. Quantitative and qualitative methods were used to analyze primary data and conduct the process evaluation of the SafeTeens program. For the outcome evaluation, study design and secondary data sources were carefully considered when developing the outcome evaluation plan. MVC rates were calculated for Cleveland County and each of three comparison groups at pre- and post-implementation of SafeTeens. MVC rate differences computations with 95% confidence intervals were calculated for each group to determine if the decrease in teen MVCs in Cleveland County was significantly lower than the decrease observed in the comparison groups. A program evaluation report and PowerPoint presentation were created to present evaluation findings to stakeholders in April 2014, along with a comprehensive report sharing program recommendations.

Results: Results suggested that the SafeTeens program was implemented with fidelity and students reported being satisfied with the program. However, student engagement with the program activities was low. Students reported interactive activities as program components that they like best, yet the majority of students recommended increasing the number of engaging activities in which they can participate. Statistical analysis of the long-term impact of SafeTeens suggested that the program did not lower the number of teen MVCs that occurred in Cleveland County since the program's implementation in 2005 ($p = 0.05$). Sample size was too small to evaluate impact of SafeTeens on teen driver fatalities.

Discussion: This Capstone project not only provided Cleveland Regional Medical Center with a user-friendly toolkit to conduct future evaluations of the SafeTeens program, but it also included recommendations for improving the program's effectiveness. This evaluation contributed to the current body of knowledge surrounding evaluated drivers' education programs. The UNC Department of Surgery Capstone experience provided a setting in which parties engaged in a reciprocal relationship to foster a positive learning environment, enhance and develop skills, evaluate and present program findings, and promote principles of community engagement.

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Acronyms and Public Health Terms

Acronym	Definition
BAC	Blood Alcohol Content
CDC	Centers for Disease Control and Prevention
CRMC	Cleveland Regional Medical Center
GDL	Graduated Drivers Licensing
MPH	Master of Public Health
MVC	Motor Vehicle Crash
NC	North Carolina
NCGHSP	North Carolina Governor's Highway Safety Program
SafeTeens	SafeTeens Think First
UNC-HSRC	University of North Carolina Highway Safety Research Center
US	United States

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Introduction

In place of a master's thesis, Health Behavior students enrolled at the University of North Carolina's (UNC) Gillings School of Global Public Health partner with a community organization to conduct a yearlong Capstone project that requires the application of core public health competencies taught in the department. The Capstone team paired with the UNC Department of Surgery and Cleveland Regional Medical Center (CRMC) to conduct a program evaluation of the SafeTeens Think First (SafeTeens) program. This Capstone Summary Report discusses the development, implementation and results of the program evaluation.

SafeTeens Think First Program Background

CRMC, a trauma center located in Shelby, North Carolina (NC), seeks to provide high-quality health services and educational programs to the communities it serves (Cleveland County HealthCare System, 2010). Given that CRMC's Trauma Center was encountering several injuries and a few fatalities sustained in teen motor vehicle crashes (MVC), CRMC implemented the SafeTeens program in 2005 in an attempt to lower the number of teen MVCs and associated injuries and fatalities. SafeTeens is a one-time, three-hour intervention delivered to all students who attend school-based drivers' education classes in Cleveland County Public Schools (N.C. SAFETeens, Inc., 2010). Primary behaviors targeted by the program include substance-impaired driving, speeding, driving distractions, and other reckless driving behaviors. The program proposes that improving short-term outcomes (e.g., knowledge of risky driving consequences) will result in positive long-term outcomes (e.g., safe driving behaviors and reductions in teen MVCs). CRMC staff desired an evaluation of the SafeTeens program to attain empirical evidence of the program's effectiveness to reduce teen MVCs and MVC-related deaths, and identify and address potential areas for program improvement.

Overview of Capstone Activities

As part of the process to address CRMC's project proposal, the Capstone project team engaged in several key activities described in the Capstone logic model (**Figure 1**) below and generated five main

Capstone deliverables: literature review and evidence table, process and outcome evaluation plan, overall evaluation findings report, program recommendations report, and presentation materials summarizing evaluation findings for key stakeholders (see **Appendix A** for a summary of each deliverable). These deliverables were essential in determining whether the SafeTeens program decreased the number of teen MVCs and MVC-related deaths, and whether the program was being delivered as intended. The Capstone activities and resulting outputs were achieved through discussions with the CRMC staff, UNC mentorship team, and several consultants.

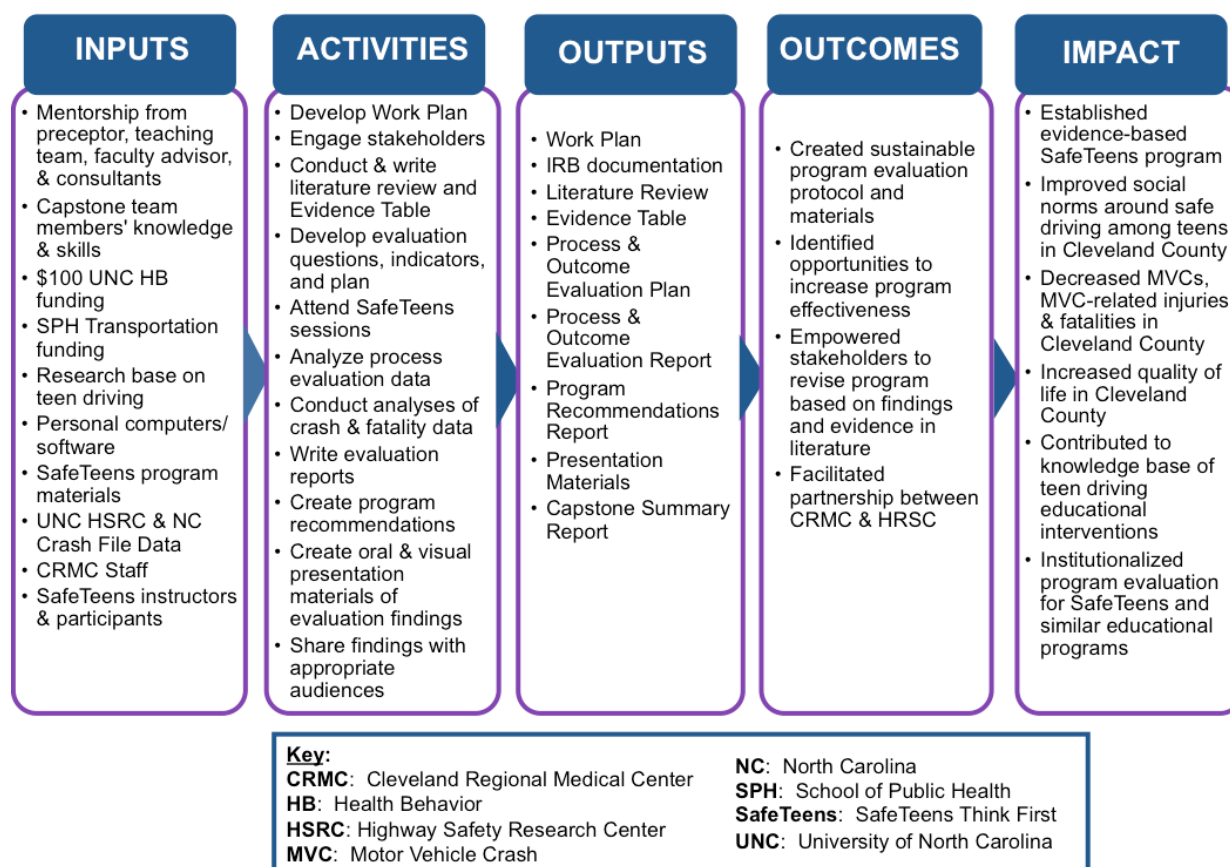


Figure 1: UNC Department of Surgery Capstone Team Logic Model

The Capstone Summary Report first outlines the impact of unsafe teen driving behaviors at the national, state and local levels. Next, the report describes methods for creating the Capstone deliverables, discusses results stemming from analysis, and synthesizes findings. The report concludes with a

discussion of implications for the SafeTeens program, similar community-based interventions, and sustainability of the Capstone work.

Background

Epidemiological Assessment of Teen Motor Vehicle Crashes

In the United States (US), MVCs represent the leading cause of death among 16- to 19-year-olds (Centers for Disease Control and Prevention [CDC], 2012). In 2002, there were 5,061 teen deaths due to MVCs, and this number has steadily been on the decline, with 2,688 MVC-related teen fatalities in 2010, marking a 50% reduction over eight years (CDC, 2012). However, the Governors Highway Safety Association reported that the number of deaths among 16- and 17-year-olds in passenger vehicles was higher during the first half of 2012 compared to the same period in 2011, marking a troubling increase in teen MVC-related deaths across the nation (Williams, 2013).

In NC, MVCs are also the leading cause of death among adolescents ages 14 to 19 (North Carolina State Center for Health Statistics, 2012). Available figures from the first half of 2011 report 17 teen deaths resulting from MVCs, ranking NC as the second highest state for the number of MVC-related teen fatalities (Williams, 2013). In 2012, NC teen drivers ages 16-19 were involved in over 32,000 crashes (Highway Safety Research Center [HSRC], 2012). Between 2005 and 2009, Cleveland County recorded 1,121 crashes involving 16- to 17-year-old drivers, which was 20% higher than the state average for this age group. During the same four-year period, Cleveland County ranked 39th out of 100 counties for number of teen driver MVCs (Hudgins, 2012). These national, state, and county figures warrant continued efforts to reduce MVCs, with particular attention to inexperienced teen drivers who are more likely to engage in risky driving behaviors (CDC, 2012).

Economic Impact of Teen Motor Vehicle Crashes

Adolescent drivers contribute significantly to the overall economic burden caused by MVCs. In 2010, nearly 282,000 teens were treated for serious MVC-related injuries at emergency departments across the country, and the costs associated with treating these preventable injuries added substantially to

rising US healthcare expenditures (CDC, 2012). Although adolescents comprise only 14% of the US population, they are responsible for 30% (\$19 billion) of MVC-related injury costs among males and 28% (\$7 billion) among females (CDC, 2012). The substantial costs associated with teen driver MVCs demonstrate the need for programs aimed at reducing risky teen driving behaviors.

Risky Driving Behaviors Associated with Adolescent Drivers

A review of the literature and epidemiological data reveals several risky behaviors that greatly contribute to MVCs among teen drivers, including speeding, not wearing a seat belt, consuming alcohol before driving, having other teenage passengers in the car, and driving between 9pm and 3am (CDC, 2012). In 2010, national statistics revealed that 39% of adolescents involved in MVCs were speeding at the time of the crash (CDC, 2012). Additionally, only 54% of adolescents surveyed in a 2010 national study reported always wearing a seatbelt while driving, and 56% of teens that were killed in alcohol-related MVCs were not wearing a seatbelt at the time of the crash (CDC, 2011; CDC, 2012). Adolescents engage in a host of risky driving behaviors, which coupled with their lack of driving experience, increase their chances of being involved in an MVC.

Approaches to Addressing Teen Motor Vehicle Crashes

Due to the high number of MVCs among teenage drivers, a variety of approaches have been implemented in order to address the issue of risky teen driving behaviors. These approaches generally fall into one of three domains: policy, parent-focused programs, and teen-focused educational interventions. Policy-level approaches include Graduated Drivers Licensing (GDL) policies and other laws such as Blood Alcohol Content (BAC) restrictions for youth (Small, 2008). GDL laws establish three stages of restricted driving for novice drivers, which include limits on the number of passengers allowed to be in the vehicle and restricted nighttime driving (Masten & Foss, 2010). Meanwhile, parent-focused interventions seem to be increasing in popularity, particularly as a complement to well-established GDL policies. At the University of Michigan, research is ongoing with regards to the promising Checkpoints Program, which utilizes a contractual agreement that outlines driving limitations and is signed by teen drivers and their parents. This program has been proven effective in increasing parental involvement and

guidance in managing their teen's GDL restrictions (CDC, 2012). There are also various other projects that seek to provide parents with tools to effectively teach safe driving skills to their teen (CDC, 2012).

Teen-focused educational interventions include two main subcategories: traditional driver education and trauma-based interventions, although many programs rely on a combination of these approaches (Small, 2008). Traditional driver education teaches teens about the risks and associated consequences of poor driving in a classroom-like setting and often lacks the use of social learning methods. Some experts argue that this type of education is ineffective because solely informing teens about risks does not have a long-term impact on driving behavior (Small, 2008). Trauma-based interventions incorporate active social learning methods into the learning experience, and they hold some promise in impacting behavior (Small, 2008). Social learning methods include, but are not limited to: discussion, role-plays, driving simulators, and creating life-like road situations, such as students becoming victims in a mock crash (Small, 2008; Chan, Pradhan, Pollatsek, Knodler, & Fisher, 2010). Few teen-focused educational interventions have been evaluated for effectiveness. Of those that have been evaluated, only a few interventions were evaluated for long-term outcomes such as crashes, traffic offenses, and injuries.

Summary of Findings regarding Evaluated Teen Driving Interventions

A review of the literature for long-term outcome evaluations of teen MVC prevention programs revealed that the body of literature on this topic is relatively small, as the majority of studies focused on short-term impact such as change in knowledge or attitudes toward risky driving behaviors. Out of 338 articles on teen MVC prevention programs, nine articles (covering seven programs) met our predetermined inclusion criteria. The seven programs fell into two of the three approaches discussed above: teen-focused educational programs (five) and policy (two).

Of the five educational programs reviewed, two were traditional education programs and three were trauma-based interventions. The two traditional educational interventions failed to address the multiple risk factors involved in teen crashes and instead focused only on a single risk factor such as alcohol or seat belt use (Shope, Elliott, Raghunathan, & Waller, 2001; Carcaillon & Salmi, 2005).

Evaluations of the “Atout-Route” and the “Alcohol Misuse Prevention” educational interventions showed a reduction in MVCs among those that completed their respective safe driving program, but the reduction was not statistically significant (Shope et al., 2001; Carcaillon & Salmi, 2005). The trauma-based interventions were successful at decreasing driving offenses (speeding and driving under the influence citations) among intervention participants; however, these driving programs solely targeted juvenile driving offenders (Kooler & Bruvold, 1992; Ekeh, Hamilton, Demko, & McCarthy, 2008; Ekeh, Hamilton, D'Souza, Everett, & McCarty, 2011; Manno, Maranda, Rook, Hirschfield, & Hirsh, 2012). Juvenile driving offenders are a particularly high-risk group and may be inherently different from the greater adolescent population (Manno et al., 2012). Consequently, it cannot be inferred that these trauma-based programs would be just as successful if tested with a teenage population that had not committed a serious driving infraction (Manno et al., 2012). Furthermore, the impact of these programs seemed to last for only up to six months (Kooler & Bruvold, 1992; Ekeh et al., 2008; Ekeh et al., 2011; Manno et al., 2012). Implementation of these trauma-based programs may require follow-up sessions in order to maintain their effects beyond a six-month period.

The most promising evaluation studies reviewed are those related to GDL laws. A 2011 literature review of GDL evaluation studies found that a significant reduction in teen crashes was observed in states where GDL laws were implemented (Hartling, Wiebe, Russell, Spinola, & Klassen, 2004). Furthermore, states that enforced stricter, more comprehensive GDL laws observed a greater reduction in MVCs involving 16-year-olds compared to states that did not enforce GDL laws (Chen, Baker, & Li, 2006). These findings suggest that GDL is effective in reducing MVCs among 16-year-old drivers, but the mechanism causing this outcome is unclear. The second policy program addresses BAC in younger drivers (Zwerling & Jones, 1999).

Efforts to Address Teen Motor Vehicle Crashes in North Carolina

In addition to interventions and programs across the US to respond to teen MVCs and related fatalities, local and state entities have also prioritized efforts to collect information and develop effective strategies to prevent MVCs among teens in NC. However, NC currently lacks a centralized resource that

lists and describes current interventions and policies in the state that address risky teen driving behaviors. Despite this limitation, the Capstone team's investigation of peer-reviewed and grey literature revealed a handful of interventions that sought to reduce risky driving behaviors among teens.

In 1997, NC was the second state in the nation to implement a comprehensive GDL system that restricted the conditions under which novice drivers could operate a vehicle (HSRC, 2001). Foss and colleagues (2001) conducted an evaluation of GDL impact and found that fatal crashes among 16-year-olds declined by 57% in 1999 compared to 1996. Furthermore, crashes among 16-year-olds involving minor or no injuries declined by 23% for the same period (Foss, Feaganes, & Rodgman, 2001). These findings suggest that GDL dramatically reduced teen MVCs in NC.

In addition to GDL, several programs have been implemented across NC to address teen MVCs. The 2013 North Carolina Governor's Highway Safety Program's (NCGHSP) plan identified "VIP for a VIP" (Vehicle Injury Prevention for a Very Important Person) and "StreetSafe" as promising educational programs that demonstrate consequences of risky driving to teens (Wallace, 2012). Additionally, NC high schools have implemented "Click It or Ticket, Securing Your Future", requiring students to wear seatbelts prior to leaving school grounds (Wallace, 2012). JoCo Teen Drivers is a student-led program raising awareness of risky driving behaviors in Johnston County ("About JoCo Teen Drivers", n.d.). While several programs throughout NC seek to improve outcomes related to risky driving behaviors among teens, few have been formally evaluated to determine their impact on the incidence of teen MVCs.

Rationale for SafeTeens Think First Program Evaluation

Given that the SafeTeens program had not been formally evaluated since its implementation in 2005, the 2013-2014 Capstone team conducted a process and outcome evaluation of the program to assess its effectiveness. The goal of the process evaluation was to examine how the program is being implemented centered on a set of literature-based criteria. These findings can support and strengthen the results of the outcome evaluation and can highlight components of the program to improve upon in order to obtain the desired long-term outcomes. As indicated by the literature, previous drivers' education program evaluations have tended to focus on short-term outcomes. This focus is problematic because

health behavior theory indicates that behavior change happens over time, and only measuring short-term outcomes will not confirm whether long-term behavior change is occurring (Glanz, Rimer, & Viswanath, 2008). Therefore, the Capstone team pioneered an analysis of long-term outcomes in order to contribute to existing limited knowledge on long-term effects of teen safe driving interventions.

Methods

Capstone Orientation to SafeTeens Think First Program and Stakeholders

Capstone team members first initiated contact with SafeTeens staff beginning in April of 2013 in order to start familiarizing themselves with the program. The team also received program materials, including a PowerPoint presentation, a program script, and program videos to help identify the SafeTeens' core components. During early fall 2014, the Capstone team and preceptor travelled to Shelby, NC and attended a lunch meeting hosted by CRMC staff. The luncheon served as an opportunity to utilize and build meeting facilitation and community engagement skills. It allowed the Capstone team to connect with more than 15 key stakeholders, including veteran program instructors, coordinators, and drivers' education teachers. The luncheon opportunity helped forge a stronger partnership between the Capstone team and SafeTeens' stakeholders, building sustainability for future tasks that the team would undertake. At this luncheon meeting, the team prioritized applying community engagement skills in order to ground SafeTeens' stakeholders in the reasoning and theory behind the approaches used in the evaluation. Capstone team members also completed informational interviews regarding the objectives of the program and program delivery. After the interviews, the team attended a full SafeTeens session held at a local high school. These engagement activities helped focus the evaluation efforts and built a foundation to springboard the Capstone team into producing their five main deliverables.

Capstone Methods for Production of Deliverables

Literature Review and Evidence Table

The Capstone work began with a thorough review of the literature in order to ground the team's evaluation in existing and evaluated interventions. An evidence table was created, which summarized all

adolescent safe driving programs that assessed long-term outcomes. The evidence table later served as a resource for identifying and creating program recommendations for SafeTeens.

Evaluation Plan

After becoming familiar with the existing literature on evaluated drivers' education programs, the team created an overall program evaluation plan that would be executed in the spring semester. The Capstone team decided to implement both a process and outcome evaluation to comprehensively evaluate the program from multiple approaches and to adhere to standard program evaluation protocols.

The Capstone team relied on a mixed methods approach to creating the process evaluation plan, the purpose of which is to assess the implementation and delivery of the program and its various components. The findings of the process evaluation would help explain or strengthen any findings from the outcome evaluation, and identify areas for program improvement. In collaboration with the Capstone faculty advisor, preceptor, and SafeTeens program coordinators, the Capstone student team developed instruments to gather both quantitative and qualitative data to assess program fidelity (extent to which program is delivered as intended), dose delivered (number or amount of intended units of each component delivered), and dose received (the extent of participants' engagement and satisfaction with the SafeTeens program) (Linnan & Steckler, 2002). Drafts of the instruments were sent to SafeTeens program staff to obtain feedback and approval of evaluation areas. The final process evaluation toolkit contained a SafeTeens Attendance Log (to measure attendance), Activity Log (to measure dose delivered, dose received, and fidelity), Student Survey (to measure dose received), and a Process Evaluation User Guide, designed to standardize measurement across evaluators and enhance sustainability of the toolkit.

In order to assess the effectiveness of SafeTeens, the outcome evaluation focused on measuring long-term outcomes. Preliminary discussions with SafeTeens stakeholders revealed that there was a strong desire to determine if the SafeTeens program has saved teen lives. Taking into consideration the needs of SafeTeens program staff, data quality, and the feasibility to collect and obtain secondary data, the Capstone team focused the outcome evaluation on investigating SafeTeens' impact on teen MVCs and MVC-related fatalities among Cleveland County teens.

The outcome evaluation research questions were:

- 1) Has SafeTeens altered the rate of MVCs among 16-year-old drivers?
- 2) Has SafeTeens altered the number of fatalities among 16-year-old drivers?

Outcome evaluation indicators were the number of crashes and fatalities among 16-year-olds measured on a quarterly basis. The Capstone team obtained pertinent secondary data from the University of North Carolina Highway Safety Research Center (UNC-HSRC) in Chapel Hill. The data obtained have been standardized and were regularly collected throughout the state. To answer the outcome evaluation research questions, the team utilized a retrospective non-equivalent control group pre-/post-test study design. The Capstone team examined data from 16-year-old drivers before and after the SafeTeens program was implemented. Sixteen-year-olds were selected because at the earliest, NC teen drivers are 16 when they receive their provisional license and are independently driving (Goodwin, Foss, Margolis & Waller, 2010). Additionally, the literature suggests that 16-year-old drivers are more likely to be involved in MVCs than their 17-, 18- and 19-year-old counterparts (Williams, 1996; Williams, 2000). Statistical analyses were conducted on carefully selected comparison groups comprised of 16-year-old teens living in various regions of the state (see **Appendix B** for Piedmont A Comparison Group Selection and discussion). Graphical representations were employed to display changes in crash rates over time, and results produced by SAS (version 9.3.1) were used to interpret any statistical differences among the data.

Conducting the Evaluation

In the spring of 2014, Capstone team members executed their process evaluation plan. In conducting the evaluation, the team worked closely with CRMC staff to schedule SafeTeens program sessions that the team members could attend. Three Capstone members conducted the process evaluation, along with the help of one CRMC staff member. All evaluators were trained using the Process Evaluation User Guide to standardize data collection. Evaluators collected both qualitative and quantitative data by observing a total of three SafeTeens sessions and three different high schools. At each session, evaluators assessed whether the identified core components of the program were not completed, partially completed,

or fully completed, and whether dose received pertained to none, a few, or many of the students. After each session, the evaluators conducted a debriefing with program instructors to gather qualitative data that captured insight on session delivery. This qualitative process resulted in a total of 13 instructor debriefings. Lastly, high school instructors distributed the Student Survey to students at the end of the each session, which led to the collection of self-reported data from 181 participants.

Analyzing the Data and Writing the Evaluation Report

Data entry for all process evaluation data collected at the three sessions evaluated was performed by two Capstone team members and stored on a shared drive in a Microsoft Excel spreadsheet. Data from the SafeTeens Activity Log were averaged to calculate the overall fidelity and overall dose delivered of the program. Dose received was analyzed using the qualitative data collected from both the Activity Log and Student Survey. For qualitative data analysis, the team adopted an iterative approach for the analysis of field notes from responses to open-ended prompts and self-reported student responses from survey items. Two Capstone team members conducted independent reviews of the qualitative data and produced preliminary codes reflecting common themes that emerged from the data. The team discussed preliminary themes, arrived at a consensus on codes, and generated a codebook. Using Microsoft Excel, each team member individually coded the qualitative responses and then crosschecked the application of codes. Disagreements in coding were discussed and the team made final decisions on the application of those codes. This procedure was implemented in order to objectively analyze the data and minimize bias.

Upon receiving the outcome evaluation data set from UNC-HSRC, the team conducted exploratory data analyses to understand the data, which included creating a comprehensive descriptive statistics summary and plotting the data in monthly, quarterly and yearly increments. In addition, graphical representations of MVC rates were organized by comparison groups. The overall 16-year-old MVC rate during the pre-implementation of SafeTeens (2002 to 2006) was compared to the overall 16-year-old MVC rate during the post-implementation time period (2008 to 2012). MVC rate difference computations between pre- and post-implementation were performed to determine if there was a statistical difference between Cleveland County and each comparison group. The Capstone team

discovered that driver fatalities among 16-year-olds were rare in Cleveland County; therefore, MVC-related fatality data was analyzed only descriptively.

After concluding the analysis of both the process and outcome evaluation data, methods and findings were summarized in an evaluation report, with the purpose of distribution to the SafeTeens and CRMC staff. In creating the evaluation report, Capstone team members ensured the use of practitioner-friendly language and included comprehensive evaluation and analysis steps in order to ensure sustainability for future uses of the evaluation as desired by the SafeTeens staff. Once again, we engaged community stakeholders by sending this document to the preceptor and CRMC staff for feedback, and incorporated their comments into the final version of the deliverable. In doing so, the Capstone team members applied and strengthened community engagement skills, qualitative and quantitative data collection and analysis skills, and collaborative decision-making skills. The team gained experience and knowledge in planning and implementing both a process and outcome evaluation, including instrument development, evaluation/study design, and practical adaptation of evaluation methods.

Development of Program Recommendations Report

Based on the major findings presented in the evaluation report, the Capstone team developed seven program recommendations for the SafeTeens staff to consider as next steps in revising the program. The Capstone team utilized the literature review and evidence table to suggest modeling certain components from other evaluated drivers' education programs. Creating the program recommendations report was an iterative process, as it was separately sent to both the Capstone team faculty advisor and preceptor for feedback. Team members then incorporated this feedback into the final report, providing resources and citations for CRMC staff to utilize in implementing the recommendations.

Presentation of Findings to SafeTeens Stakeholders

Lastly, the Capstone team prepared a formal 30-minute presentation of evaluation findings for the SafeTeens program staff and instructors, Capstone preceptor and faculty advisor, and UNC-HSRC expert consultant. Team members first identified key findings from the process and outcome evaluations that were most important to present to stakeholders. Capstone members then formulated a presentation of

these findings using Microsoft PowerPoint, which underwent several iterations to ensure that the materials were presented in a practitioner-friendly format and were sensitive to stakeholders' long-standing commitment and dedication to SafeTeens. Capstone team members arranged a presentation luncheon funded by the Department of Health Behavior, and sent out formal invitations to the aforementioned parties. After completion of the Capstone presentation, there was a two-hour discussion among attendees surrounding future revisions of the program and opportunities for collaboration between SafeTeens and UNC-HSRC. The Capstone team shared the all five main deliverables produced throughout the Capstone project, as well as accompanying data, graphics, and other products, with the CRMC staff. CRMS staff planned to use presentation materials and other deliverables to share findings with other community stakeholders, guide program revisions, and conduct future evaluations of the SafeTeens program. Ultimately, by creating a series of professional documents for multiple audiences, the Capstone team learned how to tailor and present information in formats appropriate for passionate community members, as well as academics and practitioners.

Results

Literature Review and Evidence Table

The Capstone team's literature review and evidence table deliverable suggests that there are a limited number of outcome evaluations that focus on the long-term impacts of teen driving interventions. GDL policies seem to be the most effective at reducing teen MVCs and MVC-related fatalities. Additionally, the literature claims that scare-tactics in drivers' education programs are not very effective, and suggest that the social learning methods are more effective at creating long-term behavior change (Glanz, Rimer, Viswanath, 2008). This deliverable also informs the SafeTeens program recommendations report.

Evaluation Plan

The evaluation plan outlines the approach for conducting the process and outcome evaluations, included an evaluation rationale, purpose, methods, and analysis plan. The plan presents a comprehensive

description of the methods, tools, and resources used to conduct the evaluation, and it includes appendices of instruments and the SafeTeens logic model created in collaboration with CRMC staff. This document serves as the basis for the evaluation that was conducted in the spring. To ensure sustainability after the Capstone team's departure, the evaluation plan serves as a roadmap that will allow SafeTeens staff to replicate the evaluation in the future.

Evaluation Report

Process Evaluation Results

The evaluation report contains multiple key findings that impact SafeTeens and its stakeholders. The Capstone team's process evaluation results suggest that the overall fidelity is fully completed and dose delivered is almost always fully completed, based on averages across the three evaluated sessions. However, results indicate that dose received was only partially completed, identifying a need for increasing engagement opportunities for participants. Student Survey results indicate that a majority of students favor the hands-on activities and engagement opportunities, but also recommend that the program could be improved by increasing the number of opportunities for students to engage with the material (see **Appendix C** for a full review of student satisfaction responses).

Outcome Evaluation Results

The evaluation report also contains outcome evaluation findings. During 2002 to 2012, there were approximately 100 MVCs per year among 16-year-old drivers in Cleveland County (please see **Appendix D** which displays quarterly MVC rates for 16-year-old drivers in Cleveland County). Most notably, the results suggest an overall decline in the MVC rate among 16-year-old drivers in Cleveland County; however, a similar decline in MVCs is also detected in each of the three comparison groups (see **Appendix E**).

Statistical analysis between pre- and post-implementation of SafeTeens suggests that there is no difference in MVC rate differences between Cleveland County and the comparison groups (Piedmont A, Piedmont B and the Rest of the State). The 95% confidence intervals from the rate difference computations for each of the comparison groups do not overlap, indicating that the MVC rate differences

are statistically the same in each comparison group (see **Appendix F** for rate difference computations with 95% confidence intervals).

The Capstone team's results also indicate that during 2002 to 2012, fatalities among 16-year-old drivers were a rare event in Cleveland County. In total, there was a single fatality among 16-year-old drivers in Cleveland County, which occurred in 2004. Due to the small number of teen driver fatalities in Cleveland County between 2002 and 2012, the Capstone team can neither comment on the overall trend of the data nor statistically assess the impact of the SafeTeens program on teen driver fatalities.

Program Recommendations Report

The Capstone team's literature review and evidence table, findings from the overall program evaluation, including feedback from program instructors and participants, inform the program improvements presented in the program recommendations report. This comprehensive report identifies and expands upon the following seven recommendations: (1) develop a conceptual model to identify key factors that have the greatest impact on teen MVCs (Earp & Ennett, 1991; Green & Kreuter, 2005); (2) model the program after other evidence-based adolescent safe driving; (3) create a formal curriculum that consists of clear objectives and goals, subject matter, and specific instructional strategies and methods to assess participants' understanding of content (Lunenberg, 2011); (4) increase the number of sessions and shorten the duration of each session in order to improve participant engagement and allow more time to develop safer attitudes toward risky driving behaviors which can occur in stages (Glanz, Rimer, & Viswanath, 2008); (5) incorporate more opportunities for student engagement with program material, such as facilitating small group work and inquiry-based opportunities (Yee, n.d.); (6) alter timing of SafeTeens program delivery to a period closer to when students are driving independently since the impact of educational interventions fades over time (Small, 2008; Ekeh et al., 2011); and, (7) conduct ongoing program evaluation, including assessing short-term outcomes prior to the program as well as six month and/or one year post-program implementation.

SafeTeens Evaluation Findings Presentation Materials

The presentation materials share key findings and program recommendations with SafeTeens staff and stakeholders and provide a clear framework for program staff to utilize in revising the program components. Results from the presentation involve acknowledgement by SafeTeens' stakeholders that there is a need to revise the program while maintaining strong community support, and the establishment of a partnership between Dr. Robert Foss, the UNC-HSRC, and CRMC staff. This partnership will serve as a promising avenue for SafeTeens to collaborate with experts in the field of teen driving and will ensure support and resources throughout the adoption of the Capstone team's recommendations.

Discussion

Interpretation of Program Evaluation Results

Findings suggest that SafeTeens is implemented with fidelity, since core activities and topics are consistently delivered across sessions. While the majority of students report strong satisfaction with the overall program, there is a low level of engagement and interaction with the program as identified through evaluator assessments. The Capstone team's interpretation of poor program engagement is endorsed by students whose most commonly reported area for improvement was to increase engaging activities. The overall process evaluation findings suggest that although the program is delivered as intended, students may not be fully engaged in the program and not processing key program objectives. Thus, SafeTeens may benefit from adopting engagement recommendations provided by the Capstone team.

The outcome evaluation results indicated that SafeTeens did not lower the number of teenage MVCs occurring in Cleveland County. The Capstone team was unable to interpret the impact of SafeTeens on teen driver fatalities due to the small sample size. Although MVC-related fatalities are quite rare in Cleveland County, it does not diminish the importance of intervening on teen risky driving behaviors as teen MVCs and driver fatalities are still impacting the community.

Capstone Project Limitations

As with any program evaluation, the Capstone team encountered limitations that impacted the program evaluation and findings. The Capstone team experienced obstacles to identifying the program's

core components due to the absence of a formal program curriculum, which may have limited the team's ability to evaluate the main components of the program. Discussions with key stakeholders regarding this challenge resulted in the selection of key activities to be assessed through the program evaluation. Earlier collaboration with the stakeholders and program developers may have increased the team's knowledge of core components during the evaluation planning stage. Focus groups with staff and participants may have also strengthened the team's understanding of the program, but these were not feasible due to travel time and limited resources.

Another project limitation was that the Capstone team was only able to evaluate three SafeTeens sessions for the process evaluation. Due to an abnormal number of inclement weather events during the spring process evaluation, the Capstone team evaluated only three of four spring sessions, with the assistance of a trained CRMC staff member. While evaluating sessions in the fall semester may have strengthened Capstone findings, time limitations and transitions in SafeTeens' program coordinator position precluded the Capstone's team from conducting process evaluations earlier in the academic year.

The Capstone team strategically chose to examine long-term outcomes in teen MVCs and MVC-related fatalities. There are several limitations to analysis with this type of data. Although a nonequivalent control group pre-/post-test study design is a viable way to answer the team's outcome research questions, a multiple time series regression analysis would have been more comprehensive. Such a test would control for additional variability that is typically present in MVC data such as seasonal trends for MVCs. However, such a test was beyond the statistical capabilities of the Capstone team, requiring input and knowledge of a PhD-level biostatistician. Nonetheless, use of MVC rate difference computations between groups does aptly answer Capstone team's research questions. After reviewing the raw data, descriptive statistics summary, graphical plots and program content, Drs. Foss and Bowling independently agreed that a multiple time series regression analysis would have resulted in similar statistical conclusions.

Potential Implications of Capstone Work

SafeTeens Think First Program Implications

The Capstone team's work is the first formal evaluation of the SafeTeens program since its implementation in Cleveland County in 2005. Because the Capstone team regularly emphasized the importance of a rigorous evaluation, SafeTeens stakeholders valued the process and evaluation findings. CRMC staff will be able to effectively employ the evaluation plan and toolkit for future program evaluations, which will ensure ongoing and valuable program monitoring. The Capstone team facilitated a promising partnership between CRMC and UNC-HSRC, which may enhance the adoption of program recommendations, and have positive effects on important program outcomes. Through this partnership, SafeTeens may benefit enormously from cutting-edge research in teen driving interventions, while UNC-HSRC is poised to learn a great deal about the SafeTeens community-based initiative.

A key implication of the Capstone work is that SafeTeens may benefit from program revisions involving the structure and focus of the program. Although SafeTeens does not reduce the number of teenage MVCs or driver fatalities, the program exists within a passionate and organized community effort and enjoys strong program fidelity. Adoption of the Capstone team's recommendations may result in the development of an evidence-based program with the potential to reduce teen MVCs and related deaths.

Teen Driving Community-based Interventions Implications

This evaluation of the SafeTeens program is one of a small pool of safe driving educational interventions to be evaluated. Thus, the Capstone team's evaluation is an important contribution to the existing body of knowledge in this field. Evaluation results will become a part of the UNC-HSRC, which may inform future development and evaluation of community programs similar to SafeTeens. Additionally, Capstone findings may inform resource allocation for communities desiring to reduce teen MVCs, since they will have access to the Capstone team's evaluation findings, the strengths of the SafeTeens program, and recommended areas for program improvement. With permission from SafeTeens, the process and evaluation toolkit can be adapted and used by programs across the country that seek to implement similar teen driving interventions.

Sustainability

Throughout the project, the Capstone team worked to ensure the sustainability of project deliverables. The Capstone team purposefully involved SafeTeens program staff in various stages of the evaluation, and integrated SafeTeens feedback throughout development of the evaluation design, logic model, instruments, session evaluation schedule, and other evaluation activities. SafeTeens staff was also trained to conduct a process evaluation and participated in the evaluation of two sessions. Evaluation materials shared with SafeTeens will allow program staff to independently collect data, conduct a process and outcome evaluation, and analyze data. Although these efforts were taken to ensure ease of use and sustainability, it is important to note that both process and outcome evaluation implementation may be impacted by lack of stakeholder time, resources, and skills. However, this obstacle can be overcome by continued collaboration between CRMC staff and the Capstone preceptor, as well as establishing relationships with professionals dedicated to evaluating and promoting evidence-based interventions in the field of teen driving programs. Perhaps the most important contribution to sustainability of SafeTeens is the established collaboration between UNC-HSRC and the CRMC staff which has implications for incorporating evidence-based program components as well as providing data sources for evaluation.

Impact on Capstone Team

The Capstone experience allowed the team to gain practical exposure to evaluation design and implementation within a community-based public health setting. Capstone team members learned how to balance implementing rigorous evaluation techniques while meeting the needs of passionate stakeholders. As the Capstone team encountered barriers, team members learned to adapt to each unique situation by capitalizing on individual's skills and assets to identify obstacles, create solutions, and implement changes necessary to achieve Capstone objectives. This solution-driven approach allowed Capstone team members to respectfully engage with stakeholders, experts and mentors, in a manner that promoted trust and allowed Capstone work to be completed. The Capstone team also learned to make decisions in a collaborative manner, while maintaining a supportive and encouraging environment, and conducting

Capstone work in an organized, effective efficient manner. Overall, the Capstone project enhanced and developed each team member's professional skill set resulting in personal and professional growth.

Conclusion

In summary, the UNC Department of Surgery Capstone project experience provided a setting in which multiple parties engaged in a reciprocal relationship to foster a positive learning environment, enhance and develop skills, evaluate and present findings of a community program, and promote the principles of community engagement. The Capstone team members received quality mentorship and expert guidance, as well as a valuable opportunity to engage in the application of program evaluation skills essential to the practice of public health in community environments. In exchange for its supportive environment and willingness to host a team of Master of Public Health (MPH) students, the host organization, CRMC, received a comprehensive formal evaluation of its program, an evaluation toolkit that can be used in future evaluations, and a user-friendly summary of the evaluation findings and recommendations. The unique experience provided by the Department of Health Behavior at the Gillings School of Global Public Health has equipped the Capstone team members to more fully and competently apply core public health competencies and valuable practical skills in future public health practice.

References

- “About JoCo Teen Drivers” (n.d.) Retrieved October 10, 2013, from <http://www.jocoteendrivers.com/about.html>
- Carcaillon, L., & Salmi, L. (2005.) Evaluation of a program to reduce motor-vehicle collisions among young adults in the county of landes, france. *Accident Analysis & Prevention*, 37(6), 1049-1055.
- Centers for Disease Control and Prevention [CDC]. (2011). CDC study finds seat belt use up to 85 percent nationally [Press release]. Retrieved from http://www.cdc.gov/media/releases/2011/p0104_vitalsigns.html
- Centers for Disease Control and Prevention [CDC]. (2012). Teen drivers fact sheet: motor vehicle safety. Retrieved October 11, 2013 from http://www.cdc.gov/motorvehiclesafety/teen_drivers/teendrivers_factsheet.html
- Cave, T., Ludwar, J., & Williams, W. (2006). Brain-based learning. *Alberta Education*. Retrieved from https://education.alberta.ca/apps/aisi/literature/pdfs/bbased_learning.pdf
- Chan, E., Pradhan, A., Pollatsek, A., Knodler, M., & Fisher, D. (2010.) Are driving simulators effective tools for evaluating novice drivers’ hazard anticipation, speed management, and attention maintenance skills? *Transportation Research Part F: Traffic Psychology and Behavior*, 13(5), 343-353.
- Chen, L., Baker, S., Li, G. (2006.) Graduated driver licensing programs and fatal crashes of 16-year-old drivers: a national evaluation. *Journal of Pediatrics*, 188(1), 56-62.
- Cleveland County HealthCare System. (2010). *Mission, vision, values*. Retrieved from <http://www.clevelandregional.com/Mission-Vision-Values.html>
- D’Agostino, R., Sullivan, L., & Beiser, A. (2006). *Introductory Applied Biostatistics*. Brooks/Cole Cengage Learning.
- Earp, J. A., & Ennett, S. T. (1991). Conceptual models for health education research and practice. *Health Education Research*, 6(2), 163-171.

- Ekeh, A., Hamilton, S., Demko, D., & McCarthy, M. (2008). The effect of a trauma center-based intervention program on recidivism among adolescent driving offenders. *The Journal of Trauma and Acute Care Surgery*, 65(5),1117-1121.
- Ekeh, A., Hamilton, S., D'Souza, C., Everett, E., & McCarthy, M. (2011.) Long-term evaluation of a trauma center-based juvenile driving intervention program. *The Journal of Trauma and Acute Care Surgery*. 2011;71(1):223-227.
- Foss, R. D., Feaganes, J. R., & Rodgman, E. A. (2001). Initial effects of graduated driver licensing on 16-year-old driver crashes in North Carolina. *JAMA: The Journal of the American Medical Association*, 286(13), 1588-1592.
- Glanz, K., Rimer, B., & Viswanath, K. (Eds.). (2008). *Health behavior and health education: theory, research, and practice*. John Wiley & Sons.
- Goodwin, A., Foss, R., Margolis, L., & Waller, M. (2010). "Parents, teens, and the learner stage of graduated licensing." *AAA Foundation for Traffic Safety*. Retrieved December 10, 2013 from <https://www.aaafoundation.org/sites/default/files/ParentsTeensReport.pdf>.
- Green, L. W., & Kreuter, M. W. (2005). *Health program planning: An educational and ecological approach*. McGraw-Hill New York, NY.
- Hartling, L., Wiebe, N., Russell, K., Spinola, C., Klassen, T. (2004.) Graduated driver licensing for reducing motor vehicle crashes among young drivers. *Cochrane Database System Review*, 2(2).
- Highway Safety Research Center [HSRC]. (2012). North Carolina crash data [data file]. Retrieved October 8, 2013, from <http://www.hsrb.unc.edu/crash/datatool.cfm>
- Hudgins, E. (2012.) Teen road safety in North Carolina: putting best practice into action. 2012. Retrieved October 30, 2013, from <http://www.ncleg.net/DocumentSites/Committees/NCCFTF/Reports%20and%20Data/Teen%20Road%20Safety,%20Dec%202012.pdf>
- Johnston County Emergency Services department. Johnston county teen drivers. Retrieved October 10, 2013 from <http://www.jocoteendrivers.com/about.html>.

- Karaca-Mandic, P., & Ridgeway, G. (2010). Behavioral impact of graduated driver licensing on teenage driving risk and exposure. *Journal of Health Economics*, 29(1), 48-61.
- Kooler, J. & Bruvold, W. (1992). Evaluation of an educational intervention upon knowledge, attitudes, and behavior concerning drinking/drugged driving. *Journal of Drug Education*, 22(1), 87-100.
- Linnan, L., & Steckler, A. (2002). *Process evaluation for public health interventions and research*. San Francisco, California: Jossey-Bass.
- Lunenburg, F. C. (2011). Key components of a curriculum plan: objectives, content, and learning experiences. *Electronic Journal Volumes, Schooling*, 2(1). Retrieved from <http://www.nationalforum.com/Electronic%20Journal%20Volumes/Lunenburg,%20Fred%20C.%20Components%20of%20a%20Curriculum%20Plan%20Schooling%20V2%20N1%202011.pdf>
- Manno, M., Maranda, L., Rook, A., Hirschfield, R., & Hirsh, M. (2012). The reality of teenage driving: the results of a driving educational experience for teens in the juvenile court system. *The Journal of Trauma and Acute Care Surgery*, 73(4), 267-272.
- Masten, S.V., & Foss, R.D. (2010.) Long-term effect of the North Carolina graduated driver licensing system on licensed driver crash incidence: a 5-year survival analysis. *Accid Anal Prev.*, 42(6), 1647-1652. doi: 10.1016/j.aap.2010.04.002; 10.1016/j.aap.2010.04.002.
- N.C. SafeTeens, Inc. (2010). SAFETeens Think First: a safe driving education curriculum. (2010 Edition). Rolesville, NC: Author
- North Carolina Department of Commerce - Labor and Economic Analysis Division (2013). *North Carolina's April County and Area Employment Figures Released*. Retrieved December 9, 2013, from http://www.ncesc1.com/pmi/rates/PressReleases/County/NR_Apr2013CountyRates_M.pdf
- North Carolina State Center for Health Statistics. Leading cause of death – statistics [data file]. Retrieved October 8, 2013, from http://www.schs.state.nc.us/schs/deaths/lcd/lcd_data.cfm.
- Shope, J. et al. (2001). "Long-term follow-up of a high school alcohol misuse prevention program's effect on students' subsequent driving." *Alcoholism: Clinical and Experimental Research*, 25(3), 403-410.

- Small, K. (2008). Interventions to prevent adolescent motor vehicle crashes: A literature review. *Orthopaedic Nursing*. 27(5), 283-290.
- U. S. Census Bureau. (2012). *Median household income, 2007-2011, Selected Counties in North Carolina*, Retrieved December 9, 2013, from <http://quickfacts.census.gov/qfd/states/37000.html>
- U. S. Census Bureau. (2010). *Persons per Square Mile, Selected Counties in North Carolina*, Retrieved December 9, 2013, from <http://quickfacts.census.gov/qfd/states/37000.html>
- U.S. Census Bureau (2010). *Urban and Rural Classification, Selected Counties in North Carolina*, Retrieved December 9, 2013, from <http://www.census.gov/geo/reference/ua/urban-rural-2010.html>
- Wallace, R. (2012.) North Carolina Governor's Highway Safety Program FY 2013 highway safety plan. Retrieved from http://www.nhtsa.gov/nhtsa/whatsup/safeteaweb/FY13/FY13HSPs/NC_FY13HSP.pdf
- Williams, A. F. (1996). Magnitude and characteristics of the young driver crash problem in the United States. In *New to the road: reducing the risks for young motorists. Proceedings of the First Annual International Symposium of the Youth Enhancement Service*.
- Williams, A.F. (2000.) Graduated licensing in the United States; Proceedings of the 65th Road Safety Congress—Around the World in 2 and ½ Days: Lessons for the UK? Retrieved from <http://www.rosipa.com/roadsafety/conferences/congress2000/proceedings/williams.pdf>
- Williams, A.F. (2013). Teenage driver fatalities by state: 2012 preliminary data. Retrieved from http://www.ghsa.org/html/publications/pdf/spotlights/spotlight_teens12.pdf
- Yee, K. (n.d.). Interactive Techniques. *Faculty Center for Teaching and Learning*. Retrieved April 3, 2014, from http://www.fctl.ucf.edu/TeachingAndLearningResources/CourseDesign/Assessment/content/101_Tips.pdf

Appendices

Appendix A. Deliverable Tables

Deliverable 1: Literature Review & Evidence Table	
<i>Format:</i>	Eleven-page literature review narrative report with three-page table.
<i>Purpose:</i>	To identify teen safe driving interventions and/or programs that have been evaluated using long-term outcomes, and to identify characteristics of these programs that contribute to their success.
<i>Intended Audiences:</i>	Capstone preceptor, Sharon Schiro, PhD; and SafeTeens program coordinators, Dr. Michael Barringer, MD, and Betsy Tesseneer, RN, BSN.
<i>Activities:</i>	<ul style="list-style-type: none"> • All Capstone team members conducted an initial search of the literature to familiarize themselves with a) terminology or nomenclature commonly used by experts in promoting safe teen driving behaviors, b) existing teen driving interventions, and c) evaluations of teen driving interventions. • Two Capstone team members met with the School of Public Health librarian at UNC's Health Sciences Library, Mellanye Lackey, MSI, who worked with team members to develop a search strategy, including developing several search syntaxes. • Two Capstone team members led the formal literature search and review process. • Capstone members worked with Dr. Schiro to develop appropriate evidence table categories to organize and summarize teen driving interventions and programs. • Disseminated the Evidence Table to Dr. Schiro, Dr. Barringer, and Ms. Tesseneer via email in December of 2013.
<i>Recommendations:</i>	<ul style="list-style-type: none"> • If the SafeTeens team intends to use the evidence table in the future, it should be updated based on a search of literature published since October 2013 using syntax terms developed by the Capstone team through collaboration with Ms. Lackey.

Deliverable 2: Process & Outcome Evaluation Plan	
Format:	36-page document, including the SafeTeens program logic model, a 20-item activity log, a six-item student survey, an attendance log, and a process evaluation user guide.
Purpose:	To outline the approach that will be used for conducting the process and outcome evaluation, which will be used to determine the a) attendance, dose delivered, dose received, and fidelity, and b) effectiveness of SafeTeens on teen motor vehicle crashes and driving-related fatalities.
Intended Audience(s):	Capstone preceptor, Sharon Schiro, PhD; and SafeTeens program coordinators, Dr. Michael Barringer, MD, and Betsy Tesseneer, RN, BSN.
Activities:	<p>Process Evaluation Plan</p> <ul style="list-style-type: none"> • Developed a list of process evaluations indicators, including indicators assessing program attendance, fidelity, dose delivered, and dose received • Created a logic model for the SafeTeens program • Created a SafeTeens Activity Log, Attendance Log, and Student Survey • Created a SafeTeens Process Evaluation Guide with instructions on employing evaluation instruments • Submitted evaluation toolkit (activity log, attendance log, student survey, and logic model) to SafeTeens staff for review and incorporated their feedback into final products • Created a process evaluation plan outline and draft • Final draft of the evaluation plan reviewed by SafeTeens and CRMC Trauma staff • Incorporated feedback from SafeTeens and CRMC Trauma Staff into final product • Disseminated the final process evaluation report to Dr. Schiro, Dr. Barringer, and Ms. Tesseneer via email in December of 2013 <p>Outcome Evaluation Plan</p> <ul style="list-style-type: none"> • Developed research questions, study design, and analysis plan • Received feedback on research questions, study design and analysis plan by biostatistician and content expert • Incorporated feedback to develop outcome evaluation indicators and finalize research questions, study design, and analysis plan • Created outcome evaluation plan outline and draft • Final draft of the outcome evaluation plan reviewed by content expert and SafeTeens stakeholders • Received and incorporated feedback on outcome evaluation plan collected from community members • Disseminated final overall process and outcome evaluation plan to

	<p>CRMC staff and other stakeholders in December 2013</p> <ul style="list-style-type: none"> • Outcome evaluation plan used to guide subsequent Capstone outcome evaluation conducting in early 2014 as well as a guide to future stakeholder-led outcome evaluations
<p>Recommendations:</p>	<p>Process Evaluation Plan</p> <ul style="list-style-type: none"> • SafeTeens staff should train program participants/instructors on the purpose and structure of the process evaluation plan • If SafeTeens staff plan on using this evaluation plan in the future, they should review the main constructs of the process evaluation annually to ensure that the evaluation plan reflects the core components of the program • SafeTeens staff should implement the process evaluation on an annual basis to be constantly collecting feedback on the program’s effectiveness and fidelity, in order to improve the curriculum <p>Outcome Evaluation Plan</p> <ul style="list-style-type: none"> • The Capstone team created the outcome evaluation in order to analyze valid and robust data. If in the future the SafeTeens Staff implements the outcome evaluation plan using different data sources, careful consideration should be taken to determine if data can be appropriately analyzed • SafeTeens Staff should implement the outcome evaluation plan on an annual basis when new data is made available in order to continue to determine the effectiveness of SafeTeens over time • SafeTeens Staff could assess short-term program outcomes by following up with SafeTeens program participants 6 months and 12 months after participation in SafeTeens

Deliverable 3: Process & Outcome Evaluation Report	
Format:	30-page narrative report, including appendices.
Purpose:	To present the main findings from the a) process evaluation conducted at 3 SafeTeens sessions, and b) outcome evaluation determining whether SafeTeens decreased the number of teen MVCs and driving-related fatalities in Cleveland County, NC.
Intended Audience(s):	Capstone preceptor, Sharon Schiro, PhD, and SafeTeens program coordinators, Dr. Michael Barringer, MD, and Betsy Tesseneer, RN, BSN.
Activities:	<p>Process Evaluation Report</p> <ul style="list-style-type: none"> • Reserved University cars for transportation to/from SafeTeens Sessions • Trained program evaluators, including four Capstone team members and one SafeTeens staff member, to conduct a process evaluation and complete process evaluation instruments • Capstone members attend two SafeTeens sessions (2/4/14 and 2/5/14) • SafeTeens staff member independently conducted process evaluation due to inclement weather affecting travel (2/17/14) • Collected student satisfaction surveys from SafeTeens Participants in attendance at three sessions evaluated • Completed the SafeTeens Activity Log and SafeTeens Attendance Log at three sessions • Created data structures & codebook for entry of data collected throughout process evaluation • Analyzed data collected from SafeTeens Student Satisfaction Survey, Attendance Log, and Activity Log • Identified recommended next steps for the SafeTeens program, based on findings of the evaluation • Created outline and rough draft of the process evaluation report and shared with preceptor • Incorporated feedback from preceptor into the final draft of the process evaluation report • Presented findings at April 11, 2014 presentation <p>Outcome Evaluation Report</p> <ul style="list-style-type: none"> • Developed outcome evaluation plan and reviewed with Drs. Foss and Bowling • Compiled descriptive statistics (mean, median, mode, standard deviation) for variables of interest and graphed data to review its spread • Narrowed and selected appropriate statistical tests based on preliminary analysis of data • Requested SAS file containing data variables necessary for analysis

	<p>from Eric Rodgman at UNC-HSRC</p> <ul style="list-style-type: none"> • Analyzed data using SAS and compiled a preliminary report • Reviewed preliminary findings with Drs. Foss and Bowling and incorporated feedback • Synthesized analysis and compiled into evaluation report <p>Overall Report</p> <ul style="list-style-type: none"> • Presented findings at April 11, 2014 presentation
<i>Recommendations:</i>	<ul style="list-style-type: none"> • SafeTeens coordinators should carefully review the recommended next steps outlined in the evaluation report and consider making revisions to the program as needed

Deliverable 4: Program Recommendations Report	
Format:	11-page narrative report.
Purpose:	To present seven suggested program recommendations for improvement of the SafeTeens program.
Intended Audience(s):	Capstone preceptor, Sharon Schiro, PhD, and SafeTeens program coordinators, Dr. Michael Barringer, MD, and Betsy Tesseneer, RN, BSN.
Activities:	<p>Process Evaluation Report</p> <ul style="list-style-type: none"> • Reviewed Capstone literature review and evidence table • Reviewed process and outcome evaluation findings, including qualitative feedback from students and instructors • Identified key areas for improvement • Reviewed literature to support recommendations • Narrowed and finalized appropriate recommendations • Presented findings at April 11, 2014 presentation
Recommendations:	<ul style="list-style-type: none"> • SafeTeens coordinators should carefully review the recommendations outlined and enlist the assistance of UNC-HSRC to adopt suggestions

Deliverable 5: Presentation Materials	
<i>Format:</i>	PowerPoint presentation composed of 46 PowerPoint slides
<i>Purpose:</i>	To orally and visually present the main findings and recommended next steps derived from the process and outcome evaluations
<i>Intended Audience(s):</i>	Capstone preceptor, Sharon Schiro, PhD, Capstone Faculty Adviser, Susan Ennett, PhD, SafeTeens program coordinators, Dr. Michael Barringer, MD, Betsy Tesseneer, RN, BSN, Jessica Laws, RN, SafeTeens instructor, NC State Highway Patrol Officer Jason Singlevich, and expert consultant, Robert Foss, PhD
<i>Activities:</i>	<ul style="list-style-type: none"> • Identified main findings from process and outcome evaluations • Identified main figures and tables from process and outcome evaluations • Synthesized main findings and figures in a PowerPoint format • Assigned presentation sections to Capstone team members • Prepared guide for main speaking points • Edited and finalize PowerPoint presentation materials • Presented to intended audience at April 11, 2014 presentation
<i>Recommendations:</i>	<ul style="list-style-type: none"> • SafeTeens coordinators may disseminate presentation materials to advise SafeTeens stakeholders, including SafeTeens instructors and Cleveland County high school drivers' education teachers, of evaluation findings • SafeTeens coordinators may rely on presentation materials to address revisions to SafeTeens program

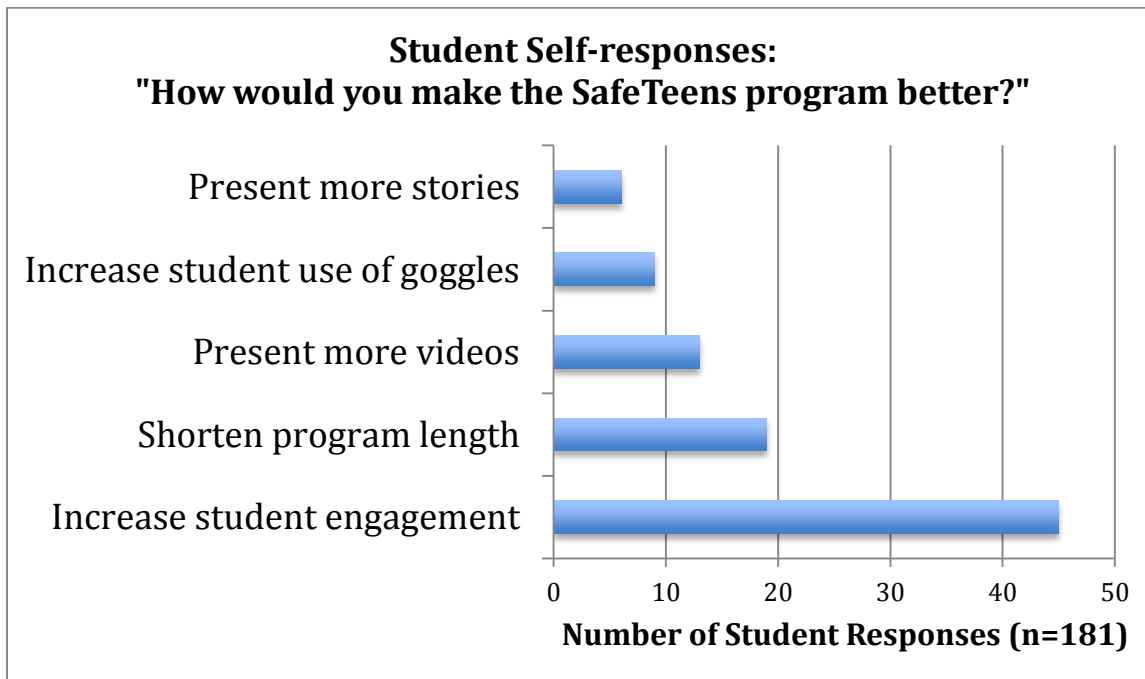
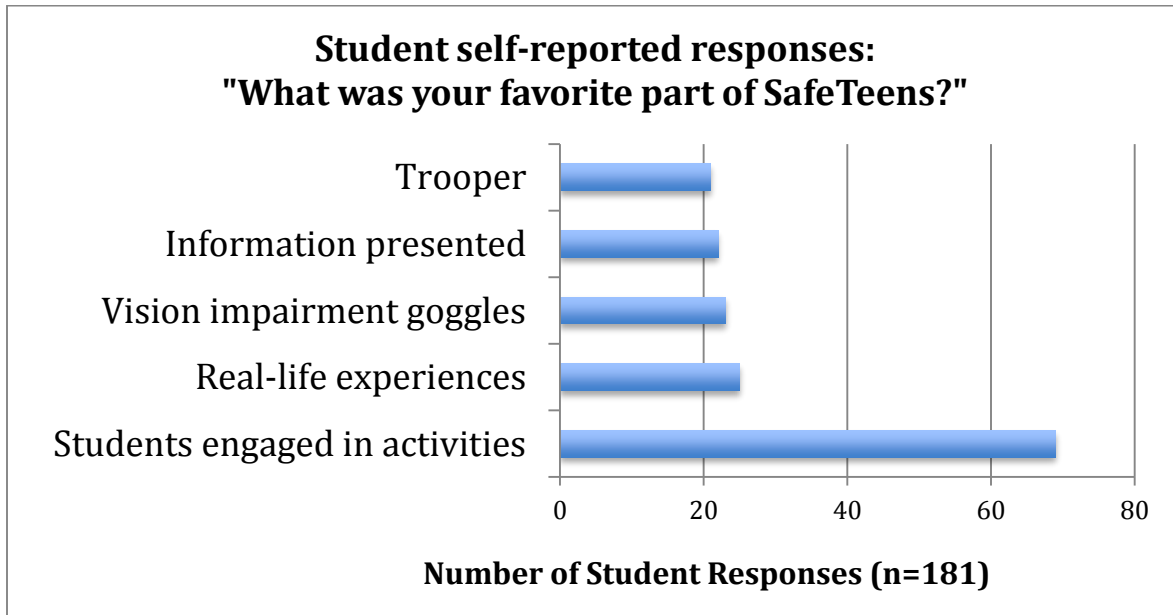
Appendix B. Piedmont A Comparison County Group Selection

NC Piedmont Counties	Area % Urban	Area % Rural	Population Density (Persons Per Square Mile)	Socioeconomic Status (Median Family Income)	Unemployment Rate
Alamance	18.36	81.64	356.5	\$44,430	*8.6
Alexander	5.52	*94.48	143.1	*\$40,658	*8.6
Anson	0.99	99.01	50.7	*\$34,659	*10.2
Cabarrus	30.17	69.83	492.1	\$54,280	7.9
Caswell	0.05	99.95	55.8	*\$37,926	*8.6
Catawba	31.61	68.39	387.1	*\$43,733	*9.7
Chatham	2.51	97.49	93.1	\$56,935	5.7
Cleveland	9.28	90.72	211.3	\$38,352	9.5
Davidson	16.56	83.44	294.7	\$44,728	*9.1
Davie	5.54	*94.46	156.2	\$50,562	8
Durham	46.93	53.07	935.7	\$50,078	6.6
Forsyth	58.92	41.08	859.2	\$46,417	8
Franklin	2.04	97.96	123.3	\$44,598	7.9
Gaston	38.17	61.83	578.8	\$43,052	*9.1
Granville	4.81	*95.19	112.7	\$49,090	*8.9
Guilford	38.86	61.14	756.4	\$46,288	*8.6
Harnett	*7.91	*92.09	*192.7	*\$42,965	*9.5
Iredell	16.85	83.15	277.8	\$51,139	*8.5
Johnston	*11.11	*88.89	213.4	\$49,888	7.5
Lee	*11.35	*88.65	*227	\$44,836	10.6
Lincoln	14.74	*85.26	262.7	\$50,279	*8.7
Mecklenburg	86.09	13.91	1755.5	\$55,994	*8.5
Montgomery	1.29	98.71	56.5	\$32,946	*9.6
Moore	*6.61	*93.39	126.5	\$48,348	8.2
Orange	*12.53	*87.47	336.2	\$56,055	5.3
Person	1.85	98.15	100.6	\$43,271	*9.2
Randolph	*7.52	*92.48	*181.1	*\$40,602	*9.1
Rockingham	5.78	*94.22	*165.6	*\$38,311	*10
Rowan	15.34	84.66	270.7	\$43,121	*8.8
Stanly	5.27	*94.73	*153.3	*\$43,424	8.4
Stokes	2.91	97.09	105.6	\$43,099	7.5
Surry	5.18	*94.82	138.4	*\$36,788	*9.3
Union	19.29	80.71	318.7	\$64,813	7.1
Vance	*7.21	*92.79	*179.2	*\$34,084	11.7
Wake	56.51	43.49	1078.8	\$65,289	6.6
Warren	0	100	48.9	\$34,495	11.1
Yadkin	1.74	98.26	114.7	*\$40,375	8
Inclusion Criteria Range	± 3 percentage points	± 5 percentage points	± 50 people per square mile	± \$4K	± 1 percentage point

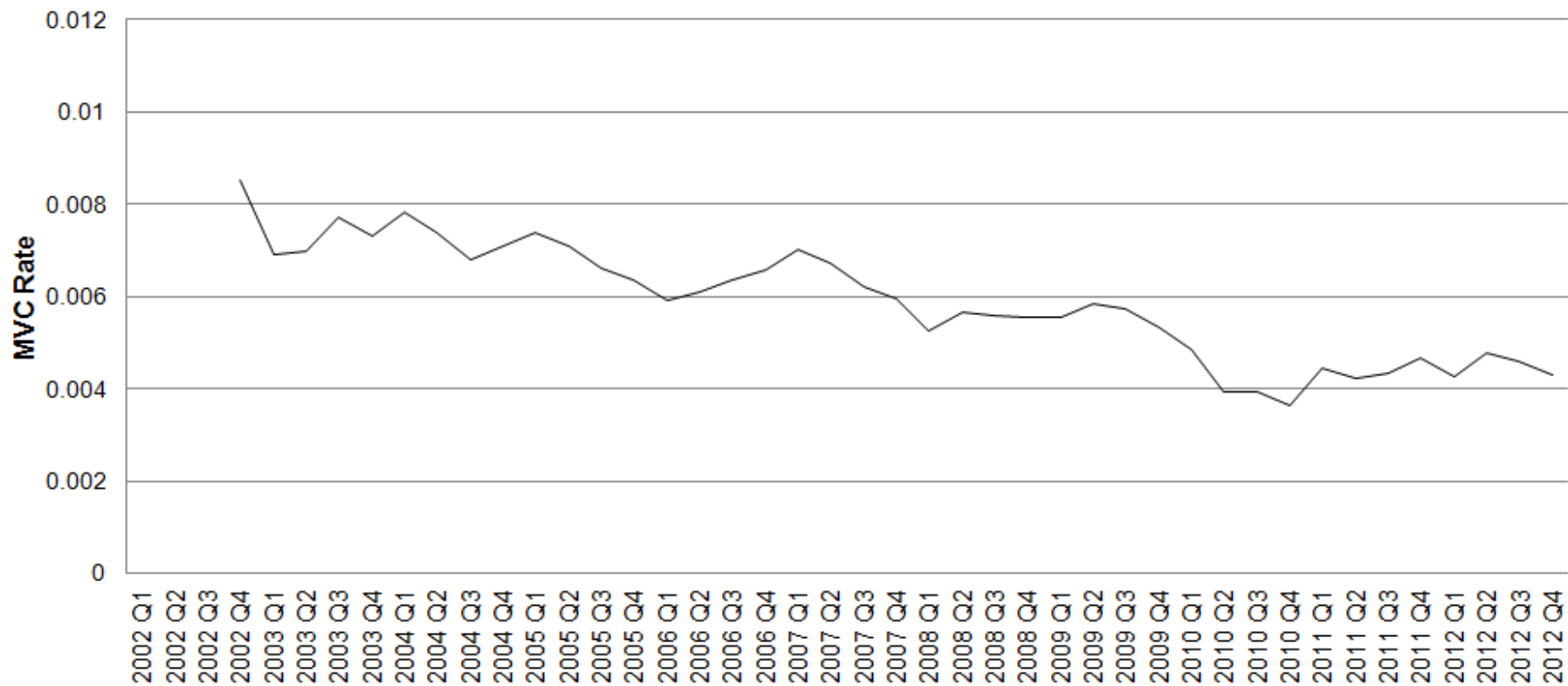
Piedmont A Comparison Group Selection: The 37 Piedmont counties were compared based on the following domains: (1) Area Percent Rural (US Census Bureau, 2010b), (2) Area Percent Urban (US Census Bureau, 2010b), (3) Population Density (US Census Bureau, 2010a), (4) Socioeconomic status based on median household income (US Census Bureau, 2012) and (5) Unemployment rate (North Carolina Department of Commerce, 2013). Piedmont A comparison group counties, highlighted in blue, are Harnett, Randolph, Rockingham, Surry, and Vance, and these five counties were selected due to their similarity to Cleveland County as indicated by the inclusion criteria range. All data that met the inclusion criteria are denoted with an asterisk. Excluding Cleveland County and the Piedmont A counties, all remaining counties listed comprise the Piedmont B comparison group. Note: Johnston County meets

several inclusion criteria; however, it was excluded from Piedmont A based on its substantially higher income level and lower levels of unemployment. Johnston County also has JoCo Teens, a teen driving program, which adds a confounding variable (“About JoCo Teen Drivers”, n.d.).

Appendix C. Student Survey Responses

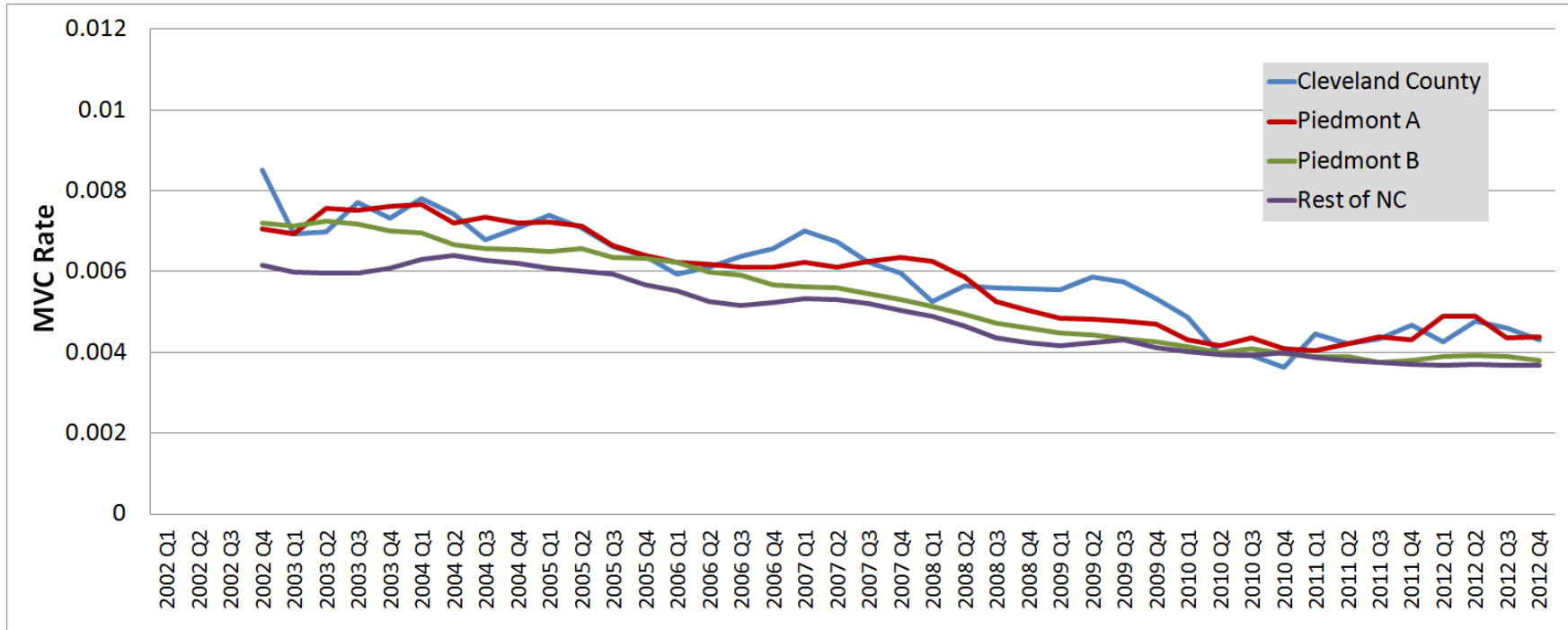


Appendix D. Quarterly MVC Rates among 16-year-old Drivers in Cleveland County, 2002-2012



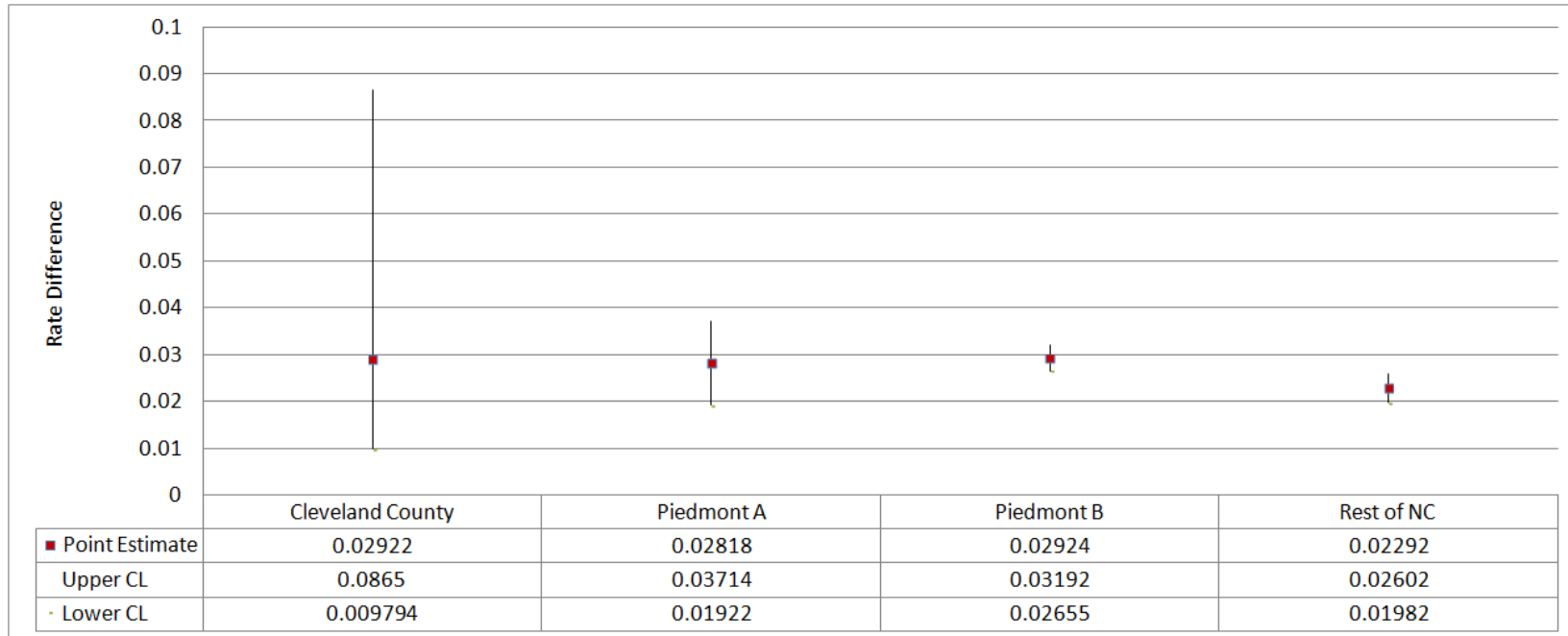
Note: These quarterly MVC rates are presented as trend lines calculated by obtaining a moving average for annual MVC rates. Thus, the trend line for MVC rates is not presented for Q1-Q3 in 2002.

Appendix E. Quarterly MVC Rates among 16-year-old Drivers by Comparison Group, 2002-2012



Note: These quarterly MVC rates are presented as trend lines calculated by obtaining a moving average for annual MVC rates. Thus, the trend line for MVC rates is not presented for Q1-Q3 in 2002.

Appendix F. MVC Rate Difference Computations with 95% Confidence Intervals among 16-year-old Drivers



Note: Point estimates from the rate difference computations are denoted by the red bullet mark. The 95% confidence intervals are indicated on the graph with grey vertical lines and represent a high level of certainty about our data. The 95% confidence intervals will contain the average of all point estimates 95% of the time and thus reflect a significance of 0.05 ($p=0.05$). The confidence interval for Cleveland County is much wider than the other comparison groups because of its relatively smaller sample size. Notice that the confidence intervals are overlapping for all comparison groups, indicating that the rate difference point estimates are *not* statistically different from one another.