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ATV Safety Training: It's a Valuable Tool for Everyone!

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ATV Safety Training: It's a Valuable Tool for Everyone!

by

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Abstract

All-Terrain Vehicles (ATVs) are fun to ride but they are only a machine. As much as everyone would like to blame the ATV when things go wrong, the end result ultimately stems from the operator's actions. It doesn't have a brain, it does what you tell it to do, and it cannot tell the operator that this is a bad idea or what the consequences might be. These thoughts are ultimately the operator's responsibility to assess and acknowledge what risks exist. Driving is a skill and education is a key portion of ATV safety training. Our current requirements are not regulated to be the same across the nation, creating complicated and miss-matched rules that vary from one state to the next. If knowledge is power and experience takes practice than ATV safety training could be the difference between life and death. In this study, there were 447 fatalities reported in Minnesota and Wisconsin during 2007-2020 that were attributed to ATVs but only 6% of these individuals had ATV safety training. Adults in the sample represented a whopping 82.7% of the population and our current system is providing a perpetually failing protective system that continuously provides our citizens with an educational injustice that is on the border of being negligent. It is time that we work together to fix this by requiring all ATV operators to take an ATV safety training class that teaches the same fundamental material, regardless of their age or experience level. This training is a valuable tool in reducing and preventing injuries or deaths and age should never be used as the defining characteristic that decides if safety education is necessary because age will never be a reliable indicator of experience on these machines, contrary to popular belief.

Keywords: ATV safety training, educational injustice, negligent, criminal justice, health, public safety

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Chapter 1: Introduction

ATV Safety Training Requirements in America

ATVs provide valuable transportation options and are beneficial in many aspects in life. They can help create positive family memories, make agriculture tasks easier, aid outdoor enthusiasts during hunting and fishing seasons, provide hours of entertainment, and they also provide significant positive impacts on our economy. ATVs can also cause unnecessary injuries and deaths if they are not recognized as only being a machine that responds to the operator's control and decision-making skills and this is why ATV safety training for all operator's is important. If you don't take the time and effort to ride safely, you may not live long enough to ride again.

For years, Minnesota has been a leader in ATV safety, along with the neighboring state of Wisconsin but recently other states, like Oregon have taken the safety spotlight by requiring ATV safety certification for all ATV operators riding on public land. According to Minnesota's and Wisconsin's Departments of Natural Resources (DNR) booklets for ATVs, an approved ATV safety training program is required for anyone born after, July 1st, 1987 in Minnesota and Jan. 1, 1988 in Wisconsin, before riding on public lands. The policy of using a date to define if there is a safety training requirement is seen in multiple states across our nation and there are states that only require ATV safety training from certain age groups. A prime example of this rule is found in Iowa where ATV safety training is only required for those aged 12-17 riding on public land (ATVcourse.com). The problem with these policies is that they are generally focused

on targeting the younger riders and leave a large portion of the current ATV riding population outside of the requirements and uneducated in the basics that these safety programs cover.

Since experience is generally believed to come with age, one would believe that the older the operator is, the less likely they are to become a statistic but the data from this project does not support that assumption. Experience operating any vehicle takes time and ATV operators are from all age groups, not just our youth. In fact, the sample population used in this project show that historically, Minnesota and Wisconsin have seen a larger percentage of fatalities experienced by those operators who are not affected by the current ATV safety training requirements because they were born before the requirements took effect. Operating any type of machine, whether it be a daily driver vehicle, heavy equipment at work, or even a riding lawnmower at home, can place an operator and others around them in a potentially dangerous situation and driving any type of vehicle requires some degree of training, even if it is just the basics on how to start and stop. But when it comes to ATVs, there is a common misconception that safety training isn't needed but this is a myth because ATVs can go the same speed as an automobile and they could arguably be considered easier to gain access to than a regular automobile. The only real difference between ATVs and automobiles is that an automobile has a seat belt and a roll cage to keep you from slamming into the ground or being ejected but the ATV doesn't. Sensational news headlines are splashed across media outlets when injuries and fatalities happen on ATVs and expenses like medical bills and a loss of income or even bankruptcy can follow these incidents so it is important to reduce the risks as best as possible.

While ATV safety training is not a solution that can prevent all incidents, it is a basic course that can provide basic operating knowledge, teach riders simple riding skills, identify safe

riding techniques and important factors that influence successful riding experiences, and teach basic first aid in addition to emergency responses. This type of training should not be targeted only at the younger generations but should be utilized all across the board since adults make up the largest percentage of the ATV operator population in this study and historically experienced the largest negative impact in Minnesota and Wisconsin. Although we can choose to target youth because their age group is more manageable and because they are more amenable to our requirements or rules, the influence from those older than them is significant and effective when it comes to teaching safety and riding skills. How can we encourage safe riding and protect people if we don't educate them in safe operation of the ATV, incident prevention, and emergency responses first?

Research Statements

This integrative research project was designed to be a multi-sectioned study that is both investigative and informative and is also both qualitative and quantitative. The characteristics of the fatal incidents were examined in an attempt to provide a well-rounded review of the fatalities and was meant to look at all of risk-factors in the data since every characteristic had a role in the incident in some way or another. This project is not meant to simply be another report, but one that will hopefully encourage society to see the many issues that this field faces and to see that there is a major issue with our current safety training policies nationwide, not just in Minnesota and Wisconsin. It is meant to inform, educate, and motivate the public to see that ATV safety training affects everyone, even if they don't actively participate in the ATV riding experience, because it affects the public's safety and health.

Some of the issues that are covered include the lack of adequate and reliable recording practices, the reporting issues that face the field, and the lack of an organized system to track incidents. This study covers 12 research questions: 1) What is an ATV? 2) What are the current laws that apply to ATV safety training in the studied states? 3) What was the total number of fatalities attributed to ATVs in Minnesota and Wisconsin during the years 2007 through 2020? 4) What age groups exhibited the highest fatalities during these years? 5) What does gender reveal in the fatalities? 6) What percentage of ATV operators during this time period had ATV safety training and can we increase this? 7) Where are these individuals dying? 8) How and why are they dying? 9) What part of the year is the deadliest historically on ATVS in Minnesota and Wisconsin? 10) Is Substance use, like alcohol, an issue on ATVs? 11) Is helmet use required, regulated, or reported on ATVs? 12) What more can we do to potentially reduce fatalities in the future?

Key Concepts & Terminology

Definition of ATV

ATV is a term that is thrown around a lot in society but it is a term used quite loosely. Defining the actual machines that are part of this study is both important and difficult due to differing legislation and this holds true all across the United States. For the sake of this project, we will be referring to ATVs registered as Class 1 ATVs in Minnesota, ATVs in Wisconsin, and Class 1 ATVs in Oregon. While All-Terrain Vehicles (ATVs) and Utility-Terrain Vehicles (UTVs) have several common features, there are critical differences between the two vehicles and these differences affect more than just what the machine is called (United States Department of Agriculture, 2011). At this time, every state has their own definition for each of these

machines, it can be difficult to compare data for similar findings because the requirements can be so drastically different from one state to the next. The United States Consumer Product Safety Commission (CPSC) has a website that lists state ATV information and they try to keep it updated but even this website doesn't have everything and primarily directs you to the individual state websites for more information. How a vehicle is defined and labeled can affect the registration requirements, insurance coverages and requirements, operational zones, type of safety certification required, and even minimum age of operation. All of these differences combine into a larger problem affecting recording, reporting, research, and enforcement of current requirements since none of the information transfers over from one state to another, let alone across the nation.

Currently, the definitions for each state are as follows:

> Minnesota: An ATV is defined as a Class 1 ATV in the 2021-2022 Off-Highway Vehicle Regulation booklet as a motorized vehicles with three to six low-pressure or non-pneumatic tires, which has a total dry weight of 2,000 pounds or less, and a total width measured from outside of tire rim to outside of tire rim that is 50 inches or less (Minnesota DNR, 2021).

> Wisconsin: An ATV is defined as a commercially designed and manufactured motor-driven device that has a weight, without fluids, of 900 pounds or less, has a width of not more than 50 inches as measured laterally between the outermost wheel rim on each side of the vehicle, exclusive of tires, mirrors, and accessories that are not essential to the vehicle's basic operation, and is equipped with a seat

> designed to be straddled by the operator, and travels on three or more tires (Wisconsin DNR, 2021).
>
> Oregon: A Class 1 ATV is defined as being a vehicle 50 inches wide or less with a dry weight of 1,200 pounds or less, which uses handlebars for steering, has a seat designed to be straddled by the operator, and travels on three or more pneumatic tires that are 6” inches or more in width and has wheels with a rim diameter of 14” inches or less (Oregon State, 2021).

The single greatest difference seen between these three definitions is the weight qualification which ranges from 900 pounds to 2000 pounds. In contrast to each state’s definition, the CPSC currently defines an off-road, motorized vehicle having three or four low-pressure tires, a straddle seat for the operator, and handlebars for steering control (Topping, 2020). This definition does not have any weight restriction tied to it but limits the number of tires on the machine, providing an excellent example at just how important these differences can be from one border to another. The CPSC’s definition also draws attention to the recording difficulties that plague this field, and this is just the tip of the iceberg.

Word Choice

A significant detail in this project revolves around the wording used to describe the fatal incidents that are studied. In the Minnesota Department of Public Safety’s *Minnesota Motor Vehicle Crash Fact, 2020* report, attention was drawn to the terms that are used to describe incidents. The report shares that the term “crash” is used in preference to “accident” because the

latter term suggests there is a random, unavoidable quality about the events in question. As mentioned before, ATVs don't have brains, but we do and the operator's decisions are what ultimately control the situation during a crash. I prefer to use the term incident since each fatality is a unique situation and you will hardly ever see the term accident in this paper because true accidents are far and few in between in reality.

Research Objectives

The primary investigative objective of this project is to see who was dying. The age of the individual at the time of their fatality is reviewed as the age range and spread seen in the fatalities is the fundamental supporting factor in the push for requiring ATV safety training from all riders. The roll of each individual in the incident is also reviewed as every person had a role in the incident that caused their fatality regardless of whether they were an operator, a passenger, or a by-stander. Gender was reviewed because history shows that it is a reliable indicator of risk and it is interesting to see the statistical difference that exists between the two recorded genders. This section also identifies just how few ATV operators held ATV safety training certification at the time of the incident, identifying that there is an obvious need that exists for increased safety education and utilization of the learned material.

The secondary investigative objective researches where people were dying according to historical data in Minnesota and Wisconsin. Currently, ATV safety training is only required when riding on public land in Minnesota, Wisconsin, and Oregon but ATV safety training is applicable on all land regardless of status as private or public since knowledge is power. One of the biggest issues that faces this field is that ATVs were not designed to be ridden on roads, yet an overwhelming amount of the fatalities are experienced on some form of traveling route

besides a trail. In 2014, Weintraub and Best reported that 35 states already allowed ATVs on certain roads in some form or another and in 2017, the Wisconsin DNR reported that 65% of the fatal incidents for that year and 63% of the fatal incidents in 2016 occurred on a road (Wisconsin DNR, 2016 & 2017). Even though the Wisconsin rates included both ATVs and UTVs, the data shows that riding these machines on roadways is a safety issue that is repeatedly being seen in the historical data and this is an issue that will not be solved anytime soon.

The third investigative objective examines how and why people died by looking at the contributing factors of what happened and whether the death was a result of an ejection, rollover, collision or another less common situation like falling through the ice. Alcohol and drug use was also recorded as this was found to be a significant contributing factor in the sample population since 43% of all fatalities in this report involved alcohol. Lack of helmet use was also found to be a significant issue that affected death rates in passengers and operators alike and at this time, there is no current federal ruling that requires helmet use while operating an ATV (Helmkamp et al., 2009). Recording practices for alcohol and drug use and also for helmet use were sketchy during this research and the lack of recording resulted in a large part of the data not being recorded in Minnesota and Wisconsin.

The other topics covered in this project are more informative than investigative but are issues that have significant impacts on the entire situation all across our nation and each one of these has their own special place. Topics covered include: the history of how ATV safety certification requirements became a reality, the issues surrounding the current push for more stringent rules regarding children and ATV's, the financial impacts that ATVs and their activities have on our economy, and what the future potentially may have planned for ATVs.

Chapter 2: Literature Review

Historical Background

All-Terrain Vehicles (ATVs) first became available in the United States in the early 1970's and were originally intended for recreational use but were found to be beneficial for agricultural use and industrial use (Fawcett et al., 2016). As the use of ATVs rose, so did the injuries, especially on the three-wheeled ATVs, more commonly known as three-wheelers. In 2016, an article titled *A Review on All Terrain Vehicle Safety* shared that historically, three-wheelers accounted for approximately 105,000 injuries in the United States in the first decade after their initial release (Fawcett et al., 2016). Three wheelers were considered a machine that could harm anyone who dared to ride them and eventually the quad bike, a four-wheeled recreational vehicle that was designed to be less tippy and in turn, less dangerous, became the champion of the market. These four-wheeled recreational vehicles are often referred to as four-wheelers and for the sake of this paper and record keeping, we will refer to all three-wheelers and four-wheelers interchangeably as ATVs for simplicity since they both share the straddled seat and handlebar characteristics.

Due to all of the injuries on the three-wheelers, a lawsuit against the ATV manufactures was brought by the CPSC in 1987 and the result was a voluntary 10-year consent decree that was established in 1988 (Fawcett et al., 2016). This consent decree was a bold step in the name of safety for American citizens and established many important regulations, while also ending the production and sale of three-wheelers from manufacturers. The consent decree also set an expectation that ATV manufacturers would offer safety training courses to purchasers of new

ATVs but it did not specify what the training would consist of or how it would be provided. In addition to these two major requirements, manufacturers were also required to recommend adult supervision for youth, to recommend engine size restrictions, to recommend helmet use, and add a restriction on carrying passengers (Fawcett et al., 2016) These regulations are a significant piece of history as this was the first time that ATV manufacturers were forced to step up their game and accept additional responsibility for their products, but not the last time.

In 1990, the trade association for ATV manufactures called the Specialty Vehicle Institute of America (SVIA) published the first voluntary standard for ATVs, which at the time was named ANSI/SVIA 1-1990: Four Wheel All-Terrain Vehicles-Equipment, Configuration, and Performance Requirements, and this new standard included provisions that were developed as part of the original consent decree in 1998 (Weintraub & Best, 2014). A very important piece of history happened not too long after this standard when the initial ten-year period of the original consent decree ended and the ATV manufacturers agreed to voluntarily keep similar prevention strategies in place by entering into ATV action plans which were voluntary, company-specific agreements (Weintraub & Best, 2014). Each manufacturer submitted their Action plan to the CPSC for review and approval and a copy of each manufacturers current action plan can be found online at https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/ATV/ATV-Action-Plan-List. Since these action plans were submitted voluntarily, they were not enforceable by the CPSC and manufacturers could withdraw at any time, without penalty, as long as they gave the Commission 60 days' notice (Weintraub & Best, 2014). But these action plans were not simply the end of the road for manufacturers and the ANSI/SVIA standards were updated again in 2001 and in 2007 before

being made mandatory in 2008 due to the Consumer Product Safety Improvement Act (CPSIA) being passed (Weintraub & Best, 2014).

To present date, there has been various other legislation attempts regarding ATV use and safety but one that stands out and has continued to make noise in the field is a petition that was originally filed in 2002 by multiple groups, urging the CPSC to ban the sale of adult-size ATVs for use by children. After holding ATV hearings across the country, the CPSC rejected the petition to ban them but initiated a rulemaking on this subject which was to be finalized in 2005. In 2008, the Consumer Product Safety Improvement Act (CPSIA) again called for the rulemaking to be finished but this was again delayed (Weintraub & Best, 2014). In 2012, the CPSC provided stakeholders and other interested parties with a forum to discuss the issues surrounding ATVs and developed the ATV Safety Summit as the start of a two-pronged approach to improving ATV safety that involved stakeholder engagement and regulation. (CPSC, 2013). The reasoning behind this ATV Safety Summit was that the CPSC has limited authority to affect the behavior of ATV operators since the CPSC cannot control the usage of helmets, the riding of ATVs on pavement, the licensing of drivers, and the age of an operator but the involved parties could work together and in doing so, they may be more successful in agreeing on the important points (CPSC, 2013). The issue of having limited authority is experienced by all entity's when it comes to ATV safety due to the different rules from one location to the next and this will continue to be an issue in the future until the basic requirements, regulations, expectations, and enforcement is the same everywhere in the United States.

Beyond the reasons for the ATV Safety Summit the CPSC provided, there were many valuable points discussed and some came from manufacturers, some from other interested

parties, and some came from families of those who were lost or injured due to an ATV. A few of the issues mentioned were the importance of parental supervision, the ages and skill levels of those operating ATVs, key training elements like quality instruction, material, and practical skills; access to training for all; the improvement of data quality and availability for research, and funding issues (CPSC, 2013).

Current Nature & Extent

The issues from the ATV Safety Summit in 2012 are the same issues that plague the ATV safety field today and 10 years later, there are still no uniform federal laws passed that restrict the age of an operator or require the operator to have any knowledge about how to ride an ATV before they hop on one and head out. America also does not have a universal system that records injuries and deaths let alone a universal requirement that says they must be reported. Without having adequate recording systems, it is impossible to have reliable data to base our research on.

Another issue that the field faces is that there is no system that records ownership of ATVs even though we have systems that record ownership for automobiles. As of 2005, only 16 states required registration of an ATV which left about 70% of the United States with no requirement (Wagner, 2020; Helmkamp et al., 2009) Even though this statistic could be considered slightly outdated, it showcases one of the greatest issues plaguing this field and without a system to keep track of ownership, it is impossible to know just how many ATVs are actually in operation today. It is also impossible to have a realistic idea of how many ATV operators there are since one machine can be used by more than one operator at different times. In 2006 alone, there were about 800,000 new ATVs sold in the United States and their sales have grown year-after-year since 2012 (Helmkamp et al., 2009; MCD Team, 2022). In 2020, which

was a record year despite the Covid-19 pandemic, there were 874,000 ATV sales globally and that number was just below 850,000 globally in 2021 (MCD Team, 2022). ATVs are already extremely popular with the general public and with their increased presence in Law Enforcement, Military, and the private sector companies, their sales are expected to continue to grow but so can injuries if safety for all is not conveyed as an important part of the riding experience.

As for revenue, the North America ATV and UTV market was valued at USD 5.69 billion in 2020, and it is expected to reach USD 7.54 billion in 2026 (Mordor Intelligence, 2022). In addition to these sales recorded by the Manufacturers, ATVs support our local economies with local sales revenue and tourism revenue. Currently, the revenue that ATVs alone bring into our economy is a number that is complicated to calculate because of the trickle-down effect on local economies and the vast variety of purchases that are related to ATVs. An appropriate example of this trickle-down effect would include the following: The buyer purchases a new machine and the state receives sales tax revenue on a new purchase if the purchase occurs in one of the 45 states and the District of Columbia who collect sales tax on the purchase of the new ATV (Fritts, 2020). Additional revenue may be collected if the ATV is required to be licensed or registered or if a trail pass sticker is required in order to legally ride on the trails in each state. If an individual is required to obtain and pay for ATV safety training, this fee would also be additional revenue for the state and if there is a filing fee for recording the training, it would also create an additional form of revenue. If there is a loan on the machine, there is an entity collecting interest on the outstanding loan amount and insurance carriers collect premiums in exchange for providing insurance coverage on the machine. There may be additional revenue if the individual

chooses to buy extra equipment like accessories, maintenance goods or plans, protective riding gear and clothing like helmets, gloves, pants, boots, or goggles, and even trailers and straps for transporting the ATV. Once the ATV has arrived at home, the ATV still creates revenue since it requires fuel to run, periodic maintenance, and repairs. Often times, an individual will transport their ATV to another location for riding opportunities which helps to create tourism revenue as people often pay for lodging, food, fuel, and other essentials and splurges while on the road. All of this money combined provides a hefty chunk of revenue that generates from just one single machine but the only way to continue the revenue stream is to keep the ATV in use, which aligns with the ultimate goal of ATV safety training: learn it, use it, and live to ride again.

Nationwide, the current total of deaths attributed to ATVs showed that as of 2018, there were a total of 15,744 ATV-related deaths that occurred between 1982 and 2018 (CPSC, 2020). This report was published as a work in progress that hadn't processed all of 2017 and 2018 data, so the amount was noted that it was expected to increase once those reports were completed. It also cautions that it does not include all of the ATV fatalities since they are not always reported and does not differentiate if the fatality was from an operator, passenger, or an uninvolved by-stander. Just like the dark figure of crime that exists in the criminal justice field, there is a dark figure of incidents, injuries, and fatalities that are attributed to ATVs that we will never know.

Even with the data that does exist, most of it focusses on various states, regions, and individual trauma centers, but few studies have reported on the entire U.S. population (Helmkamp et al, 2009). Until legislation defines the bare minimum of what needs to be reported and recorded consistently across the nation and there is enforcement of this requirement, the data will always be difficult to analyze and compare for researchers. The lack of consistent recording

practices, the unorganized recording systems that plague the field, and the lack of legislation to enforce any action can potentially limit research in this field since the data can be unfathomable to effectively and efficiently research. Even the CPSC had stated in 2013 that the ATV data provided by the CPSC can be difficult to use, especially for researchers; at times CPSC data can be “an absolute mess” and there are often duplications. Without having reliable data to review and previous theories to test, it can be difficult to create research that broadens the field or helps create discussions and movement. Without being able to draw in interest to the field, it can be difficult to build a strong foundation that supports efforts for increased funding and enforcement of ATV safety training in the future. Going back to the CPSC’s statement in 2013 about the messiness of the data, they also reported that the magnitude of research needed on ATV safety was already at odds with the funding that was available back then and this funding issue can be a significant roadblock to creating and enforcing effective safety training programs. While this may be true in general, there are states and organizations that have figured out how to provide free training through existing grant programs or fundraising efforts. There is hope that this funding issue could be corrected with some additional effort and lobbying for support since the CPSC is already aware that ATV safety should be made a national policy priority in regards to public awareness and funding and that the funding would be on par with gang violence, drug and alcohol abuse, and obesity (CPSC, 2013). The problem is that we are almost a decade from this statement but it doesn’t appear that this public awareness and funding has happened and at what point does this constituent negligent behavior or an educational injustice?

Why it Matters

Humans tends to question authority and ATV safety training is no different. The truth of the matter is that ATV safety training doesn't really matter until it does. Even though it isn't on your radar right now, that doesn't mean it won't be at some point down the road and it can affect your family members, friends, neighbors, and entire community. An ounce of prevention now may be worth a whole lot more in the future.

For the readers who still don't understand why, I would like to have them pause and ponder an important thought-provoking question before they continue reading. Please take this time to ask yourself why driver's education for a driver's license is such an important requirement in America: Is it important merely because it is a traditional or because it provides a fundamental approach that covers the basics before letting people loose behind the wheel of a vehicle that can seriously injury or kill themselves or someone else? If you respond by saying that there is no comparison between driver's education and ATV safety certification, I beg you to reconsider since the vehicles in consideration do about the same speed but only one has a roll cage and a seat belt. When something goes wrong while riding an ATV, there is absolutely nothing on an ATV to keep you from smacking the ground or being ejected.

Occasionally individuals will take the stance that they don't believe they will ever drive an ATV or that they currently don't have access to one so there is no reason to worry about it for right now. While this defense may be true at this exact moment, we can't predict what the future holds for ourselves or anyone else. The truth of the matter is that the number of ATV operators is always growing, just like the drivers of regular automobiles. In 2004, the United States Department of Transportation published their Licensed Drivers Statistics report that revealed

there were 198.9 million licensed drivers in the United States (US Department of Transportation, 2012). While the data from 2004 is technically outdated, it still gives the reader a baseline number to consider when finding out that in that same year, there were already an estimated 23 million ATV riders (Helmkamp et al., 2008). What's more is the fact that these numbers have been sure to grow in the last 18 years as ATVs and other recreational vehicles have become increasingly more popular, accessible, and affordable. The hard truth in regards to safety on any recreational vehicle is that anyone who can start it can drive it, but they aren't always capable of driving it safely. To the readers who say that ATV safety doesn't apply to them, I point out that there are many parents and spouses out there who thought the same thing before an incident occurred and who would do whatever they could to go back and change the way that things happened. Statements from the CPSC in 2013 show that even back then, there was awarenes of the need for ATV safety training to be provided on a larger scale than what was currently being offered:

> "Traditionally, it has been assumed that only owners and riders should be trained in ATV safety; in essence, those whose recreational, vocational, or family activities are likely to involve ATVs. However, ATV safety training should be provided to children or others whose friends might give them the opportunity to ride, and those who would benefit from training ahead of time (CPSC, 2013)."

And in 2018, the University of Nebraska stated:

> "We could significantly reduce death and injury from ATVs in Nebraska if we can keep children and those who haven't had training off ATVs, but that's not going to happen so

> we need to focus on training and education about the risks and this applies to our entire society (Cerino, 2018)."

Both of these statements show us why ATV safety training for all ATV operators is important instead of just targeting certain segments of the population. Our goal as a society should be to acknowledge this nationwide concern and address it with education in an attempt to minimize unnecessary injuries and deaths while keeping in mind the fact that there will always be some level of risk involved in any activity, even with all of our safety efforts because accidents do happen and unforeseen risks are a reality.

Of course, there will always be those who may be quick to say that since these machines are so dangerous, we must do away with them but this is not a realistic response. ATVs are used to enjoy recreation and create family memories but they are also useful in many other applications like agriculture work, hunting, emergency management, public safety, and forestry operations. What people seem to forget is that an ATV is only a machine, it is not a toy, and it has been designed to carry a person over a terrain (Blaze Powersports and Outdoors, 2020). It is not a babysitter for children. It does not have a brain nor a conscious and it can only do what you tell it to do. It cannot tell the operator that they have made a bad decision or what the outcome of their decision will be. The majority of ATV crashes are caused by the operator's decision making and very rarely are these incidents a result of a true mechanical failure. ATV safety training provides the operator with the basic skills needed in order to operate the machine in a safe manner while riding but more importantly, it also teaches people what to do when an emergency arises. Emergency situations in general aren't a question of if but more a question of when and being prepared may be the key to survival.

Sometimes, you'll hear people bring up the view that older riders don't need ATV safety training because they are older and they know what they are doing but age is not directly related to skill level when it comes to driving an ATV since everyone starts riding at different times in their life. An 11-year-old may have more experience and more hours operating an ATV than their 57-year-old grandparent does. Experience operating an ATV takes time and increasing the operator's skills takes practice since driving is a skill. ATV safety training field days can be an important portion of safety training for inexperienced riders where hands-on riding experience is provided under supervision while constructive criticism is provided in a positive manner while focusing on the basics of operating the ATV. The intent of the hands-on field day is to equip the rider with the basic knowledge about how to operate an ATV and build on their skills so the operator will be able to handle a situation when they come across it while out riding. Inexperience when riding can be deadly but if operators learn to ride within their experience levels, they can reduce their risk of injury or death on an ATV.

Another commonly discussed subject when it comes to why ATV safety training matters is that it focuses on the size of the ATV in relation to the operator and stresses the point that the operator must fit the ATV properly. Often times news stories will report that a child died or was seriously injured when the ATV they were operating or riding on as a passenger flipped or rolled over and they were crushed under the ATV and while this is sad, it can be prevented. When children or even small framed adults are on ATVs, they must make sure they appropriately fit the machine. Too often, an operator doesn't have the required physical ability to operate the ATV they are on because they don't meet the minimum fit requirements that are there for their safety. These concerns are commonly brushed off when the individual in question is an adult who has

the legal right to ride what they want, but they can't always control what they want to ride which places themselves and everyone around them in danger. As engine power continues to grow on these machines and the size of the machine gets larger, the ability to control the machine will continue to be seen. The current guidelines provided by the Minnesota DNR are excellent guidelines and are those that are shared at the in-person hands on riding portion of the ATV safety training program:

> The operator must physically fit the machine they are riding and they must be able to reach the controls with their feet and should be able to stand up with space between the seat and their bottom.
>
> The operator should be able to sit on the straddled seat with their legs almost parallel to the ground.
>
> They should be able to comfortably grasp both the brake lever and the throttle without having to re-grasp or over-grasp the handlebar. A good rule of thumb is that the brake lever should be about where their knuckles are on their hand when they go to make a fist so that they are able to pull the brake lever in.
>
> When the operator grasps the handlebars, there should be a distinct bend in their elbow similar to a 45 degree to 90-degree bend and when they turn the handlebars, they must be able to turn them all the way from one side to the other without letting go of either side or leaning with their body to turn them. (Minnesota DNR, 2021)

Along with the concern about fitting a machine properly comes the concern about the maturity level of the operator and also the cognitive processing ability of the operator. Too often, people instantly think about children in this aspect but they forget about the elderly or vulnerable

population who are using ATVs for yard work or for running short errands locally. These individuals may have health concerns or medication that they take that can interfere with their ability to operate a vehicle and while children do have relatively immature abilities compared to a healthy adult, their abilities vary across the board and every person is unique. A study published recently in the American Journal of Occupational Therapy found that the average reaction time ranged from 0.81 seconds to 1.09 seconds for the 200 participants in the study and that reaction times increased with age, indicating potential correlations with functional outcomes (Palmiscno et al., 2020). ATV safety training can help these individuals become aware of how their special circumstances can influence their actions and reaction times and be aware of their limits they may experience while riding.

A significant part of ATV safety training is teaching riders to look ahead and to assess their risk. If an operator is not instructed to be looking ahead a certain distance or what to watch out for, they may be unaware of dangerous situations they could be soon facing or unaware that they haven't left themselves enough time to recognize and react. This is especially important with children who have not taken Driver's Education for their regular driver's license yet since they likely have never been formally taught this type of information. Teaching riders that different riding terrains also have an impact on reaction time and handling is also critical information to have when riding on ice, in snow, or even in mud or water. Water puddles and mud holes driven through at high speeds or being deeper than originally thought can cause the operator and any passenger to be ejected or cause a rollover, flip, or slide on the side. Snow, ice, mud or water can cause the brakes on an ATV to not work properly and to take longer time to engage or even prevent engaging at all. The way that ATV tires grip on bare ground is different

than on wet grass or leaves, or in mud, or on ice or snow and most of all, on pavement and the instant traction that the soft rubber tire gains when it hits the pavement can have severe consequences for the operator and/or passenger on the ATV. Many ejections and rollovers are caused at the transition place when the tires of the ATV exit one terrain and enter another. Beyond these terrain issues, learning how to properly traverse a hill or fallen object while out riding or knowing which way to lean can make the difference between an ATV staying on its wheels or flipping over and ejecting the rider(s) or potentially pinning the occupant(s) or even crushing them on impact.

As you can see, these are many important topics covered during ATV safety training that every operator should know since the "most important piece of safety equipment that goes [on any vehicle] resides between the ears of the operator" (Meitrodt, 2014). And although ATV safety training is a fantastic way to prepare riders it does have drawbacks since it cannot cover every situation the operator may encounter while out riding but it is worth its value if it is learned, remembered, and used at the right time. And while we can't enforce safe riding, we can foster it as a good value and give people the valuable tools they need to practice it.

Current ATV Safety Training Requirements & Programs in Sampled States

According to the Minnesota DNR (2021), anyone born after July 1st, 1987 who is at least 12 years old and riding on public land is required to have ATV safety certification in order to operate a Class 1 ATV. Minnesota only offers the ATV safety course online and primarily refers customers to ATVcourse.com which costs $24.95. Through this website, the student earns a voucher after successful completion of the course and it is valid for one year, allowing youth

ages 10-15 the ability to attend a required in-person, hands-on field class as part of the safety training program. Once the in-person portion has been completed successfully, the certificate voucher number can be filed with the Minnesota DNR in the individual's DNR file and the certificate can be printed from the online DNR database after the filing fee has been paid. Minnesota also offers a free program for youth ages 6-9 that can help parents teach safety to children but the child does not earn a safety certificate. There is an alternative called *ATV Rider Course* offered by the All-Terrain Vehicle Safety Institute that is approved in Minnesota and this course is the agreed upon training program offered by the Manufacturers of ATVs required by the federal ruling discussed earlier in this project. This program offers training that may be free or subsidized depending on the state you live in and if the purchase was of a new ATV and the purchaser is encouraged to contact the company if they need assistance signing up for the class. If the training is not covered through the purchase of a new ATV, the program's advertised cost for the online portion and hands on portion is $55 for those 6-15 and $150 for those 16 and older. There is also an online e-course that is free to take but there is a $25 fee to earn state certification and is subject to your state recognizing the course.

Wisconsin's rules went into effect on April 28th, 2004 and are quite similar to Minnesota. Anyone born after January 1st, 1988 and who is 12 years old or older must complete a safety certification course before operating an ATV on public riding areas like trails, frozen waters, routes, permitted county and/or forest lands and must carry their safety certification card and display it to law enforcement officers when requested (Wisconsin DNR, 2017 & 2022). The online course for Wisconsin residents is available on ATVcourse.com for $34.95. This course is open to all ages but the certificate only becomes valid at age 12. Wisconsin also accepts an ATV

safety course offered through their approved vendor www.offroad-ed.com for $34.95 and offers traditional classroom options once a year for each county for a fee of $10. Per the Wisconsin DNR website, these options are the only ones approved and honored in Wisconsin at this time and in Wisconsin's 2020 Recreational Vehicle Annual Report they specifically state that Wisconsin does not accept safety training from ATV Safety Institute (ASI). Since this training is what is required from the Manufacturer's by past legislation, it is interesting to see that it isn't an approved course. Wisconsin also is a little bit different in the fact that it doesn't necessarily require a hands-on field safety day like Minnesota for the youth group.

Oregon's ATV safety training requirement went into effect on January 1st, 2014 and covers all operators of quads and three-wheel ATVs (Class 1 ATVs) and off-road motorcycles (Class III ATVs) on public land. Oregon's website, rideATVoregon.org, informs riders about the safety card requirements and the state goes above and beyond the basic requirement of implementing ATV safety training by offering the online class through the Oregon Parks and Recreational Department for free to anyone who wants to take it. This offer is provided to all users due to a wonderful grant program enacted in the state that is available to individuals whether they are a resident of Oregon or not. With this program, the user is able to print a 30-day temporary card while one plastic wallet sized ATV Safety Education Card is mailed for free to each person who completes the course. At this time in Oregon, youth under age 16 are required to complete a hands-on course within 6 months of earning the online certification. Oregon also accepts out of state ATV safety certification from other states and there is also an alternative course offered online for residents of Oregon at ATVcourse.com for $34.95, similar to the course offered in Minnesota and Wisconsin.

A Word of Caution

Too often, we see legislation that is passed that is unenforceable in the actual sense but is created with good intentions and requiring ATV safety training from all operators could be one of these situations. Some of the best-meaning law changes can have some of the worst negative repercussions if they are passed as knee-jerk responses to sensational incidents or if the effects, expected and unexpected, short term and long term, are not considered properly. Requiring ATV safety from everyone as a one size fits all blanket policy would have to be a legislation change that was approached properly with adequate research on how to implement it, fund it, encourage it, and enforce it effectively.

Chapter 3: Research Design

Research Method Selection

Three states were chosen purposively for this project because of their current ATV safety training polices and how they were applicable to the characteristics that were chosen for the study. The three states were chosen for this study: Minnesota, Wisconsin, and Oregon. Oregon was chosen for this project because it requires an ATV Safety Certificate for all operators on public land, regardless of age. Minnesota and Wisconsin were chosen based on the fact that they both require ATV safety certification for riding on public land for some riders and because the availability and reliability of publicly published data was fabulous.

Delimiters

After reviewing the yearly summaries previously published by the Minnesota and Wisconsin DNR, it was simple to identify that there were far more characteristics to research than I originally thought and that each characteristic affected the outcome of the incident in a unique manner. There were a few situations that complicated this project and they revolved around the lack of reliable data that plagues this field and also about the type of the machine involved in the incident.

The lack of information that exists for the public's review made the initial research portion of this project horrendous. The same issues with recording and reporting kept appearing during all of the research for this project. Originally, this project was meant to look at the fatality reports for multiple states based on a random sample from our 50 states but this did not go as planned because there are multiple states that don't record this type of data or publish the data

for the public. Without having adequate and similar reporting and recording systems in each state, it is difficult to find information that has been recorded and can be reviewed so that apples can be compared to apples. During this initial period of gathering data, there were states that didn't respond to repeated contact and requests for data and others that were wild goose chases of emailing this department only to be told to email a different department because no one really knew who would have the information, if they recorded it, or if I could have access to it. Due to these issues, the project was consolidated and I picked the two states, Minnesota and Wisconsin, that had reliable data that was easily accessible to the public. However, there are noticeable discrepancies in what is recorded between these two different states, such as the fact that alcohol or drug use isn't recorded in Minnesota as reliably as in Wisconsin and helmet use in both states also suffered from sporadic recording practices. One of the major pushes that stem from this project is that this field of research needs consistent recording requirements that are the same in every state so that future researchers can access comparable data. Anyone can google ATV accidents and find a wealth of research but what all of this research lacks is reliable, reproducible, and organized data to support the claims that are made in the research. Without being able to replicate these studies and verify the data, how can we trust that the findings are consistent with the data unless multiple reports are finding the same things?

Since this study uses data that was reported and recorded, it is important to remember that the recorded incidents may not include the ones that went without being reported or were misrepresented, whether on purpose or by accident. No data can ever be 100% correct and must allow for some flexibility. One of the issues that kept resurfacing during this project was the fact that record keeping is difficult in general but if an incident is not reported to the proper

authorities, it won't be recorded and if updates about an individual are not reported when they pass away due to complications from an incident, the data also cannot be updated. Another issue that seems to keep coming up in research for this field is the fact that health information from the incidents is technically classified as private data so it can be difficult to gather the necessary information in the first place. There is research out there that pulls data from medical billing codes but the accuracy and reliability of these reports are questionable as well as the follow-up procedures.

While picking out which fatalities to include in the sample population, I had to determine what would be classified as an ATV in each state to make sure that the incidents and requirements were being compared to semi-similar machines in the sample states. Since each state again has different rules for ATV safety training, they also had different qualifications for what constitutes an ATV which was not surprising. The weight discrepancies from state to state for an ATV were the real head scratchers since the other qualifications were quite similar such as the straddled seat and low-pressure tires. In addition to the issues regarding definitions, there was also a problem regarding the locations of the incidents since I had to choose whether to exclude fatalities that happened on private land or keep them in the sample population. Since there is no minimum age for a person to operate an ATV on private land, all incidents that happened on an ATV from the sample population were included, regardless of what type of property or terrain the incident occurred on or the age of the individual because ATV safety training could very well have changed how things went.

Research Population and Sampling

Overall Sample Population

The fatality rates in Minnesota and Wisconsin during the years of 2007-2020 were gathered from state published public reports that are available through each state's respective DNR department and the links for each report are included in the reference section of this paper. The information used is considered public data and does not require IRB board approval because there is no breach of confidentiality. The sampling technique used during the research was non-random and the years included were chosen specifically based on availability of data. Incident reports from Oregon were not included in this study as the incident information is not readily accessible online for the public to review. Oregon was used as the comparison state in this study because it stands out in its requirement for ATV safety training and because it is an excellent example of how we can offer ATV safety training for free to all.

Excluded Fatalities

The initial fatality reports from Minnesota and Wisconsin included fatalities that occurred on other types of recreational vehicles as well as on ATVs so each yearly report was filtered to exclude the incidents that did not meet the specifications. Any incident that did not list the type of recreational vehicle classification resulted in a contact to the state via email to have the incident researched and type of machine verified. Due to the resulting emails from R.J. Serwe (personal communications, March 15, 2021-April 12th, 2021), multiple reports from 2010-2015 were updated on the Wisconsin DNR's website and the incidents from 2007-2009 were identified in the emails since these yearly reports are not listed on the website for instant access to the public anymore without the direct links. The direct links for every year's report are

included in the reference section of this project in case anyone would like to view the data or replicate the study. In total, there were 562 fatalities reported from Minnesota and Wisconsin during 2007-2020 on ATVs and UTV's, resulting in 115 fatalities being excluded from the sample population because they were attributed to vehicles that did not meet the qualifications for classification as an ATV according to the respective state's definition. The table below shows the year and the number of excluded fatalities for each state:

Table 1

Excluded Incidents from Sample Population

Year	Minnesota	Wisconsin
2020	9	18
2019	3	6
2018	9	14
2017	6	4
2016	5	5
2015	4	3
2014	3	2
2013	2	5
2012	6	1
2011	0	0
2010	4	0
2009	1	0
2008	1	0
2007	4	0
Total	**57**	**58**

Note. Source: Minnesota Annual DNR reports & Wisconsin Annual DNR reports

Net Sample Population

After excluding the 115 fatalities, the study was left with 447 total fatalities, including 417 operator fatalities, 28 passenger fatalities and 2 other fatalities ranging in age from 4 to 94. There are a few fatalities included in this sample population that are especially unique and deserve a moment to mention them specifically: A 4-year-old passenger passed away in 2017 when they fell of the back of an ATV that was towing a dual axle sprayer. In 2019, a 7-year-old bystander was struck by an ATV and killed. In 2008, a 60-year-old was in the wrong place at the wrong time and was struck head-on by an intoxicated driver travelling in a car down the same dirt path but the 3-year-old passenger that was riding with the 60-year-old survived. In 2007, a pedestrian was struck by an ATV. Every single one of these fatalities was a real person who had a family and even though they are included in this report, they are never to be remembered as just another statistic.

Additional Sample Elements

There were two incidents provided by the Minnesota DNR that did not include the individuals' ages in the reports. With further research online, the individuals' ages were able to be located and the reports are identified in the references section. The fatality from 2007 was located in a news article and the fatality from 2012 was located in Minnesota's Ice-Related Fatalities 1976-2021 report.

Conceptualization & Operationalization

Using a purposive and non-random sampling design, I was able to classify the fatalities into categories depending on which variables were being studied in each comparison. The resulting tables from my research can be found in Appendix A. Since the data that was the

foundation of this research study had previously been gathered by the Minnesota DNR and the Wisconsin DNR, this study did not violate confidentiality because only the characteristics of the fatality were investigated.

Data Collection & Processing

All reports for this project were located on the internet for the public to access for free and the links are provided in the reference section. During the research, the DNR yearly reports were kept together with any articles and studies and other information that supported the project. All internet sources were recorded and given due credit as well as other sources such as email that was used in the project. After reviewing the yearly fatality summaries for years 2007 through 2020, the data was classified into each category in an excel spreadsheet based on the characteristic that was being studied and then was formatted into tables to show the findings.

Data Analysis & Reporting

This project started out small and morphed into a unique study that includes quite a bit of background information on the subject. As history goes on, there will be increased research which will be beneficial as the research now is limited due to recording and reporting issues. As for the findings in this study, various charts, tables, and graphs are used to show readers the differences between the compared characteristics in order to give a visual representation to the findings. Even though this study only focuses on the events in Minnesota and Wisconsin, it is meant to be an eye-opener that there are issues in this field that need to be addressed and soon. These issues that were experienced in this study are not only applicable to Minnesota and Wisconsin but are being experienced all over our nation.

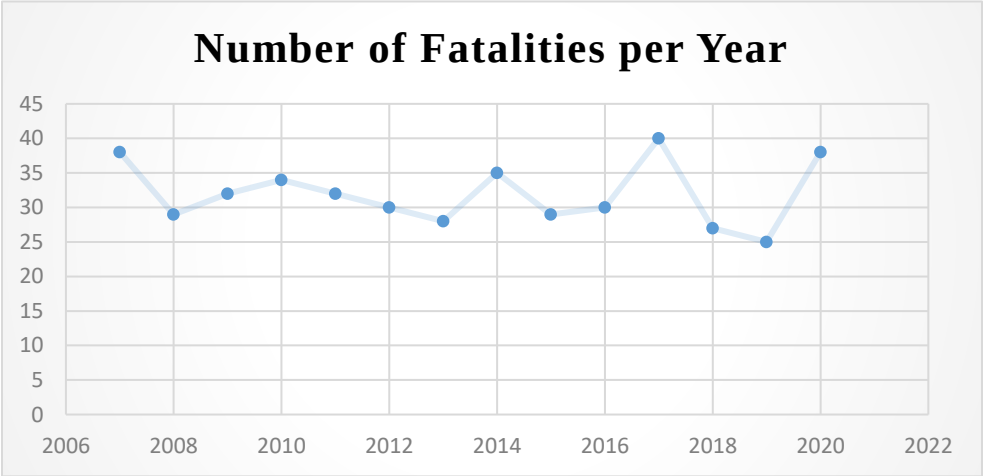
Chapter 4: Findings & Conclusion

Fatalities by year

The combined data from Minnesota and Wisconsin show that people keep dying in connection with ATVs. This statement doesn't mean that if you ride an ATV, you will end up injured or die, it just means that there is an issue we are seeing in the data and we need to find a way to change that. Historically, there were years that had higher rates of fatalities than some of the others but in the long run, the average number of fatalities per year balances out and shows that the amount of fatalities had stayed relatively the same for the studied years of 2007-2020.

Figure 1

Number of Fatalities per Year



Historical data like number of fatalities each year help researchers track long-term rates and identify trends in the findings. When increases in fatality rates are seen year after year, the reasons as to why may be investigated, same if we see decreases or a significant number being

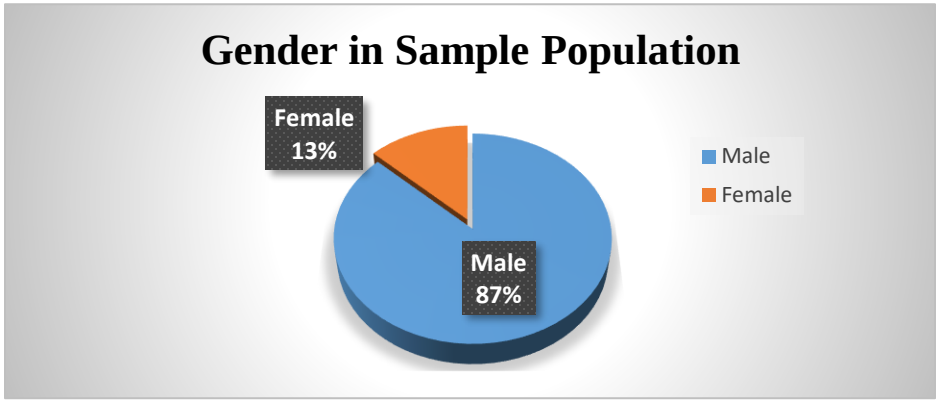
reported that stands out from other years. Although we would rather see a decreasing number year after year, a stable report is better than one that is increasing.

Gender

Gender is a unique factor since it can potentially affect the way that ATV safety training is taught since males' brains have a greater part of the cerebral cortex that is dedicated to spatial and mechanical functioning indicating that they may learn better with movement and pictures rather than just words (Zamosky, 2011; Gurian & Stevens, 2005). Gender also has an important role when it comes to risk assessment and in the learning techniques used in educational programs since a hands-on approach may be more beneficial for males compared to just reading information or showing the information in a video or presentation. Gender can also affect the development of effective Public Service Announcements that target specific behaviors.

Figure 2

Gender in Sample Population



In this study, males were found to have experienced higher rates of fatalities, coming in with a total of 389 fatalities, which represented an incredible 87% of the sample population. In

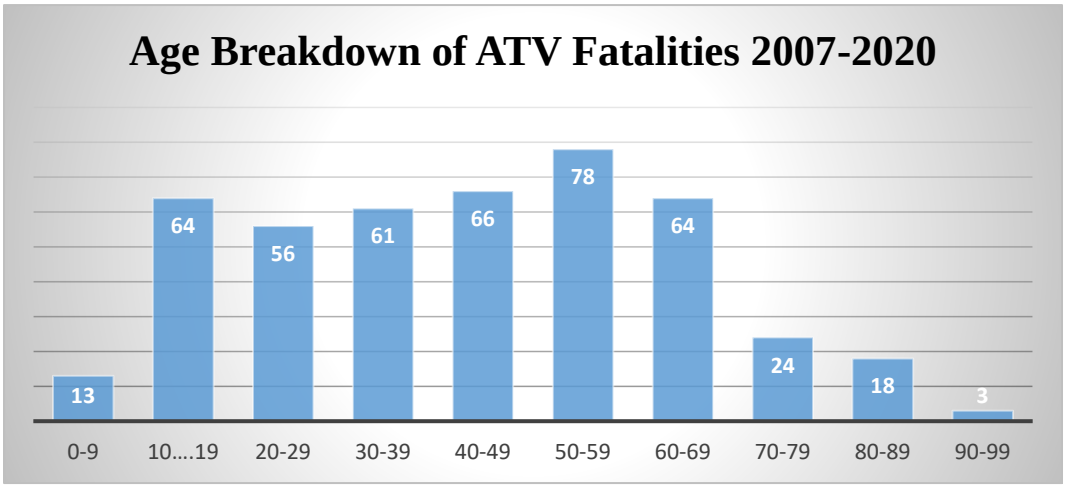
contrast, there were only a total of 58 females, representing a total of 13% of the included sample population. The highest number of female fatalities in any given year was experienced in Minnesota in 2020 and 2018, with both years coming in at a total of 5 females each year. In comparison, the highest number of male fatalities recorded in one year was 23 in Wisconsin in 2014.

Age

Classifying the ages in 10-year spans was done to show the overall range of the fatalities attributed to ATVs in Minnesota and Wisconsin. The numbers of fatalities and overall percentages found in this study indicate that in reality, the risks are quite similar when you compare the different age groups side-by-side for those aged 10 through 69.

Figure 3

Age Breakdown of ATV Fatalities 2007-2020

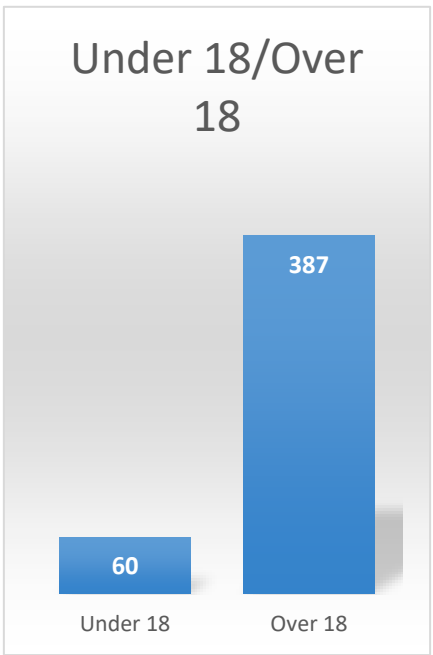


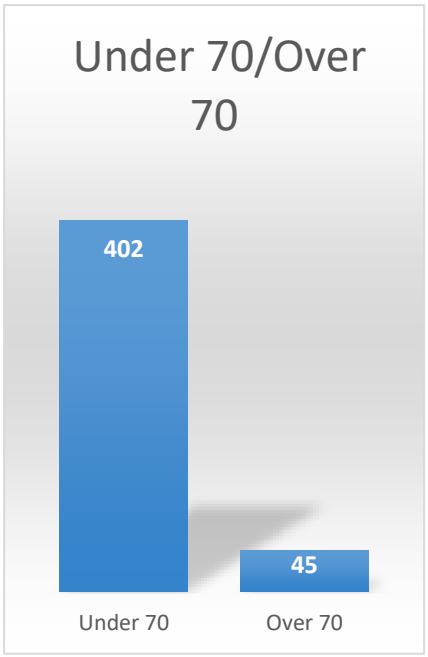
When the data was broken down further, it showed that the youth from the sample population were not the ones experiencing the highest rates of fatalities, but were in fact the

second lowest rate of fatalities in this report. Out of the 447 individuals in the study, only 60 individuals in this study were labeled as children since they were under the age of 18 at the time of their death. These 60 children represented just over 14% of the total sample population and included 50 operators, 9 passengers, and one that was a by-stander who was accidently ran over. At the other end of the age spectrum, the fatality rates historically decreased as the individuals' age increased. Individuals aged 70 and above accounted for a total of 45 fatalities which is just 10% of the sample population. This reduction in death rates could be contributed to a decrease in the amount of people riding ATVs in those age brackets, as well as individual's potentially having a higher experience level of operating if they had a long history riding ATVs, and potentially operating ATVs at slower speeds.

Figure 4

Under 18/Over 18 & Figure 5: Under 70/Over 70





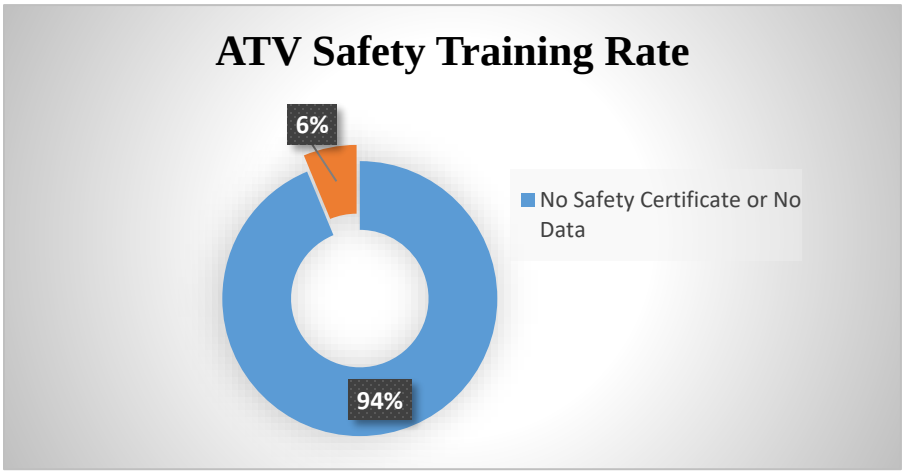
The results for age breakdown were on par with my hypothesis that ATV safety training is beneficial for everyone because the data shows that it's not only our youth who are dying. In fact, the historical data from the sample population in this study show that the middle-aged ATV riders are experiencing higher rates of fatalities than those who are younger and those who are older. This finding from the study aligns with the findings in the Executive Summary published by the University of Minnesota Tourism Center in 2005 that was titled *All-terrain Vehicles in Minnesota: Economic Impact and Consumer Profile* where it was reported that the typical 2005 Minnesota ATV rider was a white male in his mid-forties who had some college or technical schooling and was most often employed full-time earning $50,000 per year or more. As ATVs continue to grow in popularity, it would be acceptable to hypothesize that the rider profile will remain similar to this or even advance slightly in age as the population continues to get older and ATVs become more adaptable to special needs.

ATV Safety Training Rates

During this study, it was discovered that only 28 individuals in the entire study held a safety certificate at the time of the incident. These 28 individuals account for a measly 6% of the sample population and the individuals who had safety certification ranged in age from 11 to 63. Of these 28 individuals, only 4 of them were 30 years old or older at the time of the fatality.

Figure 6

ATV Safety Training Rate



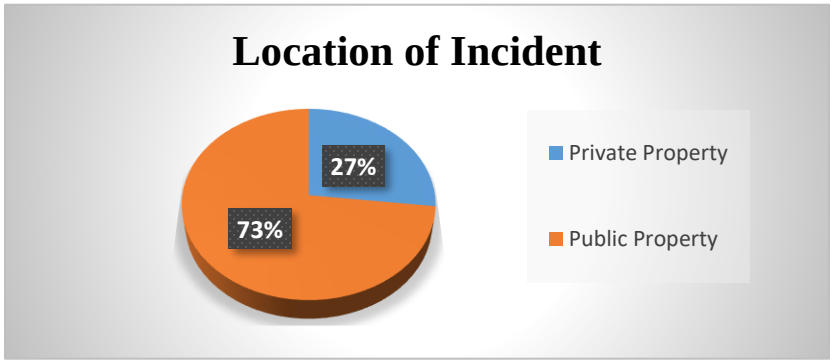
These statistics found in this research are mind-boggling and show that there is a desperate need to reach more people with our safety training efforts. Historically, ATV safety training courses have heavily targeted our youth but the results from this study indicate that we need to direct our efforts towards the entire group, not just our youth. If we were to require ATV safety training from all ATV operators, regardless of age, we would be providing equitable education that affects our public health and safety.

Location of Incident

The location of the incident is significant since it ultimately defines if ATV safety training is required. At this time, Minenesota, Wisconsin, and Oregon all require an individual to have ATV safety training if they are operating on public land. The results from this study show that 73% of the included fatalities happened on some form of public land whether that was a frozen lake, a ditch, a road, a route, or a trail.

Figure 7

Location of Incident



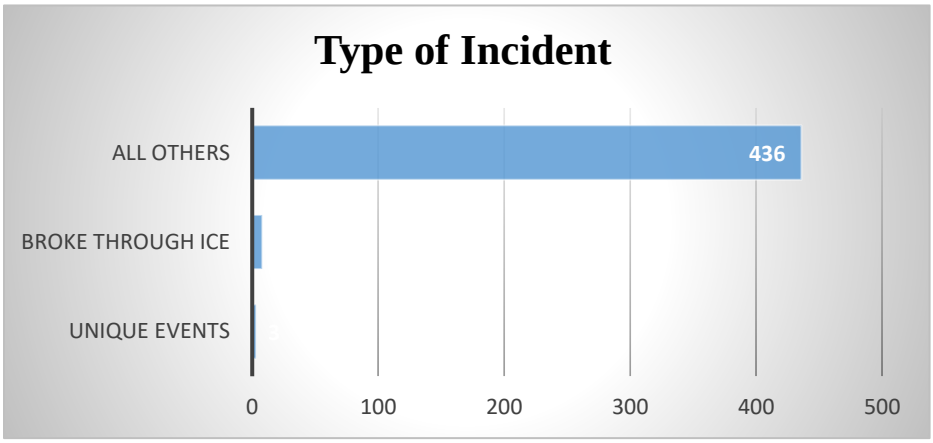
As a note, there was one report from the research in 2012 that did not include the location of the incident but was still included in the study and did not impact the percentages of the locations. Overall, 27% of the incidents from the sample population happened on private property and since they were on private property, they wouldn't have required ATV safety training but that doesn't mean that the knowledge wouldn't have potentially been helpful to have at the time. What we need to remember as the operator is that the ATV doesn't know where you are riding or what is around the corner, it just does what it is told to do and it is the operator's responsibility to be in control of the machine at all times and to be aware of the risks.

Type of Incident

Rolling ahead with the concept that an ATV only does what it is told to do, the type of incident that occurred during the fatality sheds a light on what is really happening when someone's death is attributed to an ATV. Out of the 447 incidents in Minnesota and Wisconsin over the 14-year period, there were only eight individuals who died from breaking through the ice and only three fatalities that were the result of a significantly unique event. The unique events included a pedestrian being hit by an ATV, a by-stander who was ran over, and an operator who was killed after a head-on-collision by a drunk-driver in an automobile and was simply a case of being in the wrong place at the wrong time.

Figure 8

Type of Incident



Every other incident included a situation that could surely have been prevented. These 436 fatalities were caused by many different situations like rollovers, flips, tips, falls, ejections, suffocation, crushed from being pinned under an ATV, collisions with other vehicles, collisions with fixed objects, collisions with animals, falling off the ATV, being run over by an ATV,

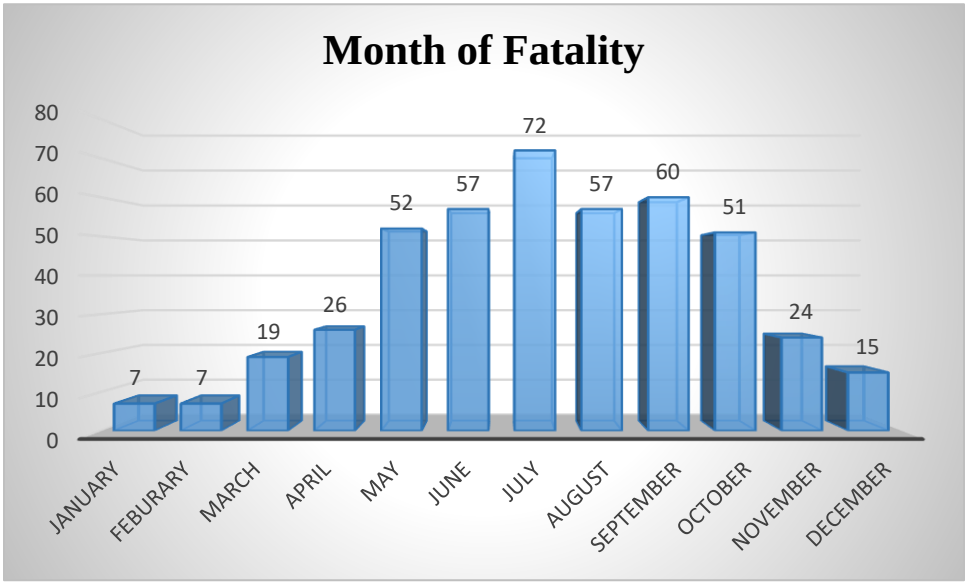
speed, loss of traction, loss of control, poor reaction time, not enough reaction time, and in-experience. All of these fatalities were preventable and the fate for some individuals could have been different if appropriate life-saving medical treatment would have been rendered promptly when the incident occurred. There are some cases where prompt medical treatment wouldn't have saved the individuals because they died on impact but it is important to discuss the risks that we face on ATVs. Risk aversion that is taught in ATV safety training can help individuals be aware of their actions and potentially what the effect will be.

Month of Fatality

An interesting factor in this study is the month of the incident for the sample population. Minnesota and Wisconsin experience all four seasons in a year and late fall to early spring typically experience cold weather. This colder weather was shown to have a limiting effect on the number of fatalities experienced in the sample population.

Figure 9

Month of Fatality



The colder months like December, January, and February in Minnesota and Wisconsin typically experienced reduced numbers of fatalities compared to the rest of the months in the year. March, April, and November have historically shown slightly higher numbers of fatalities than the truly colder months but the majority of the fatalities happen during the warmer Summer and Fall Seasons. There may be many reasons for these differences but the primary reason is just timing since more people are out and about on the ATVs in these warmer months and there are many Holiday weekends in these months. What would be interesting to research is what the fatalities would show in warmer states that don't experience the extremely cold weather during their winter seasons. Combatting the rise in incidents and fatalities could be a great focus of research in the future but for now, stepping up the Public Service Announcements during the warmer months in Minnesota and Wisconsin could have a beneficial impact on keeping safety in mind for people who are out and about, enjoying the ATV experience during a time that has historically experienced a large increase of incidents.

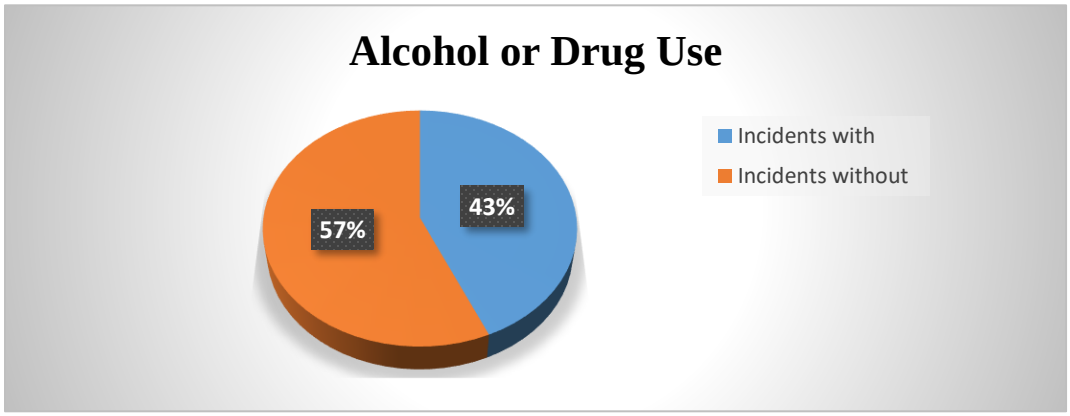
Alcohol or Drug Use

Driving under the influence of alcohol or drugs is something that happens all across our nation and becomes an issue when it interferes with our abilities. In this project, alcohol use or drug use was recorded in Wisconsin if they were detected in the deceased person's system or if a witness verified that a substance was used prior to the crash. Blood tests resulting in a positive blood alcohol concentration (BAC) were shared more often in Wisconsin's reports than in Minnesota's reports. Minnesota's reports also did not define their method of classifying alcohol or drug use in their reports and they only reported a simple yes or no if alcohol was involved. The differences in recording in these two states is yet another excellent example of the mis-

matched practices that exist through our nation and how the lack recording this information can affect data records and research.

Figure 10

Alcohol or Drug Use



Alcohol and/or drug use was an immensely significant factor in the sample population, since 43% of the incidents involved some sort of substance use and very few of these cases were attributed to any other type beyond alcohol. In the 2020 *Minnesota Motor Vehicle Crash Facts* report from the Minnesota Department of Public Safety, it was identified that drunk driving attributed to 79 of the 394 traffic fatalities that were reported in 2020, showing that substance use in connection with driving, whether on an ATV or in any other type of vehicle, continues to be a problem in our society and is one that is not likely to go away anytime soon. In recent years, there has also been increased legislation that strengthened the punishment for operating an ATV while under the influence but only the future will show us if this legislation has helped to reduce fatalities. Increased enforcement from Law Enforcement may be helpful in reducing substance use on ATVs and targeted Public Service Announcements like the ones seen on T.V. and heard

on the radio could potentially help discourage people from driving while under the influence but ultimately, we cannot control another individual's actions. Driving under the influence is a situation where every individual needs to assess their own situation and the risks involved and make a decision they can live with, no matter how that decision turns out in the long run.

Helmet Use

Since the single most important piece of safety equipment that goes on any vehicle resides between the ears of the operator it makes sense to protect it (Meitrodt, 2014). Helmets.org, a website operated by the Bicycle Helmet Safety Institute, explains that helmets help protect our brains from injury by encasing them in a support system. An interesting fact about helmets is how they are designed to protect our brains. Think of your brain as an egg, suspended in a baggy with just enough water to go around the egg, and this bag is placed inside a jar. What happens if you throw that jar at the wall? Will the jar itself, that resembles your skull, break open? What about the egg inside that only has a small amount of liquid around it to cushion it? Will the egg, your brain, make it through the impact even if the jar doesn't break or is it possible that the egg will be damaged? That scene is exactly what happens when your head makes contact with an object and why wearing a helmet is so important. The following is an example from the Motorcycle Safety Foundation (2014) of how a helmet works: First there is the hard outer shell of the helmet that we see which was designed to compress when it hits anything hard which helps to disperse energy from the impact before it reaches your head. This impact can cause the shell to delaminate on impact or even crack, breaking the helmet and rendering it in need of replacement. The second part of the helmet is inside of this hard shell and is often not seen because it is the middle part of the sandwich in the helmet and is an impact-absorbing liner

made up of expanded polystyrene (Styrofoam) that cushions and absorbs the shock as the helmet stops and your head continues moving. The third part of the helmet is the liner on the inside that touches your head when you put the helmet on and this part was designed for comfort and to help the helmet fit snuggly. The fourth part of the helmet is the retention system which is otherwise known as the chin strap and is often one of the most improperly used part of the helmet when a helmet is actually worn due to it not being strapped on at all or strapped too loosely.

All of the parts above work together in the helmet to protect the individual's skull and cushion the brain, potentially preventing traumatic brain injuries and death. At this time, helmets are not required for all riders but Minnesota and Wisconsin have rules that require the use of a helmet for their youth. Wisconsin currently requires all ATV riders under the age of 18 to wear an approved helmet at all times with the following unique exclusions to this requirement:

> When operating on areas that are open to the public, all riders under 18 must wear a helmet, except for those over the age of 12 if they are traveling for the purposes of fishing or hunting
>
> -or-
>
> On private land that is owned and controlled by the rider's immediate family, a helmet is not required. If, however, the land is owned by someone who is not a member of the operator's immediate family, a helmet is still required, with the same hunting/fishing exception as stated above (ATVcourse.com)

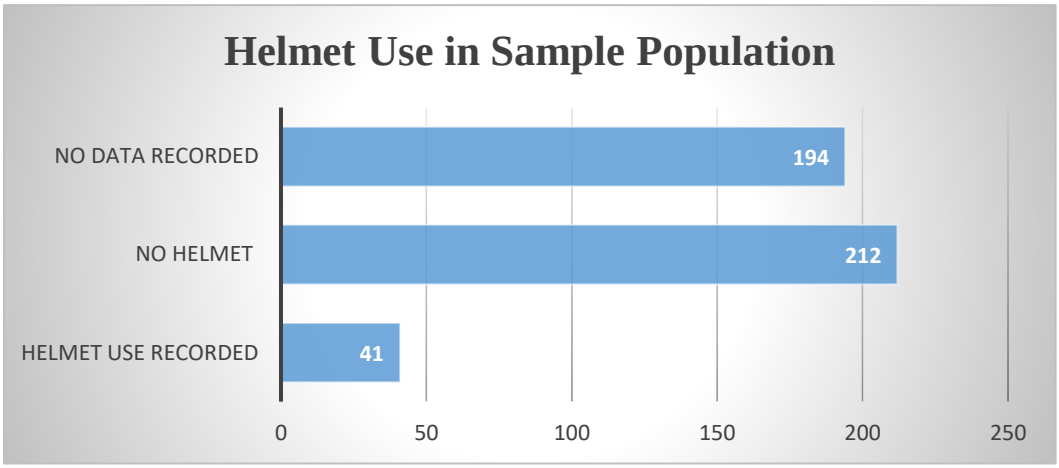
Minnesota lists similar rules on the same website, stating that riders under the age of 18 are required to wear an approved helmet but they go a bit further in the detail of exactly how to wear a helmet. In Minnesota, anyone under 18 must wear a securely fastened helmet at all times when

riding and all helmets must meet the Department of Transportation standards and display DOT approval. At the same time, it is interesting to note that Minnesota does not exclude private land from this requirement or provide an exclusion for hunting or fishing like in Wisconsin.

All across our nation, the rules regarding helmet use on ATVs vary and in 2012, 31 states had helmet requirements for ATV riders; however, in 19 of those states the helmets only applied to those below age 16 or age 18, and 5 of those states exempted riders using ATVs for agriculture work (Fawcett et al., 2016). If helmet use on ATVs was required for all riders and not just for our youth, there could potentially be a decrease in fatal accidents and in traumatic brain injuries but at what point would this be an over-reach? Would this requirement overstep that thin, invisible boundary line that represents our individual rights and freedoms? The groups out there lobbying for helmets to be required on recreational vehicles and motorcycles look past the fact that helmets aren't legally required on bicycles, yet bicycles contribute their fair share of injuries and fatalities. During 2000 through 2005, there were 4,924 people who died from bicycle mishaps in our nation at the same time that 5,204 people died from ATV crashes (Helmkamp et al., 2009). Historically, there has been so much attention aimed at bicycle safety for kids and bicycle helmet giveaways are routinely held as positive reinforcement to encourage safe riding but yet helmets for ATV safety don't receive any of this attention or funding but they are actually legally required for some of our youth (Fawcett, et al., 2016). If ATV safety was given a similar amount of attention and funding like what bicycle safety receives, it is possible that there would be a difference seen in injuries and fatalities but this goes back to the funding issues that the CPSC pointed out in 2013.

Figure 11

Helmet Use in Sample Population



In this study, only 41 individuals out of the 447 in the sample population were recorded as wearing a helmet when they died and out of this almost 10% of the entire sample population, only 12 of these individuals under age 18 were wearing helmets even though there were 60 children in this age bracket. Recording practices for helmet use were very different between the states and Minnesota historically did not record helmet use as faithfully as Wisconsin did, again pointing out flaws in the current data recording practices. The lack of helmet use in these incidents may have contributed to the incidents resulting in fatalities instead of injuries but we can't say that the numbers would have changed for certain because there is no way to know the unknown and all we can do is hopefully change the future outcomes.

Conclusion

In conclusion, the results from this study show that there was a lack of ATV safety training in the sample population who died during the years 2007-2020 in Minnesota and Wisconsin. These findings lend support to the expansion of the ATV safety training requirement

that would make the training a requirement for all ATV operators in Minnesota and Wisconsin, bringing them up to date with Oregon. Even though the data from this study focuses on just two states, ATVs are ridden in every state in our nation and fatalities due to ATVs can happen anywhere and to anyone so the findings from this study are applicable across the nation. In total, 94%, of the fatalities in this sample were experienced by those who did not have any ATV safety certification or training recorded in their file and these fatalities seemed to spread fairly evenly through the middle-aged groups. Historically, our youth and our elderly aren't age groups that are experiencing the highest death rates and it is time that we recognize that the largest risk is to the people in the middle. This middle range group is a combination of people who may have been born ATV safety training requirements were required in their state, or who may not believe they need ATV safety, or who may not even be aware that there is a requirement if their state has one. It is time that we realize that ATV safety training matters on all land, regardless of whether it is private or public. It is up to us to stand up and protect our fellow citizens by creating both a successful ATV safety training requirement and program that would fulfil this requirement that will crosses the state borders consistently and equally and is funded appropriately so it can be instituted, advertised, encouraged, and enforced.

Chapter 5: Recommendations & Implications

Study Summary

The current data that exists for research in this field is disappointing and the information that is there is unorganized and hard to use. It is time that society acknowledge the fact that our recording practices for this type of data suck and we need to advocate to do something to fix it. Beyond this enormous data issue, the main point of this study was that the majority of the sample population were people who didn't have ATV safety training when they died and we are creating a perpetually failing system when we leave people out of the requirement to have ATV safety training because they are considered too old or too experienced or are grandfathered in. While safe behavior cannot be legislated, there is an opportunity to increase awareness and change perceptions about what is safe (CPSC, 2013). Looking at the 94% of the sample population that died in this study, it's possible that ATV safety training could have changed their outcome but we can't change the past so it's time for us as individuals and a society to recognize that this is an important issue that impacts our public health and safety and we need to make some changes in order to protect our future.

Proposed Recommendations

Based on the results of this study, I propose that federal legislation first address the concern of defining what is or is not an ATV and that every state follow the definition without allowing for change so the same machine will be labeled the same in every state. Ideally, any machine with a straddled seat would constitute an ATV and anything that was designed to have a roll cage and/or seatbelts would constitute an UTV. This need for a solid identification method

and a definition that stands true across all borders would only need to be applied to ATVs and UTV's since other recreational vehicles are defined already in their name; Off-Highway Motorcycles (OHMs) are either dirt bikes or other motorcycles that are legal to be ridden on the roads and trails while Off-Highway Vehicles (OHVs) or Off-Road Vehicles (ORVs) are catch-all-terms that include anything that the other three labels don't define.

Once this definition issue has been cleared up, the federal legislation should move to require all states to require fatal incidents on any recreational vehicle to be reported to the department in charge of this information. This would require some states to identify the department who is in charge of the information and create a policy that requires the timely reporting of this information. These reports would all utilize the same database for recording and each state would then be required to be published annual reports on their state website for the public to review, similar to how Minnesota and Wisconsin currently publish their yearly data in their annual reports on their respective DNR websites.

In addition to each state publishing this data for public review, these incidents should then also be recorded into a national database so the data can be easily accessed by anyone or any entity that would like to examine the data. This extra effort to transfer the data from each state to the federal recording database should not be difficult or time consuming since every state would follow the new policy and use the same basic system when recording the reported incidents at the state level. All reports would record the same data in the same categories which would transfer the data to the federal level with ease. This new database would require a department to run the new program who would oversee the submittance of the data, follow up with states that do not submit data or who submit incomplete data, and who would be in charge

of operating the nationwide system. This federal level reporting system would operate in a similar manner to the crime reporting systems the criminal justice field already uses and by having the same systems in use in every state that compounds into a national database, we would be able to drastically cuts back on the duplication that is being seen and some of the messy disorganization that affects research in the field (CPSC, 2013)

As for any concerns regarding confidentiality in these new reporting systems, names would never be used in the data and each incident would be recorded in a similar manner to match how Minnesota and Wisconsin currently record their incidents. Currently these states identify the incident with a number or date of incident which allows the state level department to know the report that goes to that case for updating purposes but doesn't violate confidentiality. In addition to the identifier, they provide the date of the incident, the time the incident occurred if it is known, the location of the incident (road, ditch, lake, trail, yard), the type of property the incident happened on (public or private), the method of injury (flip, ejection, collision, rollover, fall through ice), the age of the individual, if the individual was a passenger or operator or if they were uniquely involved, identify if there was alcohol or drugs involved, identify if there was a helmet worn, identify if the individual held ATV safety training, and provide a small snippet of information that explains how the incident happened. By creating a database that records all of this information every time, it would ease the majority of the recording issues that researchers in the field face and would make it easier to update records if a secondary individual passes away from their injuries they received during an incident. However, this new recording system would require the full support, including financial support, of the federal and local governments in order to be enforced as there are many departments that are already stretched thin with the limited

resources they have. By utilizing a system as simple as Microsoft Excel, it would be possible to create an affordable and easy to operate system that wouldn't be a large expense and would be a perfect universal system that allows for instant verification of data, provide data for comparison year to year, and eases the submission of data.

Beyond addressing the issues that are affecting the data and research, I move on to propose that federal legislation be passed that requires ATV safety training for all operators, regardless of age or state residency. For far too long the current system has allowed people to skirt safety skills and accident prevention techniques on these machines. Going back to when these machines were first created and then pulled from the market because they were too dangerous, safety was supposed to be one of the top things enforced but it never seems to have made its impression until it was too late. While enforcing this new policy won't be an easy task or one that should be taken lightly, it is a necessary movement that can help protect our citizens. I also encourage people who utilize these machines to see that they can help be part of the solution by taking responsibility for their own safety by taking ATV safety training and instead of just taking it because it's required, take it to learn it, use it, and live to ride again.

Social & Policy Implications

First of all, we need to acknowledge that there is a problem with our current policy that is creating an educational injustice and then recognize that we can and should do something about it. Once society is aware of the issues at hand, we can move forward with changing our social policies and our legislative policies. By instituting the reporting requirements for all recreational vehicles, not just ATVs, and by requiring states to record and report this data for public review

and upload to the federal government, we will have moved forward in an effort to solve the majority of the data issues that plague the field.

Next is the issue of informing our society that there is a public health and public safety issue that needs to be addressed and educating people that this issue affects more than just those who actively engage in the activity. Many injury prevention programs have included media education campaigns that include messages emphasizing the consequences of ATV use (Aitken et al., 2004). Continuing the effort to increase education and advertising can help remind fellow citizens that safety is key to success and in 2013, the CPSC reported that Public Service Announcements are effective avenues for communicating safety messages. Law enforcement is also a great partner in education and enforcement but educating parents about their need to supervise young riders is essential to ensure that safety is continuously taught and enforced while out riding (CPSC, 2013). Other parent behaviors that could be advertise include providing safety equipment like helmets and goggles for their children and teaching them how to use them properly (Grummon et all., 2014). Communication on the trails from more experienced riders, not just parents, can also identify the rules that need to be followed and offering positive correction when they aren't being followed. Advice from other riders about the type of obstacles or situations they may encounter while out riding on a specific terrain can be helpful and people learn a lot from their peers.

When we look at the new legislation that would require everyone to obtain ATV safety training, there is significant planning that will need to go into developing the means to accomplish the development of the program and enforcement of this new requirement, not to mention the continued support it would require. Some of the issues facing this new legislation

would be creating the base federal program that would be used all across the nation, securing and providing the funds for the program, developing the program itself in different approved formats and languages for our diverse nation, bringing awareness to the requirement that instills a positive impression of why it's not only necessary but beneficial, and enforcement of the requirement.

One of the most effective ways to provide ATV safety training to all would be to create an online program similar to the ATVCourse.com program that is being used in multiple states across our nation already or work out a contract to utilize this course in all states. An online program could be completed by any person regardless of their location as long as they have internet access and a certificate would be able to be downloaded for electronic proof or printed at home for physical proof. This program would also have an option to have the certificate mailed out to the customer, similar to the program being operated in Oregon. This certification program would be open to anyone aged 6 and older. While this age may seem young to some, it is important to note that if a 6-year-old can drive an ATV, they should be able to learn about how to drive that ATV safely. This program would also be able to be repeated at any point in the future if an individual feels compelled to revisit the lessons or is told by law enforcement or our criminal justice system that they need to complete the program again as part of their sentencing, so it wouldn't necessarily be a one and done situation.

In addition to this online program, society would need to move forward and develop a plan to ensure that there is a multitude of widely available opportunities to help individuals accomplish this new requirement. To satisfy this part of the plan, each state to would be required to offer the in person traditional classes where participants take an in-person class in a class-

room. Online distance learning classes that utilize platforms like Skype, Google Meets, or Zoom would also an option that are currently used for many programs and are similar to face-to-face but may be more accessible since anyone can attend a Zoom class anywhere that they have an adequate internet connection. Every single one of these programs would be utilizing the same basic material from the federal program since the federal program will be the foundation of all ATV safety training programs. However, because the United States is a diverse population, the available programs must be offered in multiple languages or formats in order to reduce cultural barriers that may prevent an individual from fulfilling the requirement (CPSC, 2013). Utilizing the same material from state to state and across cultural barriers would ensure that the information is crossing the borders appropriately and applies to all riders equally. Each state would then have the ability to add in state specific rules regarding riding locations but the main knowledge gained would be the same across the board for everyone. By creating a solid foundation of knowledge, ATV safety training certificates would be accepted everywhere, no matter which state the individual had the training in or what entity provided the training. As for the states that have different rules about where people can ride or the requirements for riding, this should be advertised by the specific state loudly and proudly so people are aware of the requirements. Posting rules at public riding locations would be beneficial for review, as well as in the respective booklets published to identify regulations like in the DNR booklets published in Minnesota and Wisconsin.

The recording of this certification is also another hurdle when it comes to enforcing the program since anyone can make a copy of a certificate and edit it to have their name on it instead of the original name. To prevent this from happening and to be able to look up if an individual

has completed their ATV safety certification, each certificate should be recorded in the federal database and the respective state database(s).While there are people who have the same name, an address, phone number, email, and birthdate would be sufficient to identify if the certificate belongs to the correct person. The task of recording this and answering inquires would fall on the team at the federal government level who is responsible for maintaining this program and the data records, as previously discussed in this project. The data would also be able to be recorded on a person's state identification card or driver's license similar to hunter safety, snowmobile safety, or motorcycle endorsements. Recently, Minnesota moved to recording ATV safety on the back of an individual's license but the certificate is still filed through the Minnesota DNR system, showing how the two separate departments can communicate and share information. The notation on the back of the license is easier for law enforcement officers to have proof of completion immediately upon asking. Every state's system should be recording what safety training classes have been completed for that individual since it is applicable information that in theory is no different than recording the different types of categories or class of vehicle that an individual is approved to drive.

The cost of developing and supporting this nationwide ATV safety training program should be supported by our government since safety is a public health issue as well as a public safety issue. The manufacturers of these ATVs should also be financially supporting these programs since they are required to provide ATV safety training already by law. Grants could also be used to provide classes as well. Fines for not following the new requirement would be able to be used to fund the programs as well and would start being applied when an individual reached age 18, since this age allows them to no longer be considered a minor who is under their

parent's direction. The currently fine schedule for offenses in Minnesota is below and is current as of the 2020 State Payables list:

Minnesota Statute §§ 84.925.5(a): Persons 16 years and older operating an ATV on public land without a safety certificate is a fine of $125.00.

Minnesota Statute §§ 84.925.5(b): Failure to complete the independent study course before continuing to operate an ATV is a fine of $125.00.

Minnesota Statute §§ 84.925.5(c): Failure to complete an independent study course and operating test before continuing to operate an ATV after a careless or reckless operation conviction, or specified second or subsequent conviction in a season is a fine of $275.00.

Minnesota Statute §§ 84.925.5(d): Failure to complete an independent study course and operating test before continuing to operate ATV after third or more violations in a two-year period is a fine of $275.00.

As you can see, Minnesota's penalties are clear about the amount and every offense is classified as a misdemeanor and there are also penalties that can be given to parents who allow their child to operate a machine. Having a financial penalty like a fine can be a good deterrent that may work to discourage illegal actions if the rule that causes them to be a penalty is known and enforced. One of the most likely reasons why legislation may have limited effect on ATV safety in some jurisdictions is the lack of enforcement (Fawcett et al., 2016). Because of this common issue, I propose that law enforcement take a firmer stance when it comes to checking for safety certification and enforcing the ATV safety requirements that are already in effect and what may be in effect in the future. I would like to make it clear that I am NOT advocating for a

get-tougher-on-ATV-riders attitude but I AM advocating for a get-tough-on-safety attitude. These two attitudes are two very different situations with very different approaches and taking a firmer stance involving safety training should be handled correctly as the educational issue it is if the results are to be favorable.

Along with the increased efforts from law enforcement should be an increased recording effort from all licensing bureaus or similar functioning businesses. All employees from these businesses should be verifying if a person has ATV safety training the same way that they verify if a person has hunter's safety or a motorcycle endorsement on an individual's license. Proof of the certificate verifying completion of the ATV safety training course should be required in order to add this to an individual's license. This proof should also be verified by any employee who is selling applicable ATV licenses, stickers, or tabs for any machine to verify the machine is registered to a person with ATV safety training. By creating a country-wide policy that requires these actions, it helps to work around some of the issues facing recording and enforcement.

Legislation should also require dealerships who sell ATVs to check for and require proof of safety certification during the sale of any machine, whether it is new or used. By forcing dealerships to obtain a copy of the certificate, uncertified individuals will have a harder time purchasing new or used machines through these businesses and will be forced to comply with the regulations. Dealerships should also act to increase their advertising of ATV safety training programs, by whoever they are offered locally or by the Manufacturer. The free or low-cost programs offered through ATV Manufacturers are required by law and can be added benefits to the purchaser and the purchaser's family. Dealerships should be verbally and physically sharing

the information with the purchaser's and physical material can be included in the sales paperwork each purchaser receives.

Closing Remarks

Time is of the essence and people are dying. It is time for us to start moving in the right direction by requiring ATV safety training for all ATV operators because it isn't just about learning the machine or what it does and how to do it, it's about managing risk and learning what to do in an emergency. This training is a public health issue, a public safety concern, and also a criminal justice issue and these three fields can combine to create one heck of a task force that would be able to take on the issue head-first given enough attention, support, and funding. Even with the effort from these fields, it will take our society as a whole to acknowledge that this is a real issue affecting Americans and that we need to act now to make a difference later. If we build ATV safety training up as a requirement similar to the Driver's Education requirement that exists in America, it will become the normal way of doing things after a period of adjustment.

Out of all of the information provided in this entire report, the most important fact that I want any reader take away is that every single one of these 447 fatalities from Minnesota and Wisconsin could have ended with a different story. The ultimate goal of ATV safety training should be to encourage the rider to ride safely so their next ride is on an ATV and not in an ambulance or a hearse. Even though you cannot eliminate every risk, you can reduce the probability of injury and death and that is exactly what ATV safety training aims to do so learn it, use it, and live to ride again.

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Appendix A: Minnesota and Wisconsin Findings

Table A1
Operators, Passengers, Others-Combined

State	Operator	Passenger	Others
Minnesota	183	16	1
Wisconsin	234	12	1
Total	**417**	**28**	**2**

Note: Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A2

Total Fatalities by Year-Combined

Year	Minnesota	Wisconsin	Combined
2020	18	20	38
2019	9	16	25
2018	14	13	27
2017	17	23	40
2016	13	17	30
2015	12	17	29
2014	10	25	35
2013	11	17	28
2012	16	14	30
2011	15	17	32
2010	20	14	34
2009	14	18	32
2008	17	12	29
2007	14	24	38
Total	**200**	**247**	**447**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A3

Total Fatalities by Year-Gender-Minnesota

Year	Male	Female
2020	13	5
2019	8	1
2018	9	5
2017	16	1
2016	12	1
2015	12	0
2014	9	1
2013	10	1
2012	13	3
2011	14	1
2010	17	3
2009	13	1
2008	13	4
2007	10	4
Total	**169**	**31**

Note. Source:: Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A4

Total Fatalities by Year-Gender-Wisconsin

Year	Male	Female
2020	18	2
2019	16	0
2018	12	1
2017	19	4
2016	15	2
2015	17	0
2014	23	2
2013	15	2
2012	12	2
2011	14	3
2010	13	1
2009	16	2
2008	9	3
2007	21	3
Total	**220**	**27**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A5

Total Fatalities-Gender-Combined

State	Male	Female
Minnesota	169	31
Wisconsin	220	27
Total	**389**	**58**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A6

Age Breakdown of Fatalities by Year-Minnesota

Year	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-94
2020	1	5	0	1	1	3	6	1	0	0
2019	0	1	3	3	0	1	1	0	0	0
2018	1	1	3	0	3	3	3	0	0	0
2017	0	1	0	7	3	2	1	2	1	0
2016	1	1	3	1	2	3	0	1	1	0
2015	0	1	2	2	0	2	2	1	2	0
2014	0	2	2	1	0	1	3	1	0	0
2013	0	1	2	3	0	2	3	0	0	0
2012	1	3	2	1	2	2	3	1	1	0
2011	2	2	2	2	1	3	1	1	1	0
2010	1	4	1	5	3	3	2	0	1	0
2009	0	3	1	1	4	1	2	1	1	0
2008	0	4	3	2	2	4	1	0	0	1
2007	1	3	4	1	0	2	1	2	0	0
Total	**8**	**32**	**28**	**30**	**21**	**32**	**29**	**11**	**8**	**1**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A7

Age Breakdown of Fatalities by Year-Wisconsin

Year	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-94
2020	0	1	2	0	3	5	7	1	1	0
2019	1	0	5	1	1	5	3	0	0	0
2018	0	0	2	4	1	1	2	2	1	0
2017	2	4	2	2	3	5	2	0	3	0
2016	0	1	1	2	5	5	2	0	0	1
2015	0	3	1	3	2	5	1	1	1	0
2014	0	2	1	4	4	7	3	3	0	1
2013	0	4	4	2	4	1	0	2	0	0
2012	1	1	3	3	1	3	1	0	1	0
2011	0	4	1	1	5	4	1	0	1	0
2010	0	1	2	3	3	0	4	0	1	0
2009	0	3	1	3	5	4	1	0	1	0
2008	0	3	0	3	1	0	2	3	0	0
2007	1	5	3	0	7	1	6	1	0	0
Total	**5**	**32**	**28**	**31**	**45**	**46**	**35**	**13**	**10**	**2**

Note. Source*:* Minnesota & Wisconsin Combined Findi46ngs by Year 2007-2020

Table A8

Age Breakdown of Fatalities by Year-Combined

State	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-94
Minnesota	8	32	28	30	21	32	29	11	8	1
Wisconsin	5	32	28	31	45	46	35	13	10	2
Total	**13**	**64**	**56**	**61**	**66**	**78**	**64**	**24**	**18**	**3**

Note. Source*:* Minnesota & Wisconsin Combined Findi46ngs by Year 2007-2020

Table A9

Total Safety Training Rates by Year-Minnesota

Year	Yes	No	No Data
2020	0	18	0
2019	1	8	0
2018	0	14	0
2017	0	17	0
2016	1	12	0
2015	1	11	0
2014	3	7	0
2013	0	11	0
2012	0	16	0
2011	1	14	0
2010	0	20	0
2009	2	12	0
2008	0	17	0
2007	1	12	1
Total	**10**	**189**	**1**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A10

Total Safety Training Rates by Year-Wisconsin

Year	Yes	No	No Data
2020	1	17	2
2019	1	13	2
2018	2	8	3
2017	0	23	0
2016	1	16	0
2015	0	17	0
2014	2	22	1
2013	2	15	0
2012	1	12	1
2011	2	15	0
2010	2	12	0
2009	1	17	0
2008	2	10	0
2007	1	23	0
Total	**18**	**220**	**9**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A11

Total Safety Training Rates-Combined

State	Yes	No	No Data
Minnesota	10	189	1
Wisconsin	18	220	9
Total	**28**	**409**	**10**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A12

Location of Incident by Year-Minnesota

Year	Public Property	Private Property	Not Specified
2020	16	2	0
2019	8	1	0
2018	7	7	0
2017	10	7	0
2016	11	2	0
2015	10	2	0
2014	7	3	0
2013	7	4	0
2012	12	3	1
2011	9	6	0
2010	14	6	0
2009	12	2	0
2008	15	2	0
2007	9	5	0
Total	**147**	**52**	**1**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A13

Location of Incident by Year-Wisconsin

Year	Public Property	Private Property	Not Specified
2020	16	4	0
2019	14	2	0
2018	9	4	0
2017	18	5	0
2016	13	4	0
2015	10	7	0
2014	14	11	0
2013	13	4	0
2012	7	7	0
2011	13	4	0
2010	12	2	0
2009	13	5	0
2008	10	2	0
2007	17	7	0
Total	**179**	**68**	**0**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A14

Location of Incident-Combined

State	Public Property	Private Property	Not Specified
Minnesota	147	52	1
Wisconsin	179	68	0
Total	**326**	**120**	**1**

Note. Source: Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A15

Type of Incident by Year-Minnesota

Year	Broke through Ice	All Others	Unique Events
2020	0	18	0
2019	0	9	0
2018	0	14	0
2017	0	17	0
2016	0	13	0
2015	0	12	0
2014	0	9	1
2013	0	11	0
2012	1	15	0
2011	0	15	0
2010	1	19	0
2009	0	14	0
2008	0	17	0
2007	0	14	0
Total	**2**	**197**	**1**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A16

Type of Incident by Year-Wisconsin

Year	Broke through Ice	All Others	Unique Events
2020	0	20	0
2019	1	14	1
2018	0	13	0
2017	1	22	0
2016	0	17	0
2015	0	17	0
2014	1	24	0
2013	0	17	0
2012	1	13	0
2011	0	17	0
2010	0	14	0
2009	1	17	0
2008	0	11	1
2007	1	23	0
Total	**6**	**239**	**2**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A17

Type of Incident-Combined

State	Broke through Ice	All Others	Unique Events
Minnesota	0	18	0
Wisconsin	0	9	0
Total	**147**	**52**	**1**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A18

Month of Fatality- Combined

Month	Minnesota	Wisconsin	Total Per Month
January	4	3	7
February	1	6	7
March	8	11	19
April	13	13	26
May	28	24	52
June	30	27	57
July	33	39	72
August	21	36	57
September	20	40	60
October	24	27	51
November	12	12	24
December	6	9	15
Total	**200**	**247**	**447**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A19

Alcohol or Drug Use by Year-Minnesota

Year	Yes	No	No Data
2020	4	14	0
2019	5	4	0
2018	3	9	2
2017	6	10	1
2016	4	7	2
2015	7	5	0
2014	2	8	0
2013	5	6	0
2012	8	8	0
2011	6	9	0
2010	10	10	0
2009	8	6	0
2008	8	9	0
2007	4	8	2
Total	**80**	**113**	**7**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A20

Alcohol or Drug Use by Year-Wisconsin

Year	Yes	No	No Data
2020	7	6	7
2019	11	1	4
2018	3	5	5
2017	11	4	8
2016	14	3	0
2015	7	8	2
2014	13	6	6
2013	8	9	0
2012	4	8	2
2011	6	11	0
2010	10	1	3
2009	9	7	2
2008	3	3	6
2007	8	6	10
Total	**114**	**78**	**55**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A21

Alcohol or Drug Use by Year- Combined

State	Yes	No	No Data
Minnesota	80	113	7
Wisconsin	114	78	55
Total	**194**	**191**	**62**

Note. Source: Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A22

Helmet Use by Year-Minnesota

Year	Yes	No	No Data
2020	0	0	18
2019	0	0	9
2018	0	0	14
2017	0	0	17
2016	0	0	13
2015	0	0	12
2014	0	0	10
2013	0	0	11
2012	0	0	16
2011	0	1	14
2010	1	0	19
2009	0	6	8
2008	1	0	16
2007	1	0	13
Total	**3**	**7**	**190**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A23

Helmet Use by Year-Wisconsin

Year	Yes	No	No Data
2020	1	18	1
2019	2	13	1
2018	1	12	0
2017	1	22	0
2016	4	13	0
2015	0	0	0
2014	0	0	0
2013	0	0	1
2012	0	0	0
2011	0	1	1
2010	1	0	0
2009	0	6	0
2008	1	0	0
2007	1	0	0
Total	**38**	**205**	**4**

Note. Source*:* Minnesota & Wisconsin Combined Findings by Year 2007-2020

Table A24

Helmet Use by Year-Combined

State	Yes	No	No Data
Minnesota	3	7	190
Wisconsin	38	205	4
Total	**41**	**212**	**194**

Note. Source: Minnesota & Wisconsin Combined Findings by Year 2007-2020