BTSCR Project BTS-19
Improving Moped and Seated Motor Scooter (50 cc or less) Rider Safety

The Behavioral Traffic Safety Cooperative Research Program (BTSCR) is sponsored by the Governors Highway Safety Association and funded by the National Highway Traffic Safety Administration. BTSCR is administered by the Transportation Research Board (TRB), part of the National Academies of Sciences, Engineering, and Medicine. Any opinions and conclusions expressed or implied in resulting research products are those of the individuals and organizations who performed the research and are not necessarily those of TRB; the National Academies of Sciences, Engineering, and Medicine; or BTSCR sponsors.
Overview

A moped/scooter (50cc or less) is a motor vehicle that, except in two states (Virginia and North Carolina), requires a minimum of a standard driver’s license to operate on public roadways. Some states also require a motorcycle endorsement for legal operation. Although there is significant variation in the naming and definitions of these vehicles across states, common characteristics include a step-through design with two wheels, a 50cc engine size, approximately 2 brake horsepower, and a maximum speed of 30 mph on flat terrain.

In the moped/scooter user survey conducted for this study, a majority of respondents (82.5%) indicated that they use a moped/scooter for fun/recreational trips, while 72.2% reported using one for running errands. Interestingly, those percentages are much higher than the rate of usage reported for commuting to work. At the same time, the survey also showed that over two-thirds of respondents owned a car (however, it is important to exercise caution when interpreting this result due to the use of non-random sampling). This suggests that, although mopeds/scooters are a means of transportation, these vehicles serve a particular segment of the motoring public and are used for specific trip purposes. It is also notable that mopeds/scooters have traditionally been a popular primary transportation mode for some college students in campus towns, and these vehicles often provide affordable mobility for low-income populations in urban areas.

Relative to passenger cars, mopeds/scooters (50cc or less) are associated with a higher risk of injuries in the event of a traffic crash, as they do not offer the protection of an enclosed vehicle or include other safety enhancement features, such as airbags and seat belts. Additionally, operators of these vehicle types often are ejected during a collision, making them even more exposed and vulnerable to serious injuries. However, there is limited information available related to the characteristics of the moped/scooter user base; evaluations of state-level crash data are also limited.

It appears that, due to the limited power and top speed of these vehicles, which is 30 mph, the likelihood of a fatal crash is relatively small compared to what is observed for motorcycles. Accordingly, mopeds/scooters are subject to minimal guidance and oversight by regulatory agencies at the state level, and, as a result, users often are confused about operating requirements and consider mopeds/scooters to be a low-risk transportation mode, resulting in many preventable injuries. Illustrating that point, research has indicated that moped/scooter riders are especially susceptible to head and facial injuries; yet, some studies have suggested that, compared to motorcyclists, moped/scooter operators exhibit much lower rates of helmet use and have a higher likelihood of riding under the influence of alcohol. Ultimately, in the broad context of moped/scooter safety, there are several key factors that are especially important to consider:
First, due to the relatively low speeds of mopeds/scooters, in conjunction with the well-established effectiveness of modern safety gear, adverse crash outcomes are highly preventable if proper safety measures are employed. For instance, research has indicated that helmets are most effective at speeds consistent with moped/scooter capabilities, and crash data analyses conducted in this study further confirmed that helmet use is associated with reduced injury severity levels.

Second, the presence of minimal regulations and guidance, as well as a lack of enforcement for existing laws, promotes the conceptualization of mopeds/scooters as a low-risk transportation mode. Yet, crash data have clearly established an association between this vehicle type and serious head and facial injuries, and moped operators have an injury rate similar to that of motorcyclists.

Third, a lack of moped/scooter regulation impacts operators of similar vehicle types with larger engine sizes. In particular, 51–150cc motor scooters tend to be identical in appearance to the mopeds/scooters addressed in this safety guide. This promotes confusion regarding operating requirements for both vehicle types, both among their user bases and among law enforcement, and is easily exploitable by those seeking to circumvent regulatory requirements for larger-engine vehicles.

Finally, it should be noted that mopeds/scooters are widely used by members of vulnerable populations, including college students and the economically disadvantaged, who are disproportionately impacted when inadequate safety policies and enforcement practices are in effect.

**What are Mopeds/Scooters?**
Despite the aforementioned concerns, traffic safety stakeholders and professionals interested in promoting moped/scooter safety face fundamental challenges due to the lack of consistent definitions and terminology used to describe such vehicles. Across the U.S., the most common thresholds used to separate mopeds and scooters from motorcycles are an engine displacement of 50 cubic centimeters (cc) and a top speed of 30 mph. Yet, depending on the specific state being considered, and the presence or absence of pedals, mopeds and scooters can be subjected to one of nine different naming conventions (e.g., mopeds, motor-driven cycles, motorized bicycles, and motor scooters). For the sake of clarity, throughout this guide, the terms “moped” and “scooter” will be used to describe only two- and three-wheeled motor vehicles that fall at or below the 50cc and 30 mph thresholds referenced above.

**Safety Plan Development**
To improve moped/scooter safety, it is important to develop and implement an effective safety plan by assessing the extent of the problem in a given state, examining risk factors and potential mitigation strategies, and building strong partnerships with state and local entities that have a vested interest in traffic safety and are capable of executing mitigation plans. This guide is intended to assist states with assessing, planning, and implementing moped/scooter safety strategies that can be tailored to the unique circumstances within a given jurisdiction.
The first four sections of this guide each contain a series of questions that can be used to identify opportunities for improvement in moped/scooter safety and develop a plan for implementing needed actions and changes. Specific topics that are covered include the following: (1) obtaining background information regarding state vehicle definitions and regulatory requirements, (2) evaluating data relevant to improving moped/scooter safety, (3) developing state- and local-level partnerships, and (4) establishing a communication plan to promote key findings and educate riders and general motorists. The final section of this guide presents a framework for synthesizing that information into a comprehensive safety strategy that includes goals, timelines, and responsibilities. As a whole, this guide is intended to be adaptable so that it may be used to meet each state’s unique challenges and needs.
1 | Background Information

Introduction
An important first step for enhancing moped/scooter safety is to gather information regarding your state’s vehicle definitions and regulatory requirements. To facilitate those efforts, a series of fundamental questions is presented in this section that, when answered, will provide additional insight and clarity as to how mopeds/scooters are treated in your jurisdiction. Knowledge of current statutes, as well as recent regulatory changes and their respective impacts, can be used to assess the extent of moped/scooter issues, inform the development of mitigation strategies, and address your state’s unique challenges and needs.

Information regarding moped/scooter terminology and regulations can be located by examining each state’s legislative statutes, licensing and registration agency websites, and vehicle operator (e.g., driver, motorcycle, and moped/scooter) manuals. Alternatively, law enforcement, transportation department, and licensing agency representatives can be contacted directly, and, in some cases, aggregated information can be obtained from independent organizations such as the Insurance Institute for Highway Safety (https://www.iihs.org/topics/motorcycles/motorcycle-helmet-laws-table).

It is notable that all 50 states define motorcycles, require their registration, and mandate that operators obtain a motorcycle endorsement. Mopeds/scooters are often classified as a subcategory of motorcycles and are exempted from certain requirements. Therefore, it may be necessary to begin by understanding the statutory definitions and requirements related to motorcycles first and then identify the thresholds that distinguish mopeds/scooters from motorcycles.

Assessment
1. How are mopeds/scooters labeled and defined in your state?
   - How do statutes define mopeds/scooters in your jurisdiction?
   - What thresholds (e.g., top speed, engine displacement, and horsepower) and requirements (e.g., transmission type and pedals), if any, are used to distinguish mopeds/scooters from other, similar vehicles?
   - Are different labels used in different parts of the legislative code (e.g., licensing and registration)?

2. How are mopeds/scooters regulated in your state?
   - Are mopeds/scooters (50cc and 30 mph) required to be registered and/or titled?
   - Is liability insurance required for moped/scooter operators?
   - What class of driver’s license, if any, is required for legal operation on public roadways?
   - Is there a partial or universal helmet law in effect for moped/scooter operators?
• What is the minimum age for moped/scooter operation in your state?
• Are there any roadways or locations where mopeds/scooters cannot be legally ridden?

3. Have there been any recent efforts to update your state’s existing moped/scooter laws?
• When was your state’s current moped/scooter legislation enacted?
• Have any recent efforts been undertaken to update or modify your state’s moped/scooter laws?
  - If so, what changes were made or considered, and were those efforts successful?

4. What impact has your state’s moped/scooter legislation had on rider safety?
• Have the safety benefits of your state’s moped/scooter laws been evaluated? If so, what were the results (e.g., change of crash/injury/fatality rate[s])?
• Have any studies examined rates of compliance and/or enforcement for moped/scooter legislation in your state? If so, what did those studies find?

Action Step 1: Background Information
Based on this section, what steps should be taken to gather information regarding your state’s moped/scooter definitions and regulatory requirements, any potential or recently enacted changes, and their respective levels of impact? Answering those questions will be the first step to create a comprehensive moped/scooter safety plan relevant to your state’s unique needs.
2 | Data

Introduction

Being able to access and analyze quality data is essential in any effort intended to improve moped/scooter safety. In particular, crash, injury, citation, and vehicle registration data can aid in identifying risk factors for adverse traffic outcomes, which, in turn, can be used to guide mitigation efforts. User surveys can also be employed to discern common operator characteristics, perceptions, attitudes, and behaviors.

The National Highway Traffic Safety Administration (NHTSA) maintains the Fatality Analysis Reporting System (FARS), a comprehensive census of all fatal crashes in the U.S. Within the FARS system, the vehicle body type ‘84’ is classified as ‘Motor Scooter,’ which is defined as “a light, two-wheeled, open motor vehicle on which the driver sits over an enclosed engine with legs together and feet resting on a floorboard.” However, it is important to note that mopeds/scooters are more likely to be involved in non-fatal crashes, given their top speed of about 30 mph. Therefore, utilizing state-level crash data, which includes non-fatal crashes, is preferable and provides a better understanding of the problem.

Another important aspect of crash data is that 20 states use the term ‘Moped’ as a statutory classification for two- and three-wheeled motor vehicles (50cc and 30 mph). However, sometimes, the vehicle body type in police crash reports does not match the statutory definition, especially since many states have updated their state police crash report forms to comply with the Model Minimum Uniform Crash Criteria (MMUCC), Fifth Edition (2017). Therefore, it is preferable to obtain motorcycle crash data with vehicle identification numbers (VINs) to determine vehicle details, including engine size.

Vehicle registration data serve as a surrogate measure to understand the size of the user base or extent of exposure when vehicle miles traveled (VMT) data are not available. It is worth noting that a total of nine states do not require vehicle registration for mopeds/scooters.

Understanding the characteristics and attitudes of users, as well as their travel patterns, is essential. Unlike motorcyclists, the community of moped/scooter riders, with the exception of a few premium brand users, is not readily visible. Moreover, their communication tends to revolve around buying and selling said vehicles, so it is recommended that dealerships and stores be used to facilitate outreach to the moped/scooter user base.

Assessment

1. What data do you need to evaluate and/or improve moped/scooter safety in your state?
   • Are necessary data sources readily available?
     - If not, what steps can be taken to gain access?
• Once obtained, will data need to be cleaned or modified in any way (e.g., VIN decoding)?
  - Who will be in charge of data cleaning and analyses?

• What data are needed to evaluate and/or improve the effectiveness of mitigation efforts?
  - If those data do not currently exist, what resources are needed and what stakeholders need to be involved to initiate data collection and analysis efforts?

2. What data have you already used to evaluate moped/scooter safety in your state?

• What have you learned from those data?
• How have you used that information?
• Are there additional steps that still need to be taken to improve the data-based evaluation process?

3. Have other states conducted similar research that could prove informative?

• Have other states conducted more rigorous evaluations of moped/scooter safety that could inform efforts in your jurisdiction?
• Are there relevant studies in the academic literature that have evaluated pertinent moped/scooter safety issues and/or the effectiveness of outreach efforts?

Action Step 2: Data

Based on this section, what steps should be taken to obtain and evaluate relevant data for improving moped/scooter safety in your state? What data sources are needed, are they readily available, and, if not, what steps can be taken to gain access? Data experts/researchers will be needed to answer these questions.
3 | Partnerships

Introduction
Efforts to improve moped/scooter safety require strong partnerships at state and local levels. For instance, it is important to develop relationships with government and non-government agencies that specialize in traffic safety, communication, advertising, outreach, education, funding, and data collection and analysis. Successful partnerships, which are integral to any safety initiative, require strong leadership, a group of core members who are responsible for implementing strategic actions, and individuals with adequate time for the management of day-to-day activities. However, forming a robust partnership becomes challenging when the target user group is relatively small or not well-aligned with the existing organizational structure of agencies. For example, while the Strategic Highway Safety Plans (SHSPs) of all 50 states specifically recognize the significance of motorcycle crashes and fatalities, mopeds/scooters often are treated as a sub-group of motorcycles in safety initiatives, even though they likely require distinct interventions. It is also notable that moped/scooter users seldom develop their own communities. Based on our research, user groups for certain selected brands (typically high-end scooters) can be found in online communities. However, most of the time, user groups are merely formed around sales transactions, and it is not uncommon for individuals to acquire these vehicles secondhand and through one-on-one interactions. Accordingly, these distinct behavior and communication patterns should be considered when developing partnerships to enhance moped/scooter safety. To facilitate the creation of new partnerships and to assess the strengths and weaknesses of existing relationships, a partnership evaluation tool is provided at the end of this section.

Assessment

1. Do any partnerships that focus on moped/scooter safety already exist in your state?
   • What stakeholders are currently represented?
   • Do any additional stakeholders need to be recruited?
   • What are the roles fulfilled by each partnership group and member?
   • Who is primarily responsible for implementing strategic actions and leading safety efforts?

2. Do existing partnerships have the expertise, resources, and capabilities that are needed?
   • What capabilities do existing partnerships already have?
   • What additional capabilities may be needed?
   • How can necessary expertise, resources, and capabilities be acquired?
3. If a partnership does not already exist, how can one be developed?

- What stakeholders need to be recruited?
- What are the roles that will be fulfilled by each partnership member?
- Who will be responsible for implementing strategic actions and leading safety efforts?

Action Step 3: Partnerships

Based on this section, what partnerships need to be developed and how can existing partnerships be improved to support moped/scooter safety in your state? Referring to motorcycle safety partnerships would be a good starting point if your state has them.
Partnership Evaluation Tool

This tool can be used to facilitate the development of new partnerships or to evaluate the strengths and weaknesses of existing relationships. Areas of expertise that your group may need are presented in the top row, and potential partner agencies that can meet those needs are listed in the far lefthand column. Identifying the capabilities and deficits of current and potential group members will aid in the creation of strong, enduring, and successful partnerships.

<table>
<thead>
<tr>
<th>Partnership Targets</th>
<th>Areas of Expertise</th>
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<tbody>
<tr>
<td>Data collection, analysis, and interpretation</td>
<td>Policy/advocacy development and update</td>
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<tr>
<td>Educational material development and evaluation</td>
<td>Material distribution via on/offline channels</td>
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<tr>
<td>Moped/scooter rider training</td>
<td>Motorist education</td>
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<tr>
<td>Stakeholder education</td>
<td>Partnership development and management</td>
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**AGENCIES**
- Departments of Health (state and local)
- Department of Motor Vehicles
- Federal Highway Administration (FHWA)
- Governors Highway Safety Association (GHSA)
- National Highway Traffic Safety Administration (NHTSA)
- State Department of Transportation
- Other:

**NON-GOVERNMENT TRAFFIC SAFETY AGENCIES**
- Advocates for Highway and Auto Safety
- Insurance Institute for Highway Safety-Highway Loss Data Institute (IIHS-HLDI)
- National Safety Council
- Other:

**LAW ENFORCEMENT**
- Law Enforcement Liaison
- Sheriff’s department
- State police/Highway Patrol
- Other:
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<td></td>
<td>Data collection, analysis, and interpretation</td>
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<tr>
<td><strong>BUSINESS ENTITIES</strong></td>
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<td>Insurance companies</td>
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<tr>
<td>Moped/scooter retailers and renters</td>
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<td>Online/offline media companies</td>
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<tr>
<td>Training schools for moped/scooter/motorcycle riders</td>
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<td>Other:</td>
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<tr>
<td><strong>MEDICAL ENTITIES</strong></td>
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<td>Doctors/nurses</td>
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<td>Emergency departments</td>
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<td>Trauma centers</td>
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<td>Other:</td>
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<td><strong>RESEARCHERS</strong></td>
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<td>Research institutes</td>
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<td>Traffic safety consulting companies</td>
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<td>Universities/colleges</td>
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<td><strong>OTHER</strong></td>
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4 | Communication Plan

Another key step for enhancing moped/scooter safety is to develop a communication plan that outlines how stakeholders intend to share key findings and promote evidence-based safety messages. Your communication plan may include steps for assessing risk factors and needs of your target audience (riders, law enforcement, motorists, stakeholders, etc.) based on available data, developing print and digital materials, conducting focus groups to test messaging options, posting or advertising on social media, working with media outlets, and forming partnerships with traffic safety entities and moped/scooter retailers and renters to distribute and/or display physical outreach materials.

Checklist

1. How can print/digital educational materials be used to increase understanding and support for moped/scooter safety?
   - What is the demographic makeup of your target group?
   - Are there any data available regarding the risk factors for moped/scooter crashes?
   - What theoretical framework is most appropriate for your campaign’s messaging?
   - Can you identify any studies that have evaluated moped/scooter safety promotion efforts?
     - If so, what can be learned?
   - What media modes are most likely to reach the target population?
   - How have other states used media to increase understanding and support for moped/scooter safety?
   - How will the effectiveness of your communication efforts be evaluated?

2. How will you educate individuals in your state about the effectiveness of specific moped/scooter safety countermeasures?
   - What types of educational materials will you need (e.g., print materials or digital materials such as social media posts)?
   - What specific audiences do you want to reach (e.g., riders, passengers, law enforcement, motorists, or stakeholders)?
   - Which media modes can you use to reach your intended audience (e.g., television, radio, social media platforms, newspapers, or billboards)?
   - Have there been any recent, high-profile events (e.g., crashes) at the local, state, or national level that can be used to bring additional attention to the need for moped/scooter safety?

Action Step 4: Communication

Based on this section, what steps should be taken to promote key findings and educate riders and stakeholders on the need to implement specific moped/scooter safety countermeasures? Don’t forget to include online communication expert(s) in your communication group.
Comprehensive Moped/Scooter Safety Plan Development

At this point, a comprehensive safety plan should be developed that incorporates action steps from previous sections, as well as any other necessary tasks that have been identified. Answering the questions presented below will provide a basic framework that you can use to formulate your plan, but it is important to adapt that framework to meet your state’s unique challenges and needs.

Safety Plan Development

1. What changes are needed to improve moped/scooter safety in your state?
   - What steps need to be taken in order to implement those changes?
   - What type of stakeholder involvement will be required?
   - What is the anticipated timeline for implementation?

2. How will partnerships be leveraged to improve moped/scooter safety in your state?
   - What roles will be fulfilled by each partnership member and group?
   - What specific action steps will each partner be responsible for?
   - What is the anticipated timeline for those action steps?

3. How will you monitor and assess the progress of safety efforts to ensure your strategy remains on track?
   - Who will decide if and when adjustments to your overall strategy need to be made?
   - Who will be responsible for making those adjustments?