

Virginia Commonwealth University
Transportation Safety Training Center
Virginia Multi-disciplinary Crash Investigation Team

Report Number 204 – February, 2008

ABSTRACT

The crash described in this report occurred when a convertible sedan carrying four young women pulled onto a two lane interstate ramp from a gore area, into the path of a tractor trailer. The tractor trailer driver braked but was unable to avoid a collision. The tractor struck the rear of the vehicle, overriding and pushing it into a concrete barrier, causing it to overturn. The car broke free, coming to rest upside down, and the tractor driver stopped his vehicle. This crash resulted in the deaths of four of the five occupants of the convertible, three of whom were ejected. The surviving passenger received minor injuries and the tractor trailer driver was not injured.

This crash illustrates the continuing problem of underage drinking and driving, and highlights the rising concern over young women who engage in such high risk behaviors. Some repercussions for using fake identifications are discussed. In addition, this report touches on identification of work zones in crash reporting, the dangers associated with driving on heavily traveled interstates with multiple complex interchanges, and understanding information contained in toxicological analyses.

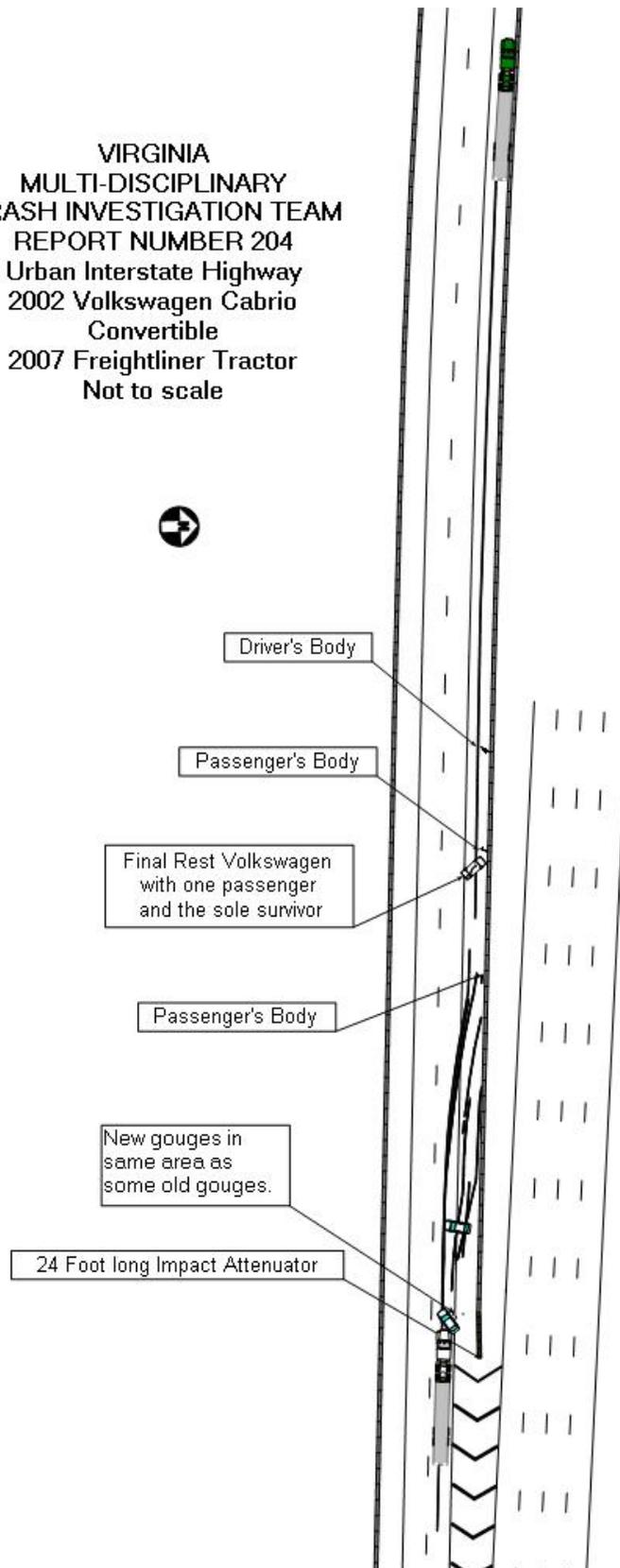
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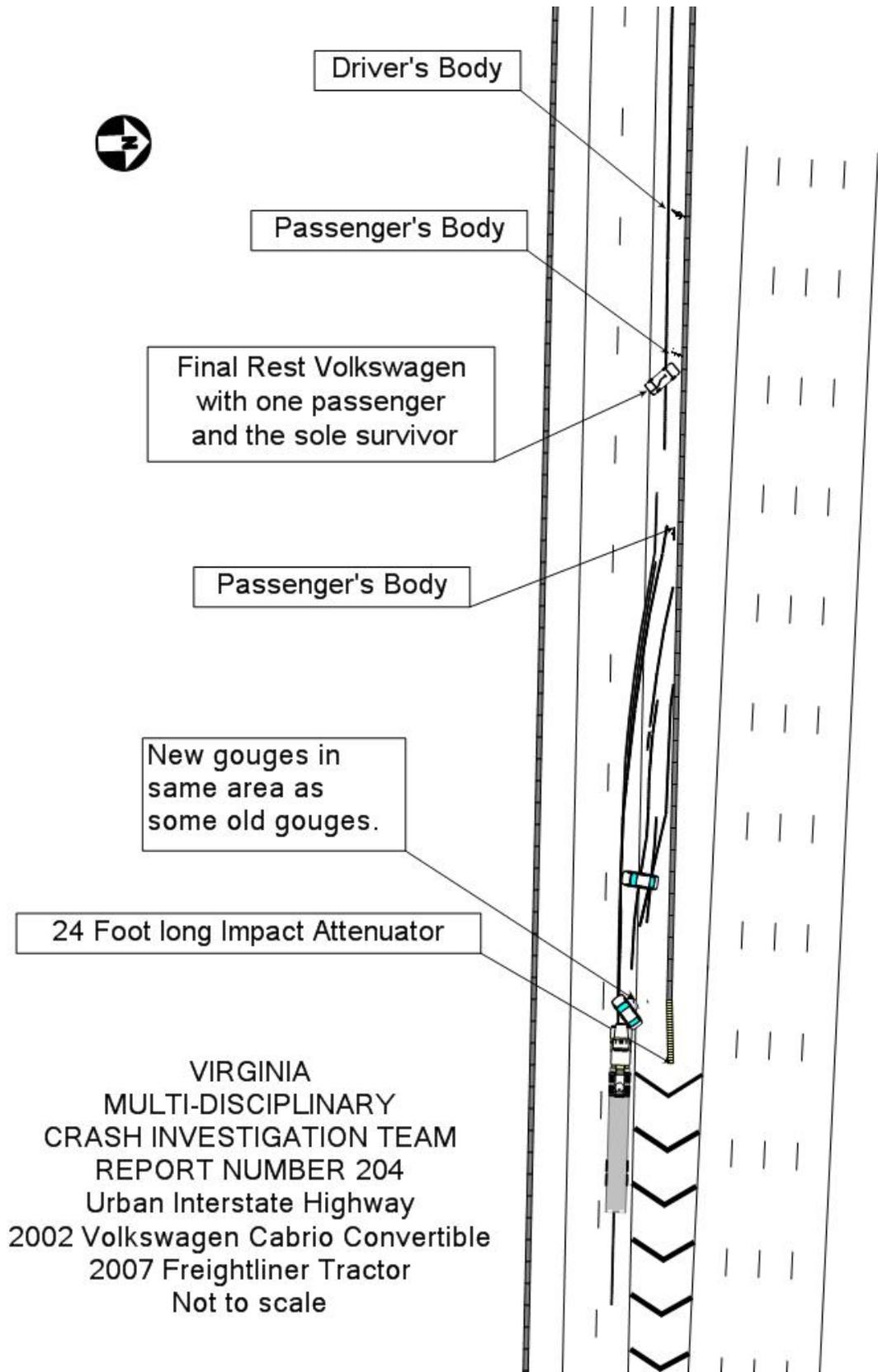
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SYNOPSIS

<u>Day, Time, Season:</u>	Thursday, 10:40 p.m., Spring
<u>Road/Weather:</u>	Urban interstate highway; cloudy and dry
<u>Vehicles Involved:</u>	2002 Volkswagen Cabrio convertible, 2007 Freightliner Columbia tractor with a semi-trailer
<u>Summary:</u>	The convertible pulled into the travel lanes of the interstate into the path of a tractor trailer, was struck from the rear and pushed into the concrete barrier.
<u>Severity:</u>	Four fatalities, one person with minor injuries, extensive property damage
<u>Probable Cause:</u>	Unsafe maneuvers on an interstate highway, underage drinking and driving
<u>Significant Points:</u>	High risk behaviors in young women, including underage drinking; heavily traveled interstate highways with multiple complex interchanges; definition of work zones for crash reporting; understanding toxicology results.

VIRGINIA
MULTI-DISCIPLINARY
CRASH INVESTIGATION TEAM
REPORT NUMBER 204
Urban Interstate Highway
2002 Volkswagen Cabrio
Convertible
2007 Freightliner Tractor
Not to scale





CRASH DESCRIPTION

On a cloudy, dry Thursday evening in late spring, a 2002 Volkswagen Cabrio convertible was headed west on an urban interstate highway. The 20 year old female driver was accompanied by four other young women. The front seat passenger was the driver's 19 year old roommate. Three women sat in the rear bench seat: two 18 year olds who had attended their high school graduation ceremony just hours before and a 17 year old who attended their school. After spending time with relatives earlier in the evening, they were headed out to celebrate, although their destination was unclear.

A 2007 Freightliner Columbia tractor pulling a refrigerated semi-trailer was also traveling west on the same highway. The 42 year old driver was traveling alone from a distant northern state. He was approximately seven hours into his trip en route to a location in Virginia about 130 miles from the crash site.

This section of interstate has six lanes in the westbound direction and is on a slight downgrade. The pavement is asphalt and in good condition. The lanes are 12 feet wide with asphalt shoulders. The two left lanes are designated for traffic entering a ramp to a main southbound interstate route and motorists are alerted to this change by pavement markings and overhead signs. Just prior to the crash site, the lanes leading to the ramp begin to physically separate from the remaining four westbound lanes through the introduction of a chevron-marked gore area. The four remaining lanes continue west as a major interstate bypass. The chevron pavement markings within the gore area are 24 inches wide and clearly mark the area that is not meant for vehicular travel. The gore area extends for approximately 1100 feet, where an impact attenuator is situated at the beginning of a concrete barrier that divides the shoulders of the two distinct sections of roadway. Triangular in shape, the gore area is at its widest, 25 feet, near the impact attenuator. For approximately 2400 feet prior to the gore, the lines separating travel lanes are six inches wide. They widen to 8 inches wide through the gore, returning to 6 inches wide after the physical concrete barriers. The road is controlled by signs and pavement markings which are in good condition. The speed limit is 50 mph. Raised snow plowable reflective pavement markers help delineate the roadway at night and during inclement weather. Also, this section of interstate has overhead lighting.



Photo #1: View of interstate looking west, where lanes are separated by a gore area.

The tractor trailer was taking the left exit, heading toward the ramp that would become the southbound main interstate road, and traveling in the right-most travel lane. As it approached the point where the two sections of interstate began to separate, the Cabrio was traveling on the right segment, the bypass interstate, in the far left lane. It was ahead of the tractor trailer and had been traveling in the adjacent lane until it reached the gore area. The car suddenly swerved to the left, entering the gore between the two sections of interstate. After quickly crossing the marked area of pavement, it continued into the right lane of the primary interstate. The Cabrio entered this lane of travel at approximately a 45 degree angle, directly into the path of the oncoming tractor trailer. The tractor driver applied brakes and locked his wheels, skidding for approximately 112 feet before striking the left rear corner of the car with the right steering tire and overriding the car. The tractor trailer made first contact with the car just west of the gore area in the right lane of the primary interstate. The tractor portion of the vehicle struck the Volkswagen, spinning the smaller vehicle counter-clockwise into its path. The tractor overrode

the vehicle with the steering axle as it rotated, crushing most of the passenger and engine compartments. The vehicles disengaged when the Volkswagen rotated from under the tractor, striking the concrete barrier with the front bumper. The Cabrio scraped along the concrete wall for approximately 100 feet and overturned, ejecting three of the five occupants. The car came to rest on its top with one passenger approximately 51 feet behind it and the other ejected passenger within a few feet of the front of the car. The driver was found about 60 feet beyond the final rest of the car. The ejected occupants, who died from blunt force trauma of the head and torso, were all found on the right shoulder near the base of the concrete wall.



Photo #2: View of crash site, looking east. Initial impact occurred west of the impact attenuator. Black marks on the concrete barrier were made by the Cabrio as it disengaged from the tractor.

Two passengers remained in the vehicle after the crash. One occupant died from head, neck and extremity trauma, but the other survived, conscious and pinned in the vehicle with

slight injuries. The tractor trailer came to rest approximately 360 feet past the driver of the car, also on the right shoulder adjacent to the wall. The tractor driver was not injured.

Immediately after the crash, witnesses stopped along the shoulders. They notified authorities to request emergency aid and began to check the victims. The investigating trooper had made a traffic stop in a work zone for the bypass and was approximately half a mile past the crash site. The trooper responded within minutes, along with fire and rescue vehicles. A rescue helicopter was dispatched to the site and both lanes of the southbound highway ramp were closed. In addition to notifying the Medical Examiner's office, a State Police divisional reconstruction team and a trooper assigned to the motor carrier unit were called. A hazardous material team was also sent to the scene to manage and clean up a fuel spill when the tractor's saddle tanks leaked.

It took approximately 30 minutes to extricate the survivor from the vehicle and she was transported to a nearby hospital. She was for treated cuts, bruises and a broken nose and released the following day. More than two hours after the survivor was removed, the deceased passenger was extricated from the wreckage and her body, along with the bodies of the other three victims, was transported to the District Office of the Chief Medical Examiner (OCME). The reconstruction team documented evidence at the scene and crews worked to remove the vehicles and clean the road. The road was re-opened to traffic and the scene was cleared approximately five hours after the crash occurred. Although some of the victims were quickly identified and family members notified soon after the crash, others did not carry accurate identification, which made the process more difficult and time consuming. The last victim's family was notified about half an hour after the scene had been cleared.

REMARKS

While investigating another four fatality crash in a different part of the state, the Virginia Multi-disciplinary Crash Investigation Team (VMCIT) was informed of this incident. Shortly thereafter, a Virginia Department of Transportation (VDOT) employee contacted the Team with questions as to whether the crash had occurred in a work zone. The issue of underage drinking by a female driver also made this a crash of interest.

Initially, this crash was thought to be in a work zone. It is a heavily traveled section of interstate and has been under construction for many years. Local residents are aware of the dense traffic and changing traffic patterns. However, drivers unfamiliar with the area can easily become overwhelmed and confused when trying to navigate through this urban interstate system. A work zone was in place for asphalt paving operations on an exit ramp off the westbound lanes of the interstate bypass, well beyond the point where the southbound interstate ramp separates from the interstate bypass. "ROAD WORK AHEAD" signs had been placed on both sides of the road, in the "Advance Warning Area" of the work zone, prior to the split. However, the "Transition" and "Activity Areas" of the work zone were located well beyond the split. Once the gore area physically separated the two interstate roads, the left road was no longer part of the "Advance Warning Area" of the work zone. There was no work being performed in the far left lanes, where the first harmful event of the crash occurred. Traffic had not slowed in the "Advance Warning Area" prior to the lane separations. Consequently, members of the VMCIT concluded that this crash did not occur in a work zone and it was not work zone related.

The 2007 Freightliner tractor pulled a semi-trailer that was designed to carry refrigerated foods. The vehicle was released to the company that owned it the day after the crash, so members of the VMCIT were not able to examine the vehicle first hand. However, a Virginia State Police motor carrier specialist inspected the vehicle the night of the crash and reported that it was, generally, in good condition. One brake was out of adjustment on the last axle of the right side of the truck, but this violation was not considered a significant defect and did not contribute to the crash. The vehicle sustained some damage along its right side, especially to the wheels and the undercarriage, but the load in the trailer remained secured and did not spill onto the highway.

The 2002 Cabrio had been purchased by its driver, in her home state, approximately seven months prior to the crash. A CARFAX report revealed that it had been involved in a

collision about two years before the purchase and damage to the front had been repaired. The white convertible had almost 90,000 miles on its odometer at the time of the purchase, but its final mileage could not be determined. The car did not have any known defects that might have contributed to the crash; however, it was totaled in this collision. During an inspection of the vehicle, VMCIT members noted deformed areas on the trunk section that matched tire impressions and green paint transfers that were consistent with the tractor. As the tractor moved forward, it crushed the roof of the Cabrio, folding the seatbacks down and forcing some of the occupants out. Once it rotated out from under the tractor trailer, the car struck the concrete barrier and overturned. At some point in this sequence, both front airbags deployed, as did the side impact airbags. Unfortunately, the damage to the roof of the vehicle was so severe that airbags could not protect the occupants from the intrusion. In fact, the deflated front passenger airbag was found lying in the engine compartment, covered with mechanical fluids.



Photo #3: Front view of the Cabrio

By his own admission, the driver of the tractor trailer was traveling 60 mph in a 50 mph zone. Speed is a consideration in a crash, not only from a reconstruction perspective, but also from a legal perspective. Virginia Law (46.2-823) states: “The driver of any vehicle traveling at an unlawful speed shall forfeit any right-of-way which he might otherwise have under this article”. However the forfeiture of any right-of-way does not imply fault in a crash. In determining fault in this crash, the investigating officer must ascertain whether the actions of either driver contributed to the crash and at what level of negligence. The Cabrio driver’s actions, both her driving behavior and chemical impairment (addressed later in this report), were grossly negligent and greatly contributed to the crash. In this scenario the tractor trailer driver loses his right-of-way, but because of the actions of the Cabrio driver, fault would still fall on her actions.

With evidence gained from the scene, the VMCIT could evaluate, to a degree, the actions of the tractor trailer driver. Had the same truck been traveling at the 50 mph posted speed limit, and its brakes activated at the same time, it would still have struck the car. There would have been a difference, however, in where the two collided and at what angle. This, in turn, may have affected the dynamics of the crash. Several possible scenarios can be considered.

First, considering only a lowering in the truck’s speed to 50 mph at impact, but keeping location and angle of impact the same; there may have been little change to the outcome. The enormous height and weight difference and angle of impact between the two vehicles were critical factors when analyzing the crash dynamics. Because the Cabrio was at an angle when struck, the wheels began sliding sideways, causing friction against the roadway. This extra friction caused the Cabrio to rotate into the path of the larger vehicle and allowed the tractor to override the smaller car. If the tractor trailer speed was reduced to 50 mph, but still struck the Cabrio at the 45 degree angle, the amount of damage to the car would not have been significantly reduced.

A second scenario is to place the tractor at the point where the driver first perceived the Cabrio entering the roadway from the gore area and lowering the tractor’s speed from 60 mph to 50 mph. The tractor now covers the distance between the two vehicles more slowly and allows the car time to travel approximately 2 to 3 car lengths further up the road. Under these circumstances, the Cabrio would have had enough time and distance before impact to complete the turn into the travel lane from the gore area. The car, now parallel to the roadway, would have been struck in the rear rather than the left rear quarter panel. The tires, now allowed to roll

forward rather than sliding sideways, would cause much less friction. This would have made it possible for the tractor to push the smaller vehicle rather than completely override it. The angle of impact with the tractor, in conjunction with the make up of the Cabrio's convertible roof, affected the amount of damage to the vehicle and its passengers. Changing the angle of impact would have changed the dynamics of this crash. Unfortunately, even under these circumstances, any consideration of the amount of damage or increased survivability of this crash is speculative.



Photo #4: Rear view of the Cabrio. Note crush damage due where tractor tire overrode trunk area.

The 42 year old tractor trailer driver had been driving commercial vehicles for over 10 years. He had an out of state license and a check of his driving history did not reveal any convictions for violations. He held a valid commercial driver's license with a current medical certificate and did not appear to have any physical or psychological impairment at the time of the crash. He had been driving for approximately seven hours prior to the crash, hauling a load of frozen food from a northern state to Virginia. He had approximately two more hours to travel

before he reached his destination. Although he had not exceeded the number of hours he was allowed to travel in one day under Federal Motor Carrier regulations, he had exceeded the 70 hour work week rule approximately 2-1/2 hours prior to the crash. However, he did not appear to have been fatigued and none of his actions contributed to the cause of this crash or decreased his ability to avoid the crash: he simply did not have enough time to take evasive action.

The 20 year old Cabrio driver was a student at a local university and she was familiar with the area, as well as with her vehicle. She held a valid driver's license from another state, but she had multiple violations both in that state and in Virginia. In the three years prior to the crash, she had three speeding convictions, including one for exceeding a speed limit by 25 mph. She also had been involved in one property damage crash for which charges were dismissed, and had a conviction in the Commonwealth for driving after illegally consuming alcohol. This type of conviction is usually conferred on a driver younger than 21 years whose blood alcohol content (BAC) is greater than .02% but under .08%, which is the presumptive level for driving impairment in Virginia. Her license had been suspended twice by her home state and was suspended again, for six months, after the drinking and driving violation. Her full driving privileges had been restored six months prior to this fatal crash.

This young woman did not alter her behavior after the last suspension. The day of the crash, she had been celebrating the high school graduation of two of her passengers, along with friends and relatives. According to acquaintances following the car, the driver and her companions were headed out for a night of partying and planned to go to nightclubs in a nearby city. Beer, vodka and marijuana were found in the vehicle after the crash. Blood removed from the driver's body at autopsy was analyzed by the Department of Forensic Science and confirmed that she had been drinking and had smoked marijuana, as well. Her BAC was .14% and her blood tested positive for Tetrahydrocannabinol (THC), the active component of marijuana, as well as a metabolite of THC.

Although toxicology tests were not conducted on the surviving passenger, the Medical Examiner removed samples of blood from the other three young women who died, along with samples of vitreous humor, the fluid contained within the eyeball. This was done at the time of the Medical Examiner's review of their bodies to determine a cause of death. Two of these passengers tested positive for THC and all three tested positive for ethanol, which meant they had been drinking as well. The 19 year old front seat passenger had a BAC of .10%. The results of blood tests for the two 18 year olds in the back seat showed higher levels of alcohol: .22% for

one and .56% for the other. These levels were extremely high; the .56% is well above what is often considered a lethal concentration.

Members of the VMCIT discussed these unusually high findings with the Forensic Toxicologist who performed the analyses, and she provided an explanation. When blood samples are drawn during a full autopsy, such as the one performed on the driver, the Medical Examiner is able to see exactly what organ or vessel the blood is being drawn from. Consequently, they know that the sample is not contaminated by other bodily fluids. However, when only a view is performed, the Medical Examiner is not able to see exactly where the sample is drawn from or the state of the internal organs. In a case such as a crash, the internal organs may be crushed, lacerated and/or ruptured, allowing other bodily fluids, including stomach and intestinal contents, to escape into the internal cavity and mix with blood. In order to gain a fuller picture of the victim's toxicological state, a second body fluid is typically sampled: the vitreous humor. When substances like alcohol are consumed, they first enter the blood stream. As blood flows through the body, they pass into other organ tissues, including the vitreous humor in the eye. Consequently, although there is typically a one to two hour delay in the levels found in vitreous fluid, this second type of sample is a good way to validate the blood alcohol content. In this crash, vitreous humor samples showed an ethanol level of .01% for the front seat passenger (BAC of .10%), and a .05% level for the passenger with a BAC of .22%. The passenger with the .56% BAC had a .08% level of ethanol in her vitreous humor. These are significant differences. It appears that their severe crushing injuries resulted in alcohol from their stomach contents mixing with the blood that was ultimately drawn for the toxicology tests. While it is appropriate to conclude that these young women had been drinking before the crash, the level of intoxication is not as high as it might first appear. Additionally, it is possible that the rear seat passengers may have begun to drink more heavily closer to the time of the crash and some of the alcohol had not passed from their stomachs into the bloodstream. This appears to be the case for the driver. Her BAC, which is not as likely to be contaminated since the sample was drawn during autopsy, was .14%. The vitreous humor sample showed a level of .08%, indicating that the ethanol in her blood was still being distributed throughout her system. Such information can be helpful to law enforcement officers investigating crashes, both for gaining a fuller understanding of the timing of pre-crash events, as well as ensuring a proper interpretation of the evidence upon which they base their conclusions.

The presence of alcohol and marijuana was a concern immediately to the investigating trooper, since the Cabrio occupants were underage for drinking and possession of marijuana is illegal. As the investigation developed, the behavior of these young women became an even greater issue. When trying to notify the victim's families about the crash, State Police officers discovered that the driver carried her older sister's driver's license and the surviving passenger carried her older sister's identification card. The young women's intent was to use the false identification to enter nightclubs illegally and continue partying.

Each year during the high school prom and graduation season, the media, school personnel and many parents work hard to warn students about the dangers of drinking and driving and try to prevent irresponsible behaviors. In addition to the educational component, they plan after-prom and post graduation parties where students can celebrate without exposing themselves and others to danger. However, there is little solid research on the effectiveness of youth programs aimed at deterring underage drinking and driving. For those that have been evaluated, the effects have not been consistent (Hedlund, Ulmer & Preusser, 2001).

While many students take advantage of these activities, others persist in repeating the treacherous pattern of high risk behaviors. The Virginia Department of Alcoholic Beverage Control (ABC) employs enforcement projects and deterrent training to combat the sale of alcohol to underage individuals. Local and state law enforcement agencies also focus efforts on curtailing youth's alcohol consumption and driving under the influence through educational and enforcement campaigns. Additionally, some judges in the Commonwealth have begun taking a more stern approach to violation of underage drinking laws by imposing sentences requiring community service and, in some cases, jail time. However, those who participate in underage drinking still have little difficulty in acquiring alcoholic beverages and continue to flaunt the law. Fatal crashes involving these youthful drivers persist.

Although many parents take an active role in trying to influence responsible behavior, others approach the situation almost fatalistically. The grandfather of one of the passengers who died in this crash was interviewed on television and said: "How many times does this happen? It happens every year. Every year, it happens. It just happened to us this year. Every parent worries about it." His comments present a view that there are no causes to such tragedies and, consequently, nothing that can be done to prevent them. He stated: "It could have happened to anyone. You don't have to be drunk to make a mistake on the highway." He also stated that he wasn't angry with the driver, because she had died as well. This attitude of resigned acceptance,

which is not unique to this one individual, implies that nothing can or will ever change, and that nothing can really be done to change that pattern. Tragically, this type of expectancy too often becomes a self-fulfilling prophecy.

Similar to other recent VMCIT investigations (*Report Number 200: Five Fatality Alcohol-Related Collision, Report Number 202: Triple Fatality Head-On Collision*), the young people involved in this crash exhibited high risk behaviors. A history of underage alcohol use and multiple speeding violations on the part of the driver, coupled with current alcohol and drug use, are clear indicators that she held little regard for the laws of the Commonwealth. Despite the fact that she had experienced three license suspensions, and that an additional conviction for driving under the influence would have resulted in a possible jail sentence and revocation of her license, this young woman had not altered her behavior with regard to drinking and driving. Her behavior mirrors the trend for increased rates of drinking while under the influence of alcohol among 18 to 20 year olds, which coincides with decreasing levels of disapproval by young people towards underage drinking and binge drinking (Newes-Adeyi, Chen, Williams & Faden, 2005).

In the past, such high risk activities were associated more with male drivers, and females were considered more responsible drivers. Unfortunately, that gender difference may be disappearing. With the media attention lavished upon “bad girl” celebrities such as Paris Hilton, Britney Spears and Lindsey Lohan, high risk and self-destructive lifestyles have become glamorous and exciting for young women. Surveys conducted for the Centers for Disease Control (CDC, 2005) revealed that female high school students were just as likely as male students to have consumed alcohol in the past 30 days. While only 23% of female high school students reported cigarette use during the previous month, 42.8% indicated that they had at least one alcoholic drink during the same time period. Trend research published in 2005 by the National Institute on Alcohol Abuse and Alcoholism showed that rates of binge drinking, defined as consuming 5 or more drinks in a row in the past 30 days (or in some studies, over the past 2 weeks), have been increasing for girls to a greater extent than for boys (Newes-Adeyi et al., 2005).

In the CDC survey, over 29% of the high school girls reported riding with a driver who had been drinking alcohol. Like the three teenaged passengers in this crash, they place themselves at risk. The widespread use of alcohol by teens, combined with greater acceptance for underage alcohol use and diminished perception of risk, are factors in the continuing loss of

young lives to alcohol-related motor vehicle crashes. Such crashes are not causeless—they are the result of cultural attitudes and peer influence encouraging poor judgment, leading to tragedy. While parents, grandparents, teachers, mentors and role models do not have the power to individually change cultural attitudes, they do have the ability to stress individual responsibility and teach skills for negating the persuasive influence of peer pressure (see *Technical Alert Number 15: Peer Pressure & Drift Racing*). Then perhaps, another fatal teen crash won't "just happen" because the driver had been drinking.

RECOMMENDATIONS

1. Driving while under the influence of alcohol and/or drugs continues to be a significant contributing factor in motor vehicle crashes. Ultimately, the choice to drive while impaired is made by a driver, and ways to influence better decision making should be explored by educators, psychologists, the Department of Motor Vehicles (DMV), Virginia State Police (VSP), legislators and the courts. While punitive measures may work for some segments of the population, these may not be effective approaches for younger drivers and/or those who thrive on sensation-seeking. Measures that would decrease the perceived benefits of substance abuse and risky behaviors should be considered and researched, including examining the effectiveness of anti-smoking campaigns aimed at teens.
2. Potential passengers in motor vehicles must actively assess the condition of a driver and make responsible choices with regard to (a) getting into a vehicle with an impaired driver and (b) allowing an impaired driver to get behind the wheel of any vehicle. The DMV, public information officials and educators should consider ways to promote passengers taking a more active role in ensuring their own safety and that of other passengers, as well as their drivers.
3. Parents of adolescent and dependent children, even if the dependents are not living at home and are over 18, should continue to take an active role with supervision of driving-related activities, especially if the dependent is known to drive irresponsibly. Often, young adults are given great independence with little perceived responsibility, which may increase their propensity to take risks. Requiring responsible driving behavior (i.e., no driving violations, taking appropriate care of the motor vehicle, etc.) and tying non-compliance with consequences (not allowing a student to take a vehicle to school, for example) may be less convenient for a parent, but may provide a real world lesson that could ultimately reduce their children's risk exposure (and their own liability).

4. The Virginia Department of Health and the Department of Education should continue to seek ways to educate the public with regard to detection and treatment of substance abuse and other addictions. In addition to messages aimed at adults, the issue of alcohol and substance abuse by teens and young adults should continue to be addressed, including ways to educate parents and friends.

5. The acquisition and consumption of alcohol by underage individuals remains a serious problem in Virginia. The Department of Alcoholic Beverage Control (ABC), VSP and local law enforcement agencies should continue to use education and enforcement of underage drinking laws to discourage this practice. ABC currently offers programs to train sellers and servers to better screen their customers before selling them alcohol. Training and/or certification could reduce the number of sales to underage patrons by educating those who sell and serve alcohol to recognize fake or suspicious identification cards. Twenty-eight of the 50 states have mandatory training/certification requirements such as the TIPS (Training for Intervention Procedures) program. In Virginia, ABC offers this type of training through their Responsible Sellers and Servers (RSVP): Virginia Program. Some companies send their employees through the RSVP program to satisfy training requirements of their liability insurers; however, the training is not mandatory by law and it is not required by all insurers. ABC should consider working with liability insurers, to encourage them to either require or provide incentives for their client companies to train employees in this important area.

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