

SEIZING THE WHEEL: THE NEED FOR UNIFORMITY IN STATE DRIVING BANS FOR PEOPLE WITH EPILEPSY

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* Staff Editor, Mississippi Law Journal; J.D. Candidate Dec. 2021, University of Mississippi School of Law. I dedicate this Comment to my mother for accompanying me to every doctor’s visit, hiding her fears and tears to make me feel better, and for caring more than I will ever know. I thank Professors Patricia Krueger and Matthew Hall for their unrelenting guidance and support. Finally, I thank my family for their unabated encouragement and my English teacher E.C. Chisholm for pushing me to limits I never imagined achievable. All errors and omissions remain mine alone.

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INTRODUCTION

I was a junior in college when I had my first seizure. The morning started like every other—I woke up, showered, got dressed, sat on my bed to put on my tennis shoes, and then everything went blank. I woke up nearly two hours later. I couldn't move my right arm and the blood vessels in my eyes and face had burst. I was alone in my dorm room the entire time, so there was no way for me to know exactly what had happened. That feeling of uncertainty has not truly left me in the four years since that day.

After three days, two hospitals in two states, and half a dozen doctors, I was told that I had a seizure. Confusion and anxiety engulfed me. I do not have a family history of seizures, and at that time, I did not know anyone who had ever had a seizure. I imagined every seizure was some traumatic event like you would see on television where a person falls to the floor, loses consciousness, and flails about trying not to swallow their tongue. As soon as I was diagnosed, I was prescribed a handful of colorful pills and lectured with new, bewildering terminology explaining my "new" life.

When my doctor told me that I could not drive for a year, I was devastated. Driving around and singing at the top of my lungs had become a beloved pastime that I was not ready to give up. I did not want to imagine the effect this would have on actually important aspects of my life such as getting to class, buying groceries, or seeing my family. I had been driving for five years with a perfect record. I'd never had a crash or gotten a ticket—I had never even been pulled over. Two days before the seizure I had driven a twelve-passenger van full of rambunctious summer camp students three hours to-and-from a field trip and then, all of a sudden, my keys were taken away like I was a grounded teenager.

I struggled adapting to life without the freedom to drive. When I was on campus, life was easier. I was able to walk most places or catch the local bus to get around town. Life was harder, but doable. I found going home to be the most difficult adjustment. I am from the rural Mississippi Delta where flat, country roads are abundant and public transit is nothing but a pipe dream. Initially, my fear of having another seizure surmounted my desire to drive. However, as the weeks and months passed with no means to go anywhere without aid and no new seizures to account for, my confidence and defiance grew. I was desperately waiting for a year without seizures so that I would, once again, be a legal driver.

That twelve-month mark was one of the only things I remembered my doctor in Memphis telling me before I was discharged. I held onto that piece of information with all of my hope. About four months after leaving the Memphis hospital, I found a local neurologist in Mississippi. Since I was a new patient, she went through a lot of the same intake questions and disclosures. I thought I may have misheard her when she told me that I only had to be seizure-free for six months before I could legally drive again. This was *half* of what the neurologist in Memphis told me. I was confused, but ecstatic. Neither the Memphis doctor nor the Mississippi doctor were wrong, they were simply telling me the laws as they applied to drivers in their state. I quickly learned that no state is the same and many differ more so than others.

Despite superb medical care, dozens of tests and scans, and thousands of milligrams of medication each day over the past four years, I have yet to be seizure-free for six consecutive months. However, in that same timespan, I have never lost consciousness. I have never lost awareness. My seizures, which occur only a handful of times each month, typically materialize during my sleep. Any seizures I have while awake typically leave me with feelings of déjà vu or a strange feeling in my stomach and may only slightly affect my sense of hearing. Although I am aware that a seizure is happening, I have always been able to continue doing whatever I was prior to the seizure's onset—speaking, taking notes during lecture, running on the treadmill, etc. Nonetheless, Mississippi law treats these seizures identical to more serious,

compromising seizures where a person loses consciousness with little or no warning.

Mississippi has no exceptions to allow consideration for the types of seizures a person has. Because of this, it is unlikely that I will ever satisfy Mississippi's six-month seizure-free period. Mississippi is not alone—thirteen other states do not have exceptions for people with epilepsy. Nearly half of states leave open the possibility for exceptions without making any explicit mention as to what could constitute an exception. These states typically allow case-by-case appeals to medical advisory boards or commissions. Alternatively, a dozen states explicitly mention at least one exception to their state's seizure-free period, mostly concerning the types or severity of the person's seizures.

No state treats this issue exactly the same, making it quite difficult for people with epilepsy. If I were to drive from North Dakota to Oklahoma, I would start my journey definitively illegal and maintain that status until entering Nebraska. Upon entering the Cornhusker State, my legal status would be uncertain—a physician's examination and a case hearing by the state would need to rule in my favor. Alternatively, Kansas and Oklahoma would seemingly welcome me with open arms as their statutes explicitly list my types of seizures as exceptions to their seizure-free periods. It is striking how a person could be legal, potentially legal, and definitively illegal all within a few hours of driving across a handful of states.

Although my story may sound a bit interesting, I am not unique. My seizures resemble those of a plethora of other people scattered throughout this country. Some of these people are lucky—learning how to live with recurrent seizures, although difficult, is one of the only burdens they must face. However, the majority, myself included, are forced to adapt to a world in which a major form of freedom and independence is effectively unattainable. Our state driving laws may have been written with good intentions, but a disproportionate number of people are adversely affected by their lack of consideration.

Presented herein is an analysis of the types of seizures that offer themselves as reasonable exceptions to the current state epilepsy-related driving restrictions. Part I identifies the defining qualities of epilepsy, the classifications of seizures, and how

different types of seizures affect a person. Part II summarizes the epilepsy-related driving laws for each state and the District of Columbia, including seizure-free periods and exceptions, mandated reporting, and physician immunity. Part III compares the risks associated with driving for people with epilepsy to other groups of drivers and discusses the inaccurate stigma that people with epilepsy have a much greater risk of causing a car accident. Part IV examines three types of seizures that allow the greatest opportunity for safe seizure-free period exceptions. Part V proffers innovative technology that may allow for more accurate detection of driving risk among individuals with epilepsy. Part VI suggests uniform laws across all states requiring physicians to examine driving aptitude and risk on a case-by-case basis rather than treating all seizures as equal. Part VII discusses the confusion of current laws among patients and physicians and suggests improvements that may better care for the patients. Finally, Part VIII offers a proposal to reform the current epilepsy-related driving restrictions.

I. WHAT IS EPILEPSY?

Most people are unable to differentiate between epilepsy and seizures, and some may even think that they are synonymous; however, a seizure is an “event” and epilepsy refers to the disease involving recurring, unprovoked seizure “events.”¹ “Epilepsy is a disease characterized by an enduring predisposition to generate epileptic seizures and by the neurobiological, cognitive, psychological, and social consequences of this condition.”² A more commonly used definition characterizes someone with having epilepsy if they have had two unprovoked seizures more than twenty-four hours apart.³ Neither of these definitions discriminate based on the *type* of seizure.

¹ Robert S. Fisher et al., *A Practical Clinical Definition of Epilepsy*, 55 *EPILEPSIA* 475, 476 (2014).

² Robert Fisher, *A Revised Definition of Epilepsy*, *EPILEPSY FOUND.* (Apr. 15, 2014), <https://www.epilepsy.com/article/2014/4/revised-definition-epilepsy> [<https://perma.cc/A7EJ-G572>]; *see also* Ettore Beghi, *The Epidemiology of Epilepsy*, 54 *NEUROEPIDEMIOLOGY* 185, 185 (2019).

³ *See* Beghi, *supra* note 2, at 186; Fisher, *supra* note 1, at 476; Fisher, *supra* note 2.

When envisioning a seizure, most people think of what is now called a tonic-clonic seizure—stiffening of the muscles and convulsing of the body.⁴ This is the same perspective that has been associated with epilepsy for most of its history.⁵ Many people would be surprised to learn that the most common seizures are so mild that they are often difficult to notice, even for the person experiencing the seizure.⁶ “It was not until the latter half of the twentieth century when clinicians successfully identified and characterized seizures occurring in forms different from the traditional tonic-clonic symptoms.”⁷ The International League Against Epilepsy (“ILAE”) currently classifies seizures among one of two major groups: focal seizures and generalized seizures.⁸

The difference between these two groups of seizures is how and where in the brain they begin.⁹ Generalized seizures simultaneously affect both sides of the brain whereas focal seizures manifest in a localized region of the brain.¹⁰ Awareness or consciousness is almost always impaired with generalized seizures—typical symptoms include sustained rhythmical jerking movements, muscle rigidity and/or twitching, and staring spells.¹¹ Focal seizures may also impair awareness and include similar motor symptoms as generalized seizures; however, many focal seizures do not affect movement or cognizance.¹² Rather, many

⁴ See Richard Barnett, *Case Histories: Epilepsy*, 389 LANCET 1971, 1971 (2017).

⁵ See *id.* (noting the historic association of epilepsy with “possession, prophecy, and mystery” and the evolution of the public and clinical views of the disease).

⁶ See, e.g., *Types of Epilepsy & Seizure Disorders in Adults*, NYU LANGONE HEALTH, <https://nyulangone.org/conditions/epilepsy-seizure-disorders-in-adults/types> [<https://perma.cc/FT24-GGD8>] (last visited Dec. 17, 2020).

⁷ Barnett, *supra* note 4, at 1971 (“For most of its history epilepsy referred to what would now be called grand mal seizures, but in the 20th century clinicians identified a host of other forms. Using electric probes to stimulate the cortex, the American-Canadian neurosurgeon Wilder Penfield showed that epileptic hallucinations and absences originated in the temporal lobes, and from the 1950s neurologists noted a connection between temporal lobe epilepsy and gradual personality changes.”).

⁸ Elaine Kiriakopoulos & Patty Osborne Shafer, *Types of Seizures*, EPILEPSY FOUND. (Mar. 2017), <https://www.epilepsy.com/learn/types-seizures> [<https://perma.cc/9BKQ-XE3M>] (describing the 2017 ILAE classification system and the typical symptoms associated with each seizure category).

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Id.* (noting the differences between motor symptoms and non-motor symptoms for generalized onset seizures).

¹² See *id.*

individuals retain awareness during a focal seizure and may only experience minor sensational symptoms.¹³

II. CURRENT DRIVING LAWS FOR PEOPLE WITH EPILEPSY

One in twenty-six people in the United States will develop epilepsy in their lifetime.¹⁴ Approximately 3.4 million people in the United States live with epilepsy and over 150,000 new cases are reported each year.¹⁵ For many of these people, the ability to drive a motor vehicle is a major concern.¹⁶ In rural and suburban areas, driving is often an essential element for self-independence, social interaction, and employment.¹⁷ However, for people with epilepsy, driving safely and legally is easier said than done.

Every state in the United States requires a “seizure-free period” before a person can get behind the wheel.¹⁸ These laws were intended to protect the public from potentially deadly motor vehicle accidents, and a few states now base their driving laws on

¹³ *Id.* (“Examples of symptoms that don’t affect movement could be changes in sensation, emotions, thinking or cognition, autonomic functions (such as gastrointestinal sensations, waves of heat or cold, goosebumps, heart racing, etc.), or lack of movement (called behavior arrest).”).

¹⁴ Patty Osborne Shafer, *About Epilepsy: The Basics*, EPILEPSY FOUND. (Dec. 2013), <https://www.epilepsy.com/learn/about-epilepsy-basics> [<https://perma.cc/GL8H-VY7F>].

¹⁵ Approximately 65 million people around the world live with epilepsy. *Id.* One-third of people with epilepsy currently live with uncontrollable seizures because existing medications do not adequately manage their seizures. *Id.* Additionally, 60% of people with epilepsy do not know the cause of their seizures. *Id.*

¹⁶ See Alexander M. Crizzle et al., *Associations Between Clinical Tests and Simulated Driving Performance in Persons with Epilepsy*, 23 EPILEPSY & BEHAV. 241, 241 (2012) (citing Frank Gilliam et al., *Patient-Validated Content of Epilepsy-Specific Quality-of-Life Measurement*, 38 EPILEPSIA 233, 233-36 (1997)).

¹⁷ Even in urban areas where it may be easier to maintain some social contacts, many people need to drive either to get back and forth to work or perhaps as part of their employment. See Jeffrey T. Berger et al., *Reporting by Physicians of Impaired Drivers and Potentially Impaired Drivers*, 15 J. GEN. INTERNAL MED. 667, 667 (2000) (“These losses have profound implications for many patients in terms of emotional and physical well-being, quality of life, and evaluation of self-worth.”). See also Crizzle, *supra* note 16, at 241; Allan Krumholz, *Driving Issues in Epilepsy: Past, Present, and Future*, 9 EPILEPSY CURRENTS 31, 31 (2009).

¹⁸ The seizure-free period varies from state-to-state and a few states do not require a specific time period but instead rely on a physician’s recommendation before setting the seizure-free period on a case-by-case basis. James W. Wheless, et al., *Driving and Transportation*, EPILEPSY FOUND. (Sept. 2013), <https://www.epilepsy.com/living-epilepsy/driving-and-transportation> [<https://perma.cc/ZS4L-B9TZ>].

actual data regarding risks for people with epilepsy.¹⁹ However, driving laws differ drastically from state to state. Seizure-free periods vary anywhere from three months to over one year in some states.²⁰ Some states require physicians to report a seizure to the state DMV, some require periodic medical updates directly from the individual, and several states do not require any reports whatsoever.²¹ Additionally, many states are split in their opinion to grant civil or criminal immunity to physicians making recommendations regarding driving privileges.²²

Although there are many differences among these laws, there is one factor that is consistent among every state: the word “seizure.” Despite some states allowing for exceptions dependent on the seizure symptoms, the majority of states have laws that, in essence, treat every seizure the same.²³

III. COMPARATIVE RISKS

It is apparent that many states are hesitant to reduce restrictions for individuals with epilepsy in an effort to mitigate the risk of serious car crashes. Indeed, many studies have produced data supporting the stigmatic notion that people with epilepsy have a greater chance of causing a car crash.²⁴ However, these studies did not examine if a seizure was the *cause* of the accident but instead included crashes caused by anything.²⁵ In actuality, only 11% of car crashes among people with epilepsy are caused by seizures—most are caused by driver error, as is the case for the majority of car crashes within the general population.²⁶ Taking into consideration the difficulty to causally link specific motor vehicle accidents to seizure occurrence while driving, many

¹⁹ *Id.* (explaining that a few states now base their driving laws on actual data regarding risks for people with epilepsy which has resulted in fewer restrictions in those states).

²⁰ *Id.*

²¹ *See id.*

²² *See id.* (discussing civil immunity).

²³ *See infra* tbl. 1 (listing state seizure-free periods and exceptions).

²⁴ *See* Krumholz, *supra* note 17, at 31.

²⁵ *See id.*

²⁶ *Id.*

studies have found that people with epilepsy are not at an increased risk for accidents compared to the general population.²⁷

A. Alcohol Use

Most studies confirm that epilepsy is cause for some concern behind the wheel, but that risk pales in comparison to car accidents caused by alcohol use.²⁸ The comparison between accidents caused by alcohol and accidents caused by seizures are considerably different. In one study, the rate for fatal seizure-related crashes among individuals with epilepsy was 8.6 per 100,000, whereas driver fatalities associated with alcohol use was 72.4 per 100,000.²⁹ The same study determined the total number of deaths due to alcohol-related fatal crashes to be 156 times greater than deaths associated with seizures.³⁰

B. Drowsy Driving

Driving with excessive sleepiness or fatigue, also referred to as “drowsy driving,” is often an inconspicuous cause of motor vehicle accidents.³¹ Drowsy driving usually stems from a driver not getting enough sleep; however, it can also happen due to

²⁷ See William C. Chen et al., *Epilepsy and Driving: Potential Impact of Transient Impaired Consciousness*, 30 EPILEPSY & BEHAV. 50, 50 (2014); Sherrilene Classen et al., *Evidence-Based Review on Epilepsy and Driving*, 23 EPILEPSY & BEHAV. 103, 104 (2012) (stating that the rate of fatal seizure-related crashes among people with epilepsy is 8.6 per 100,000); W.O. Tatum et al., *Disobedience and Driving in Patients with Epilepsy*, 23 EPILEPSY & BEHAV. 30, 30 (2012) (“More than 44,000 motor vehicle accidents (MVAs) resulting in fatality occur in the United States annually; only 0.2% are caused by seizures that occur while driving, making their occurrence relatively rare.”).

²⁸ See Krumholz, *supra* note 17, at 31 (noting the risk for drivers with epilepsy “seems limited and relatively small, particularly compared with alcohol For instance, one study estimated that the percentage of fatal driver crashes caused by a seizure is only 0.2% as compared with 30% caused by alcohol.”).

²⁹ Soham G. Sheth et al., *Mortality in Epilepsy: Driving Fatalities vs Other Causes of Death in Patients with Epilepsy*, 63 NEUROLOGY 1002, 1003 (2004).

³⁰ *Id.* (“The total number of deaths due to alcohol-related fatal crashes is 6.6 times greater than the number of fatal crashes associated with medical conditions and 156 times greater [than] those associated with seizures.”).

³¹ See J.M. Owens et al., *Prevalence of Drowsy-Driving Crashes: Estimates from a Large-Scale Naturalistic Driving Study*, AAA FOUND. FOR TRAFFIC SAFETY 1 (Feb. 2018), https://aaafoundation.org/wp-content/uploads/2018/02/FINAL_AAFTS-Drowsy-Driving-Research-Brief-1.pdf [<https://perma.cc/7S2S-S4ZH>].

untreated sleep disorders, medication side effects, drinking alcohol, or working late or overnight hours.³² Sleep deprivation has been shown to impair cognitive abilities in “the same way as drinking too much alcohol,” potentially contributing to drowsy driving crashes.³³ In 2017, the National Highway Traffic Safety Administration reported 91,000 crashes involved drowsy drivers, including an estimated “50,000 people injured and nearly 800 deaths.”³⁴ However, these estimates are conservative as it is almost impossible to accurately determine drowsiness as a contributing cause of a motor vehicle crash. This is due, in part, to the lack of testing for drowsiness available to law enforcement to administer at the site of a crash, similar to using a breathalyzer to determine blood alcohol content.³⁵ Additionally, many drivers who may have been drowsy prior to a crash may subsequently appear fully alert or may be reluctant to admit their fatigue or sleep deprivation to law enforcement.³⁶

C. Other Medical Conditions and Classes of Drivers

When compared to other medical conditions, driving with epilepsy carries less risk of causing an accident.³⁷ Fatalities caused by driving with epilepsy only represent approximately 4% of all medically related crashes.³⁸ Contrary to popular belief,

³² *Drowsy Driving*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/sleep/about_sleep/drowsy_driving.html [<https://perma.cc/E3WH-2MXT>] (last updated Mar. 21, 2017).

³³ *Id.* (footnotes omitted) (“Studies have shown that going too long without sleep can impair your ability to drive the same way as drinking too much alcohol. Being awake for at least 18 hours is the same as someone having a blood content (BAC) of 0.05%. Being awake for at least 24 hours is equal to having a blood alcohol content of 0.10%. This is higher than the legal limit (0.08% BAC) in all states. Additionally, drowsiness increases the effect of even low amounts of alcohol.”).

³⁴ *Drowsy Driving*, NHTSA, <https://www.nhtsa.gov/risky-driving/drowsy-driving> [<https://perma.cc/Q54A-2FBJ>] (last visited Dec. 17, 2020).

³⁵ See Owens, *supra* note 31, at 4 (“[T]here is no test analogous to a breathalyzer that the police can administer at the roadside to assess a driver’s level of drowsiness at or shortly after the time of a crash.”).

³⁶ See *id.*

³⁷ See Classen, *supra* note 27, at 111; Krumholz, *supra* note 17, at 31-32; Sheth, *supra* note 29, at 1002.

³⁸ Joseph Drazkowski, *An Overview of Epilepsy and Driving*, 48 EPILEPSIA 10, 11 (2007) (citation omitted) (“The fatalities associated with epilepsy and driving represent

epilepsy is associated with significantly less risk behind the wheel than other medical conditions such as heart disease and diabetes, both of which go entirely unrestricted in some states.³⁹ This is cause for concern because there are considerably more people in the country with heart disease or diabetes than there are people with epilepsy.⁴⁰ Despite this extreme disparity, those medical conditions go almost unrestricted throughout the country, while epilepsy is restricted to some degree in every state.⁴¹ Furthermore, people with epilepsy are less likely to be involved in a car crash than young drivers in perfect health.⁴²

There will always be risk involved for people with epilepsy when they are driving, even if they have been cleared by a doctor or meet state exceptions. Nonetheless, there is risk for every single person on the road. Currently, many states appear to

about 4.2% of all medically related crashes”); *see also* Classen, *supra* note 28, at 111.

³⁹ *See* Am. Diabetes Ass’n, *Diabetes and Driving*, 37 *DIABETES CARE* 597, 597-5102 (2014) (describing the licensing requirements and processes observed by states, examining the risk of driving with diabetes, and recommending procedures for how states should evaluate and license drivers with diabetes); Krumholz, *supra* note 17, at 31-32; Robert Bonow, *Are There State Restrictions On Driving After a Heart Attack?*, *ABC NEWS* (Dec. 26, 2008, 11:53 AM), <https://abcnews.com/Health/HeartDiseaseLivingWith/story?id=4228006> [<https://perma.cc/ER59-PSJC>] (“[I]n most circumstances, there’s not major restrictions if you’re not severely ill. So most patients after a heart attack who return to full functional capacity, they’re out there driving again without any limitation at all.”).

⁴⁰ There are 121.5 million people in the United States with heart disease, as of 2016. *Cardiovascular Diseases Affect Nearly Half of American Adults, Statistics Show*, *AM. HEART ASS’N NEWS* (Jan. 31, 2019), <https://www.heart.org/en/news/2019/01/31/cardiovascular-diseases-affect-nearly-half-of-american-adults-statistics-show> [<https://perma.cc/7YYN-R3RG>]. 34.2 million people live with diabetes and an additional 88 million have prediabetes. *National Diabetes Statistics Report 2020: Estimates of Diabetes and Its Burden in the United States*, *CTRS. FOR DISEASE CONTROL & PREVENTION* 2, 8 (2020), <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf> [<https://perma.cc/FS35-CGHE>]. There are only 3.4 million people in the United States with epilepsy. *Epilepsy Fast Facts*, *CTRS. FOR DISEASE CONTROL & PREVENTION*, <https://www.cdc.gov/epilepsy/about/fast-facts.htm> [<https://perma.cc/9AVX-PPAW>] (last visited Sept. 30, 2020).

⁴¹ This may result from the stereotypes associated with epilepsy. The general view of a “seizure” triggers only the thought of a tonic-clonic seizure where the individual loses consciousness. Neither heart disease nor diabetes carry a similar stigma.

⁴² *See* Classen, *supra* note 27, at 104; Sheth, *supra* note 29, at 1003 (“Rates for fatal seizure-related crashes among patients with epilepsy (8.6 per 100,000) were lower than the rates for . . . young drivers (16 to 24 years) (28.08 per 100,000).”).

champion their statutes and oppose any changes, citing excessive risk associated with people with epilepsy. Many states are not aware that the risk is less than people with heart disease or diabetes, less than healthy drivers under the age of twenty-five, and significantly less than people who drink alcohol. State legislators must educate themselves—knowing that seizures look, feel, and affect people differently is crucial to appropriately legislate this issue.⁴³

IV. “SAFER” SEIZURES

Epilepsy varies from person to person.⁴⁴ The symptoms, severity, frequency, and onset location of the seizure can be drastically different from one person to the next, making it difficult for one to accurately and confidently gauge an individual’s risk behind the wheel. While both generalized seizures and focal seizures can affect a person’s awareness, many seizures have a negligible impact on a person physically or mentally and may allow a person to drive safely.

Several states currently have exceptions to their seizure-free periods that may exempt certain types of seizures or allow a case to be considered by their respective medical advisory boards.⁴⁵ The following types of seizures do not put a person at a significant risk behind the wheel and provide states the best opportunities to loosen driving restrictions among people with epilepsy.

⁴³ For people with epilepsy causing car crashes, their typical types of seizures influence the type of crash. Andrew Neal et al., *Characteristics of Motor Vehicle Crashes Associated with Seizure*, 91 NEUROLOGY e1102, e1106 (2018) (finding that accidents involving drivers with generalized epilepsy most commonly involved the vehicle going “out of control” before the collision, while those involving drivers with focal epilepsy most commonly involved the vehicle “going straight ahead” before the collision).

⁴⁴ See *Epilepsy Facts and Myths*, EPILEPSY SOC’Y, <https://epilepsysociety.org.uk/about-epilepsy/what-epilepsy/epilepsy-facts-and-myths> (last updated Jan. 2021).

⁴⁵ Several states allow opinions from medical advisory boards. For example, the Department of Public Safety (DPS) of the State of Texas may “request[] an opinion or recommendation from the medical advisory board as to the ability of an applicant or license holder to operate a motor vehicle safely.” TEX. HEALTH & SAFETY CODE ANN. § 12.095(a) (West 2019). If the DPS makes a request, “the commissioner shall convene a panel to consider the case or question submitted by that department.” *Id.*

A. Focal Onset Aware Seizures

A focal onset seizure begins in one side of the brain and is relatively brief, lasting anywhere from a few seconds to less than two minutes.⁴⁶ In instances where the person experiencing these seizures remains alert and is able to interact, the seizures are called focal aware seizures (“FAS”).⁴⁷ FAS may appear differently among individuals with epilepsy depending on the location in the brain where they begin⁴⁸ and many people find it quite difficult to describe the strange feelings experienced.⁴⁹ Common symptoms include, but are not limited to: déjà vu, unusual smells or tastes, rising feelings in the stomach, sudden feelings of anxiety, stiffness or twitching, numbness, and tingling.⁵⁰ Focal seizures are the most common type of seizures in patients with epilepsy.⁵¹

There is little risk associated with FAS. A small number of people experiencing FAS may appear “frozen” during the brief seizure and “may not be able to respond to others;” however, the vast majority “are fully awake, alert, and able to recall events occurring during the seizure.”⁵² When the seizures are over, the person is usually able to continue doing whatever they were prior to the seizure.⁵³

Considering the brief nature and low risk associated with FAS, these seizures, alone, should not be used to restrict a person from driving. Currently, forty-seven states do not distinguish FAS from the more inhibiting seizures such as generalized, tonic-clonic

⁴⁶ See Kiriakopoulos & Shafer, *supra* note 8.

⁴⁷ *Id.* Note: All references to the outdated terminology “simple partial seizures” will hereto be altered to “focal aware seizures.”

⁴⁸ See *id.*

⁴⁹ *Focal Aware Seizures*, EPILEPSY SOC’Y (Sept. 2018), <https://epilepsysociety.org.uk/focal-aware-seizures>.

⁵⁰ See *id.*; see also Kiriakopoulos & Shaffer, *supra* note 8.

⁵¹ Anil Kumar et al., *Simple Partial Seizure*, NAT’L CTR. BIOTECH. INFO., <https://www.ncbi.nlm.nih.gov/books/NBK430685/> [https://perma.cc/TWW2-VVPN] (StatPearls, last updated Nov. 19, 2020).

⁵² Elaine Kiriakopoulos & Patty Osborne Shafer, *Focal Onset Aware Seizures (Simple Partial Seizures)*, EPILEPSY FOUND. (Mar. 2017), <https://www.epilepsy.com/learn/types-seizures/focal-onset-aware-seizures-aka-simple-partial-seizures> [https://perma.cc/SUM6-Y52H].

⁵³ *Id.*

seizures.⁵⁴ Additionally, many do not utilize medical advisory boards or physician recommendations to consider taking a patient's history of FAS into account when applying for or renewing a license to drive.⁵⁵

Maryland and Utah have enacted statutes that include explicit language pertaining to FAS, giving their medical advisory boards more freedom to rule in favor of drivers with FAS.⁵⁶ Kansas is the most vocal advocate for people with FAS. Kansas's Division of Vehicles is not ambiguous in its support for FAS unlike the states that defer any ruling to their medical advisory boards. Instead, the State allows exceptions to the its six-month seizure-free period including when a "seizure was very minor, such as tingling in the hand, or the seizures manifest themselves in odd sensations that do not interfere with attention."⁵⁷ This language does not explicitly state "focal aware seizures," however, it includes language that is, by definition, a focal aware seizure.⁵⁸

⁵⁴ Kansas, Maryland, and Utah are the only states with explicit seizure-free period exceptions for focal aware seizures. See *State Driving Laws Database*, EPILEPSY FOUND., <https://www.epilepsy.com/driving-laws> [<https://perma.cc/LR6K-HEYM>] (last visited Dec. 18, 2020). See also *infra* tbl. 1.

⁵⁵ See *State Driving Laws Database*, *supra* note 54; *infra* tbl. 1.

⁵⁶ See MD. CODE REGS. 11.17.03.04(E)(2)(e)(i)-(v) (2021) ("Favorable modifiers include: Seizures during medically directed medication changes; Simple partial seizures that do not interfere with consciousness or motor control; Seizures with consistent and prolonged auras; Established pattern of pure nocturnal seizures; and Favorable driving record."); UTAH ADMIN. CODE r. 708-7-10(2)(e) (2020) (referencing the standards and guidelines for physicians to follow that are specifically published on the state's Driver License Division webpage). See also UTAH DEP'T PUB. SAFETY DRIVER LICENSE DIV. MED. ADVISORY BOARD, FUNCTIONAL ABILITY IN DRIVING: GUIDELINES AND STANDARDS FOR HEALTH CARE PROFESSIONALS 35 (2015), <https://le.utah.gov/interim/2017/pdf/00002735.pdf> [<https://perma.cc/P32A-MZ9K>] ("Seizures (simple partial) never producing an impairment in consciousness or alertness or any loss of ability to control equipment" may be considered for exemption.).

⁵⁷ *State Driving Laws Database: Kansas*, EPILEPSY FOUND., <https://www.epilepsy.com/driving-laws/2008721> [<https://perma.cc/A858-73XA>] (last visited Dec. 18, 2020) (describing an exception by the Kansas Division of Vehicles). See also KAN. STAT. ANN. § 8-247(e)(6) (West 2021) ("For the purpose of this paragraph, seizure disorders which are controlled means that the licensee has not sustained a seizure involving a loss of consciousness in the waking state within six months preceding the application or renewal of a driver's license . . .").

⁵⁸ "Odd sensations" and "tingling" are typical descriptions of focal aware seizures, although the actual feelings experienced differ depending on the region of the brain where the seizure begins. For example, déjà vu, "rising" feelings in your stomach, and sudden emotional changes are typical for temporal lobe seizures; tingling and

This also allows for the omission of any outliers with FAS.⁵⁹ In these aspects, Kansas is the most inclusive and understanding of people with differing types of epilepsy.

B. Nocturnal Seizures

Approximately 15% of people with epilepsy have “nocturnal” seizures.⁶⁰ These seizures, according to the ILAE, are “seizures occurring exclusively or predominantly (more than 90%) from sleep.”⁶¹ Nocturnal seizures are most common “[r]ight after falling asleep”, “[j]ust before waking up”, or “[s]oon after waking up” and can include any type of seizure—focal or generalized.⁶² Because of this, many nocturnal seizures go unnoticed—often, the only signs are loss of bladder control or biting of the tongue.⁶³

The correlation between someone with nocturnal seizures, having a seizure while awake, and being safe behind the wheel depends almost entirely on the frequency of their seizures.⁶⁴ Studies have shown that the probability of someone with nocturnal seizures having a similar seizure while awake ranges

numbness are more common with frontal or parietal lobe seizures. *See Focal Aware Seizures, supra* note 49.

⁵⁹ The language makes clear that these FAS seizures must not interfere with attention. *See* KAN. STAT. ANN. § 8-247(e)(6) (West 2021). This would exclude the few individuals that “freeze” during a focal aware seizure and are briefly unable to respond to others or people whose seizures quickly evolve into more debilitating seizures. *See* Kiriakopoulos & Shafer, *supra* note 8.

⁶⁰ A “nocturnal seizure” is not a distinct type of seizure acknowledged by the ILAE. Rather, the term is used to distinguish seizures that occur predominately during sleep or just after waking and can include any type of seizure. *See generally* Carl W. Bazil, *Nocturnal Seizures*, 24 SEMINARS IN NEUROLOGY 293 (2004); R.H. Thomas et al., *Awake Seizures After Pure Sleep-Related Epilepsy: A Systematic Review and Implications for Driving Law*, 81 J. NEUROLOGY NEUROSURGERY PSYCHIATRY 130, 130 (2010) (footnotes omitted) (“Depending on the method of case ascertainment, this estimate has varied from 7.5 to 45% of people with epilepsy, with some estimates clustering around 12%.”).

⁶¹ Thomas et al., *supra* note 60, at 130.

⁶² *Nocturnal Seizures*, CEDARS SINAI, <https://www.cedars-sinai.org/health-library/diseases-and-conditions/n/nocturnal-seizures.html> [https://perma.cc/LD8V-7GJ8] (last visited Dec. 18, 2020).

⁶³ *See* Bazil, *supra* note 60, at 297 (noting that some people have reported “difficulty concentrating or even total inability to work” during the day following a nocturnal seizure, almost as if they are stuck in the postictal state of the seizure); CEDARS SINAI, *supra* note 62.

⁶⁴ *See* Thomas et al., *supra* note 60, at 134.

anywhere from 5.7% to 15% with those numbers diminishing each year.⁶⁵

Nocturnal seizures are the most prevalent exception among the epilepsy-related driving restrictions.⁶⁶ The greatest concern with nocturnal seizures is how much the person or physician truly knows about them. Many people with pure sleep-related epilepsy may not know that they have ongoing generalized seizures.⁶⁷ Additionally, a small handful of identified nocturnal seizures may not be enough for a patient or physician to truly know what to expect regarding the individual's seizures.

Before any exception is granted for individuals with nocturnal seizures, the patient needs a well-established seizure history that a medical advisory board and/or physician can evaluate. The United Kingdom, for example, does not allow any decision to be made regarding individuals with nocturnal seizures until three years after the first reported seizure, thus allowing for every party involved to better understand the individual's medical history.⁶⁸ Some states within the United States have similar regulations.

Currently ten states and the District of Columbia have statutes that explicitly address nocturnal seizures.⁶⁹ States such as Arizona and Iowa allow their state DMVs to waive their seizure-free period requirement if a doctor reports a pattern of seizures occurring solely during sleep.⁷⁰ Pennsylvania and Utah include more intricate statutory language allowing for exceptions to the seizure-free period; however, both states require the

⁶⁵ Individuals with nocturnal seizures that have a breakthrough seizure while awake will typically experience a seizure similar to the type that occurs while asleep (i.e., tonic-clonic). See Thomas et al., *supra* note 60, at 133; see also Roberto D'Alessandro et al., *Risk of Seizures During Wakefulness in Patients with Pure Sleep Epilepsy*, 62 NEUROLOGY 204 (2004).

⁶⁶ See *infra* tbl. 1.

⁶⁷ Because many people are not aware that they are prone to nocturnal seizures, many may be driving unaware and unrestricted. See Thomas et al., *supra* note 60, at 130.

⁶⁸ See *id.* at 131.

⁶⁹ See *State Driving Laws Database*, *supra* note 54 (The states are Arizona, Florida, Georgia, Iowa, Kansas, Maryland, Oklahoma, Pennsylvania, Utah, and Wyoming).

⁷⁰ See ARIZ. ADMIN. CODE § 17-4-506(D) (2020); IOWA ADMIN. CODE r. 761-605.4(4)(b) (2020).

individual's seizure history to have been established for one to two years prior to the exception.⁷¹

Nocturnal seizures do not pose a significant risk of seizures while awake and therefore, would not pose much risk behind the wheel. However, it would be in the best interest of the individuals with epilepsy, the state, and everyone on the road for there to be a set time period to establish a history of nocturnal seizures prior to making an exception for driving privileges. Studies support a time period somewhere between two and three years.⁷²

C. Seizures with Auras

Although generalized seizures, such as tonic-clonic seizures, impair awareness and typically result in loss of consciousness, there is still an argument that a significant number of individuals who experience these seizures could drive safely. This is because the majority of people with generalized seizures report having auras prior to the alteration or loss of consciousness.⁷³ In one study, when asked about their seizure activity, 64.3% of participants responded that they typically experience at least one form of an aura prior to the loss of consciousness.⁷⁴ An aura is usually considered to be the first stage of a generalized seizure that is considered synonymous with a focal aware seizure.⁷⁵ Like focal aware seizures, an aura is fairly brief, lasting anywhere from a few seconds to a minute, although they can extend in some circumstances to several minutes.⁷⁶ Each person is likely to

⁷¹ See, 67 PA. CODE § 83.4(b) (2021) ("Waiver of the freedom from seizure requirement may be made upon specific recommendation by a licensed physician if . . . [a] strictly nocturnal pattern of seizures or a pattern of seizures occurring only immediately upon awakening has been established over a period of at least 2 years immediately preceding, with or without medication."). See also UTAH DEP'T PUB. SAFETY, *supra* note 56, at 35 (noting that an exemption may be granted for nocturnal seizures appearing consistently and exclusively for a period of at least twelve months).

⁷² See, e.g., Thomas et al., *supra* note 60.

⁷³ See David Spencer, *Auras are Frequent in Patients with Generalized Epilepsy*, 15 EPILEPSY CURRENTS 75, 76 (2015).

⁷⁴ *Id.* (explaining that 64.3% of respondents reported auras when asked closed-ended questions but only 21.3% reported auras when asked open-ended questions).

⁷⁵ *Id.* at 75.

⁷⁶ See Diana Pizarro et al., *Auras Located to the Temporal Lobe Disrupt Verbal Memory and Learning – Causal Evidence from Direct Electrical Stimulation of the*

experience an aura differently;⁷⁷ therefore, an individual would need to establish a thorough history of seizures in order to understand exactly what their auras look and feel like and how long the time period is between the onset of the aura and the beginning or loss of consciousness.

Seizures that impair a person's cognitive abilities and alter consciousness, including focal impaired seizures, "major motor seizures[,] or other generalized seizures[,] are clearly the intended focus of driving restrictions."⁷⁸ This train of thought makes sense on its face—no one wants to imagine someone that has a severe risk of losing consciousness driving unrestricted down the highway. However, roughly 40% of people with epilepsy describe their auras as "nearly always" long enough for them to protect themselves in circumstances such as driving.⁷⁹ In many instances, the aura acts as the body's warning to the individual that something bad is about to happen.⁸⁰

A growing number of medical professionals and organizations view "consistent and prolonged' auras [a]s a favorable modifier to reduce the seizure-free" periods before individuals with epilepsy are able to drive legally.⁸¹ Generally, it is believed that people who always have an aura before a seizure and know their auras fairly well can acknowledge the aura and "pull over before their seizure begins" in its entirety.⁸² On the other hand, some physicians argue

Hippocampus, 10 EPILEPSY & BEHAV. CASE REPS. 99, 99 (2018); see also Spencer, *supra* note 73, at 75.

⁷⁷ See Pizarro et al., *supra* note 76, at 99; see also Spencer, *supra* note 74, at 75.

⁷⁸ See Drazkowski, *supra* note 38, at 10.

⁷⁹ Vineet Punia et al., *Epileptic Auras and Their Role in Driving Safety in People with Epilepsy*, 56 EPILEPSIA e182, e184 (2015) ("Eighty-three subjects (39.9%) reported that the duration of their auras was 'nearly always' long enough for them to protect themselves if their seizures led to loss of consciousness . . .").

⁸⁰ The "something bad" is subjective to each individual. If the person is accustomed to their auras and seizures, they will most likely know what type of seizure follows one of their auras. See *Epilepsy and Driving*, UWHEALTH, <https://patient.uwhealth.org/healthwise/article/hw108709> [<https://perma.cc/MBQ2-6GF8>] (last visited Dec. 18, 2020) ("The aura acts as a warning, which may give a driver time to pull over before the seizure begins.").

⁸¹ Punia et al., *supra* note 79, at e184. The American Academy of Neurology ("AAN") and American Epilepsy Society ("AES") are included within these organizations. See *id.*

⁸² *Epilepsy and Driving*, *supra* note 80.

that auras “provide a “false sense of safety.”⁸³ Only three states currently have statutes that explicitly mention auras as potential exceptions to their seizure-free periods.⁸⁴

Arizona, Maryland, and Pennsylvania each include similar language regarding auras as potential exceptions.⁸⁵ Each require (1) an established pattern of (2) prolonged auras.⁸⁶ While states are likely to be apprehensive of making exceptions for such seizures where altered or loss of consciousness is more likely than not, if exceptions are going to be made, these three statutes need to be the basis. Although the vast majority of people who experience generalized seizures or focal impaired seizures would either not experience prolonged auras or not know their auras well enough to find safety, there is likely a portion of people that could have time from the onset of an aura to pull over into a parking lot or to the side of the road, share their location with a family member or close friend,⁸⁷ and wait safely for the remainder of their seizure. For individuals that fall into this category, there would need to be thorough conversations with their treating physician. Additionally, it would be in the best interest for everyone involved to have criteria that the person’s seizures and auras be established over a set period of time. Pennsylvania

⁸³ Punia et al., *supra* note 79, at e184 (“[O]ur study suggests that auras may provide a false sense of safety because PWE who thought that their auras provided them sufficient duration to protect themselves occurred at a similar frequency among subjects with or without MVAs. Some patients may even attempt to ‘drive home during auras before their seizures impaired their driving’ leading to MVAs despite having an aura.”).

⁸⁴ See *infra* tbl. 1. Auras that are prolonged and well-known to the individual are deemed highly favorable to brief, isolated auras. See Punia et al., *supra* note 79, at 184.

⁸⁵ See ARIZ. ADMIN. CODE § 17-4-506(D)(4) (2020); MD. CODE REGS. 11.17.03.04(E)(2)(e)(iii) (2021); 67 PA. CODE § 83.4(b)(2) (2021).

⁸⁶ ARIZ. ADMIN. CODE § 17-4-506 (D)(4) (2020); MD. CODE REGS. 11.17.03.04(E)(2)(e)(iii) (2021); 67 PA. CODE § 83.4(b)(2) (2021).

⁸⁷ Most smartphones have features that allow for individuals to quickly share their locations using GPS location. For example, Apple has the “Emergency SOS” feature which allows a person to simply press one button and swipe their phone screen to make a call to their local emergency number (i.e., 911) as well as text all listed emergency contacts (i.e., family members). Use *Emergency SOS on Your iPhone*, APPLE, <https://support.apple.com/en-us/HT208076> [<https://perma.cc/EH7A-DXNT>] (last visited Dec. 18, 2020). This feature sends each emergency contact the caller’s current location and sends updates if the location changes. *Id.*

already requires that this period must be established over two years.⁸⁸

D. Statutory Proposal for “Safer Seizures”

First, no statutory exception should be “all-inclusive.” Any exception for FAS or nocturnal seizures should not preempt similar, more impairing seizures from *not* being included simply because they would technically be categorized as a nocturnal or focal aware seizure. It should be up to the discretion of the treating physician to determine if a patient’s seizures should fall within the state’s seizure-free period exclusions. For example, Kansas currently allows exceptions for FAS while also prohibiting exceptions for seizures that, although presenting similar symptoms, impair the individual more so than typical FAS.⁸⁹ Ideally, this same logic would be applied to any exceptions, not just for focal aware seizures. Including this exclusion of certain seizures is vital to any changes in legislation. This language would allow exceptions for seizures posing little risk but not immediately grant exceptions for similar seizures where risk is heightened.

Secondly, the greater understanding and history of drivers’ seizures decreases their risk behind the wheel. Before any seizure-free period exception is granted, there needs to be a requirement for at least two years of seizure activity, evaluated by a physician. Exceptions for these seizures, especially nocturnal seizures and seizures with prolonged auras, are desperately needed; however, acting hastily could do more harm than good. Patients and their physicians need ample time to adequately and accurately understand what types of seizures the person experiences, how their body reacts, and what their auras may feel like, if they have any.

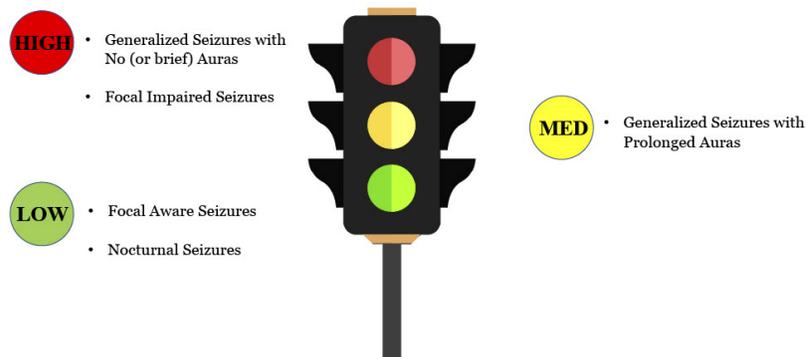
⁸⁸ See 67 PA. CODE § 83.4(b)(2) (2021).

⁸⁹ See *State Driving Laws Database: Kansas*, *supra* note 57.

V. AVENUES OF RISK ASSESSMENT

In order to better understand the risk associated with a person's seizures, doctors must first run a series of tests to diagnose epilepsy and attempt to determine the cause of the seizures. Typical tests including MRIs, CT scans, PET scans, and neuropsychological evaluations allow physicians to visualize active areas of the brain, detect structural abnormalities, and determine the affected areas of the brain.⁹⁰ However, an

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electroencephalogram (EEG) is the most common and integral part of the diagnostic process that often enables a neurologist to differentiate between focal and generalized seizures.⁹¹

⁹⁰ See *Epilepsy: Diagnosis & Treatment*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/epilepsy/diagnosis-treatment/drc-20350098> [<https://perma.cc/YPP5-9ALN>] (last visited Dec. 18, 2020).

⁹¹ C.P. PANAYIOTOPOULOS, *THE EPILEPSIES: SEIZURES, SYNDROMES AND MANAGEMENT 2* (Bladon Medical Publishing 2005) ("The seizure and epileptic syndrome classifications are based on combined clinic-EEG manifestations. Epileptic syndromes, the most important advance of recent epileptology, were mainly identified because of their EEG manifestations."); see also *Epilepsy: Diagnosis & Treatment*, *supra* note 90.

A. Electronic Simulations

Within the past decade, a handful of studies have attempted to use forms of EEG monitoring to examine driving aptitude for individuals with epilepsy. These studies used video-EEG monitoring to capture both abnormal brain activity and behavioral symptoms of a seizure while the patient was driving a simulator or playing a realistic video game.⁹² In a 2020 study, a thirty-two-year-old woman with drug-resistant focal impaired seizures underwent a video-EEG monitoring session while playing a racing game, using a “commercially available video game console,” including a steering wheel and pedal controller.⁹³ Data from the racing game allowed physicians to track the individual’s “throttle position, brake press, and steering angle” while cameras situated throughout the room recorded the patient’s driving posture and eye movement.⁹⁴ This simulation allowed physicians to see several important factors: how long it took for seizures to begin, the duration of the seizures, and the patient’s responses before, during, and after the seizure.⁹⁵ It would be virtually impossible to determine this information, accurately and safely, in any other scenario or test.

This study only examined one individual with one form of seizures; however, it laid the foundation for the future of epilepsy monitoring. Epilepsy monitoring units across the country would easily be able to incorporate systems such as the simple video game unit to collect information among a wide array of individuals allowing physicians to compare and contrast reactions between the different types of seizures.⁹⁶ These simulators would provide

⁹² See Tomoaki Ban et al., *Timelined Multimodal Recording of EEG and Driving Performance Using a Driving Simulator System During a Focal Impaired Awareness Seizure*, 13 EPILEPSY & BEHAV. REPS. 1, 2 (2020); Li Yang et al., *A Prospective Study of Loss of Consciousness in Epilepsy Using Virtual Reality Driving Simulation and Other Video Games*, 18 EPILEPSY & BEHAV. 238, 239 (2010); *Video Electroencephalography (EEG) Monitoring*, U. MD. MED. CTR., <https://www.umms.org/ummc/health-services/neurology/services/epilepsy/video-eeg-monitoring> [<https://perma.cc/T9H9-NGPF>] (last visited Dec. 18, 2020) (describing the set-up and monitoring procedure typical during a video-EEG monitoring session).

⁹³ Ban et al., *supra* note 92, at 1-2.

⁹⁴ *Id.* at 2.

⁹⁵ *Id.* at 2-4.

⁹⁶ See *Common Questions*, NAT’L ASS’N EPILEPSY CTRS., <https://www.naee-epilepsy.org/for-patients/common-questions/> [<https://perma.cc/L3YL-MJ2N>] (last visited

physicians the closest-to-reality testing to determine a patient's driving aptitude. Additionally, more advanced simulators could allow for even more accurate data. Professional-level racing simulators, although priced between \$20,000 and \$100,000 each, yield highly realistic audio, video, and feel and are designed to be "compact enough for home or shop use."⁹⁷

B. Objectives of Increased Research

Further research using advanced technology similar to these simulators is vital to better understanding the risk accompanying driving with seizures. Future studies should examine a wide array of seizures, from focal to generalized, in order to compare and contrast and ultimately determine if one type of seizure is significantly "safer" than another. Another interesting avenue of research would be to survey driver behavior and seizure composition for groups of patients taking different anti-epileptic drugs (AEDs) to study the effects certain drugs may have while driving.

The goal of this research should be a gradual incorporation of driving simulators in epilepsy monitoring units throughout the country. This sounds like a lofty goal; however, there are currently only 257 epilepsy centers in the country, 50 of which are solely for pediatric patients.⁹⁸ If, in the future, driving simulators are

Dec. 18, 2020) ("An Epilepsy Monitoring Unit (EMU) is an inpatient unit at a hospital that is specifically designed for patients with seizures. Patients are typically admitted to an EMU to undergo tests to characterize their ongoing spells and to guide individual treatment decisions. Many patients undergo video-EEG monitoring while in the EMU, which allows doctors to record your brain waves before, during and after a seizure with the EEG. A video-EEG also makes a video recording of your behavior to make interpretation of the EEG more accurate.").

⁹⁷ See *How It Feels*, CXC SIMULATIONS, <https://www.cxcsimulations.com/products/motion-pro/how-it-feels/> [<https://perma.cc/R7F3-GZKD>] (last visited Dec. 18, 2020) ("[U]nrelenting rapid-transition g-forces, one after another - accelerate, decelerate, turn this way, that way - and these simultaneously combined with more subtle sensations of ever-changing track surfaces, bumps, curbs, even contact with other cars.") ("An ultra-powerful steering force feedback motor, professional-grade steering wheel and pressure-sensitive pedals allow you to feel every detail of the car's behavior.").

⁹⁸ As of 2019, only eleven states have one epilepsy monitoring center in their state. *All Epilepsy Center Locations*, NAT'L ASS'N EPILEPSY CTRS., <https://www.naacc-epilepsy.org/about-epilepsy-centers/find-an-epilepsy-center/all-epilepsy-center->

proven to be an accurate tool to study brain activity and behavioral symptoms during video-EEG monitoring, utilizing similar protocol during a stereo-EEG would be the next avenue of assessment—likely yielding more precise data.⁹⁹ Eventually, driving simulators could become a routine component of a patient’s stay in an epilepsy monitoring unit.

VI. MANDATED RECOMMENDATIONS

Currently, only six states require a physician to report a patient’s seizures to their state DMV offices.¹⁰⁰ These mandatory reporting laws are heavily criticized for a litany of reasons. In the legal context, it is noteworthy that these statutes do not include any language requiring a physician to expand their report any further than simply acknowledging the patient’s active epilepsy. However, one of the more striking criticisms comes directly from physicians.

A. Opposition to Mandatory Reporting

The consensus among many physicians, researchers, and medical advocacy groups is that states should not mandate physicians to report seizure activity.¹⁰¹ Common justifications in

locations/ [https://perma.cc/32T2-BMT8] (last updated Apr. 1, 2019). Alaska, North Dakota, South Dakota, and Vermont do not have an epilepsy monitoring center.

⁹⁹ See Jeffrey P. Mullin et al., *Stereo-Electro-Encephalo-Graphy (SEEG) with Robotic Assistance in the Presurgical Evaluation of Medical Refractory Epilepsy: A Technical Note*, 112 J. VISUALIZED EXPERIMENTS 1, 1 (2016) (“[Stereo-EEG] is a method and technique which is used for accurate, invasive recording of seizure activity via three dimensional recordings. . . . SEEG does offer several significant advantages; SEEG allows for 1) recording of deep structures, 2) bihemispheric recordings, 3) another recording option if subdural grids failed, and 4) mapping of epileptic networks in three dimensions, mainly in patients where non-lesional extra-temporal epilepsy is suspected.”).

¹⁰⁰ California, Delaware, Nevada, New Jersey, Oregon, and Pennsylvania require a physician to report. See *State Driving Laws Database*, *supra* note 54. Alternatively, Illinois, Maryland, Minnesota, and New Mexico make the applicant or licensed driver report any seizure activity directly to the state. *Id.*

¹⁰¹ Katrina E. Lutfy, *On the Road Again: Revisiting State Laws that Unreasonably Restrict Drivers with Epilepsy and Burden the Physicians Who Treat Them*, 51 LOY. U. CHI. L.J. 1127, 1186-87 (2020) (footnote omitted) (“Accordingly, California, Delaware, Nevada, New Jersey, Oregon, and Pennsylvania should repeal their mandated-reporting laws. . . . By abolishing mandated reporting in favor of voluntary reporting, states would eliminate one discriminatory aspect of these laws.”).

favor of abolishing such laws include: infringement to confidentiality guidelines, severe impact on the doctor-patient relationship, and potential legal liability for physicians failing to report.¹⁰² The most significant argument against mandatory reporting is that such laws compromise full and accurate disclosure of medical information by the patient.¹⁰³

It is well-established that the ability to drive is often viewed as a “necessary freedom.” One of the biggest fears among people with epilepsy is losing that freedom.¹⁰⁴ Unfortunately, many chose driving over their health and safety by withholding their seizure activity from physicians.¹⁰⁵ Compulsory physician reporting is viewed as “encouragement” for many individuals to withhold critical information. Although physician reporting is currently only mandated in six states, if adopted nationwide more patients would “bury” their seizures.

“Burying” seizures is cause for concern in two regards. The first is that we could see many individuals who are prone to seizures that impair awareness “fly under the radar” of law enforcement—driving unrestricted and disregarding the public’s safety. Secondly, those same individuals would essentially be “flying under the radar” of their doctors and putting their own health at risk. In fact, patients with epilepsy are “six times more likely to compromise [their health and] medical care in order to drive illegally.”¹⁰⁶ Most seizures can be controlled by AEDs, but this is unlikely to happen without fully disclosing one’s seizures with their doctor. Despite the well-established justifications in

¹⁰² See *id.* at 1172-75; Richard S. McLachlan et al., *Impact of Mandatory Physician Reporting on Accident Risk in Epilepsy*, 48 *EPILEPSIA* 1500, 1500 (2007).

¹⁰³ See Kathryn Kramer, *Shifting and Seizing: A Call to Reform Ohio’s Outdated Restrictions on Drivers with Epilepsy*, 22 *J.L. & HEALTH* 343, 360 (2009); Krumholz, *supra* note 17, at 33; Lutfy, *supra* note 101, at 1172-73; McLachlan, *supra* note 102, at 1502.

¹⁰⁴ Krumholz, *supra* note 17, at 31 (“Driving a car is so critical to employment, socialization, and self-esteem—all aspects central to modern life in the United States—that people with epilepsy list it as a top concern in surveys.”).

¹⁰⁵ Patients with epilepsy frequently do not inform their physicians about seizure occurrence, fearing loss of driving privileges, and other social consequences. Berger et al., *supra* note 17, at 668; Kramer, *supra* note 103, at 359; Krumholz, *supra* note 17, at 33.

¹⁰⁶ Lutfy, *supra* note 101, at 1173 (citing D. Bacon et al., *American Academy of Neurology Position Statement on Physician Reporting of Medical Conditions That May Affect Driving Competence*, 68 *NEUROLOGY* 1174, 1176 (2007)).

opposition, physician reporting should be mandatory, but only if slightly modified.

B. The Patient "As a Whole"

The six states with a mandatory reporting requirement are advancing this issue in the right direction. However, these states have left a glaring opening for unnecessary restrictions to be placed on individuals with epilepsy trying to drive. The problem with the current mandatory reporting statutes is that the physicians in those states are typically only reporting *if* a seizure happened. There is little, if any, consideration for focal aware seizures, nocturnal seizures, seizures with prolonged auras, or other factors. Additionally, the states without mandatory reporting leave open the possibility for many individuals with epilepsy to clandestinely drive. In many of those states, the patient may fully and accurately disclose their seizure activity to their doctor, understand that they should not drive, and continue to drive regardless. Unless the physician has voluntarily reported the patient to the DMV, the patient is likely to go unnoticed by law enforcement despite the potential significance of their seizures.

Although states will never know every individual with epilepsy, mandatory reporting affords the opportunity to be aware of as many as possible. Contrary to the current mandates, a physician should not strictly be stating *if* a seizure occurred, but instead whether or not they believe that the patient poses a risk behind the wheel and giving a *recommendation* based on their evaluation. Doctors should be able to take into consideration the patient "as a whole," looking at their history of seizures, frequency, severity, control by AEDs, and the risk that the patient poses. Doing so may allow patients to feel more comfortable speaking freely with their doctors about their seizure activity because there would not be an automatic cease of their driving privileges. Instead, the individual would receive a thorough evaluation and recommendation that takes into consideration more than just the fact that a seizure occurred. The fear of losing driving privileges has an expansive impact which is caused, in part, by the general confusion among both physicians and patients regarding epilepsy-related driving laws.

VII. EDUCATION AND ADVOCACY

There needs to be increased education aimed toward physicians making recommendations for patients with epilepsy, specifically general practitioners. Physicians need to know the typical exceptions associated with state driving laws, the risk factors of the different types of seizures, as well as the structure of the driving laws of their state. The patient is likely to see their physician as their go-to-source for answers; therefore, the physician needs to be aware of what they are required to do, how long the patient's seizure-free period is, and any other relevant information.

A. General Concerns and Confusion

It is easy to understand how someone could become confused when researching the driving laws of their state—no state's statutes are exactly the same. For a person who recently experienced a seizure, one of the first questions they seek an answer to is the duration of their state's seizure-free period. Although those sections of state statutes are typically the most explicit and easy to understand, only half of individuals with epilepsy can correctly identify the length of their seizure-free period.¹⁰⁷ The vast majority of individuals with epilepsy do not know if they are required to report their seizures directly to the DMV nor are they certain what obligations their doctors have as far as reporting. Many assume that a seizure is an automatic revocation of their driving privileges which elicits the panic feared by opponents to mandatory reporting.¹⁰⁸ While fear among patients may lead to nondisclosure of seizures and diminished medical care, confusion among physicians also attributes to unnecessary restrictions for their patients with epilepsy.

Physicians, particularly those within family or internal medicine, are not as knowledgeable of the many state epilepsy-

¹⁰⁷ Tatum et al., *supra* note 27, at 31-32. Although nearly three-fourths of patients noted that the driving laws had been discussed with them, only 52.1% correctly identified the legal duration of the restriction imposed. *Id.*

¹⁰⁸ See Krumholz, *supra* note 17, at 33.

related driving restrictions.¹⁰⁹ One study asked doctors across several medical specialties if they were able to accurately describe their state's reporting requirements for their patients with seizures.¹¹⁰ Approximately 11% of all respondents did not know if they practiced in a state with mandatory reporting—of those that believed to know, 34% of family practice physicians and 39.5% of internal medicine physicians were wrong compared to 18.8% of neurologists.¹¹¹ The statutes for states that either have mandatory reporting or allow advice from physicians do not distinguish between general practitioners and neurologists. Any medical doctor suffices. This becomes more problematic as general practitioners, including family physicians and internists, are less likely to support driving among individuals with epilepsy.¹¹² Patients strictly seeing a general practitioner have a significantly greater chance of being told that their seizures inhibit them from driving despite the composition of their seizure history.¹¹³

B. Better Education, Better Care

While the majority within the medical community vehemently oppose mandatory reporting, it is possible that better education could assuage this problem. It is true that the majority of individuals with epilepsy can be seizure free within one to two years with the help of medical treatment.¹¹⁴ For people with

¹⁰⁹ See Laura K. Vogtle et al., *A Comparison of Physicians' Attitudes and Beliefs Regarding Driving for Persons with Epilepsy*, 10 EPILEPSY & BEHAV. 55, 56 (2007).

¹¹⁰ See generally *id.*

¹¹¹ *Id.* at 57, 60 (“When considering results from this physician survey, [individuals with epilepsy seeing a general physician rather than a neurologist] . . . may have ramifications . . . in terms of basic care, but also in terms of the kinds of advice and education regarding driving these patients receive.”).

¹¹² *Id.* at 60.

¹¹³ *Id.* at 58 (“[F]amily practitioners and internists were more likely than neurologists to oppose: [1] generally allowing people with uncontrolled seizures to have a driver's license, 99.2% versus 91.7% . . . ; [2] to allow people with uncontrolled seizures that did not result in loss of consciousness to have a driver's license, 84.6% versus 60.7% . . . ; [3] and to allow people with uncontrolled seizures that occurred nocturnally to have a driver's license, 72.3% versus 44.6% . . . ; and 4] to support mandatory reporting of patient seizure information . . . , 90.1% versus 35.9% . . .”).

¹¹⁴ See *Epilepsy: Diagnosis & Treatment*, *supra* note 90 (“Most people with epilepsy can become seizure-free by taking one anti-seizure medication Many adults can discontinue medications after two or more years without seizures. . . . At least half the

uncontrolled seizures, the individual's opportunity to qualify for an exception to their state's seizure-free period increases as the patient and their physician learn more about their seizures. For example, the physician may conclude that the seizures are typically nocturnal seizures or are mostly seizures that do not impair awareness. After a couple of years, the person may be able to recognize the onset of an aura and find safety prior to loss of consciousness. However, if the individual stops treatment or does not disclose everything to their attending physician, they are likely never going to reach these stages. If physicians are able to explain this to patients during their initial visits, then it is possible to retain them as honest patients. No solution will be a "catch-all," but this would be a significant improvement to the current layout of the state statutes.

VIII. PROPOSAL

There are several issues that need to be addressed concerning United States seizure-related driving laws; however, the most obvious issue is their need for uniformity. The current state laws differ widely in terms of seizure-free period lengths and exceptions, resulting in confusion among both patients and physicians. I have been treated in three states and have been told not to drive for three different periods of time. More than one of my own doctors have wrongly informed me of their state's seizure-free period. I have been confused. My doctors have been confused. This confusion stems directly from the inconsistencies among state laws.

I believe there needs to be a uniform six-month seizure-free period. The majority of states already follow a six-month approach and most of the other states do not differ significantly.¹¹⁵ While six months would not be enough time to fully understand a person's seizures to the extent needed to grant an exception, this time period would allow doctors to recognize and differentiate an isolated seizure from recurring seizures.

people newly diagnosed with epilepsy will become seizure-free with their first medication.").

¹¹⁵ See *infra* tbl. 1.

Although I adamantly believe the current state driving laws over-restrict people with epilepsy by not allowing exceptions for “safer” seizures, I do not think any exceptions to seizure-free periods should be granted until the patient has had two years of seizure activity. This is not to say that the patient needs to have gone two years *without* a seizure, but merely that there needs to be at least two years from the first seizure to showcase the patient’s types of seizures, duration, severity, auras, etc. Building two years’ worth of seizure history would allow a patient’s physician to better understand the risk associated with their seizures and their likelihood of driving without a significantly increased risk of crashing. Additionally, waiting two years to establish a seizure history prior to granting any exceptions may ease the reluctance many states may have with establishing seizure-free period exceptions.

An ideal composition of exceptions would include focal aware seizures, nocturnal seizures, and seizures with prolonged auras. These exceptions should not be “all-inclusive.” For example, focal aware seizures that cause a person to “freeze” briefly during the seizure would most likely impair awareness to a degree that driving would no longer be a safe option. Additionally, an exception for seizures with prolonged auras would heavily depend on the duration of the aura and the length of time from the end of the aura to the onset of the seizure. These examples again illustrate the need for a well-documented seizure history.

Since no person’s seizures are exactly the same, the decision to grant a driving exception should be delegated to their personal neurologist. First and foremost, a patient’s neurologist understands the patient, their seizures, and their risk more than anyone else. Secondly, a neurologist, more so than a general or family practitioner, will be able to differentiate the types of seizures and their effect on the patient (i.e., the reliability of a patient’s auras, the gravity of their seizures, and their appropriate treatment plan).

Contrary to popular opinion, treating physicians should be required to report their recommendations to state DMVs. If a physician believes that a patient’s seizures do not pose a significant risk behind the wheel, either because they satisfy one of the seizure-free period exceptions or for another reason decided

in good-faith, then the physician should report their positive recommendation to the DMV. However, no recommendation in favor of driving should be made prior to the expiration of the seizure-free period; any decision made for patients with recurring seizures would still need two years of seizure history prior to a physician's recommendation. Because there would likely be many people denied driving privileges by their physicians' recommendations, each state should be required to establish and maintain a medical advisory board or similar commission to hear appeals by drivers or applicants not granted driving privileges. At least one member of each state medical advisory board hearing these appeals should be a physician specializing in neurology or epilepsy. These commissions would prevent a physician from being the exclusive voice in someone's right to drive.

Uniformity is admittedly a hefty goal. If states are unable or unwilling to conform to a uniformed set of epilepsy-related driving restrictions, they should at least expand on exceptions to their seizure-free periods. Currently, forty states do not explicitly mention any exceptions, leaving countless drivers with epilepsy off the road with little hope.¹¹⁶ There is no legitimate excuse for states to deny drivers with nocturnal seizures or focal aware seizures the ability to drive.

IX. CONCLUSION

Sitawa Wafula, three-time award winning mental health and epilepsy crusader and founding executive director of Kenya's first free mental health and epilepsy support line, described her life's journey, stating:

I keep confessing about my affair so that those people who do not have the diagnosis might know and might have a constant reminder that it is alright to engage with people like us, that as long as they pull down the walls of stigma and exclusion, that we, just like them, can be able to take anything life throws at us.¹¹⁷

¹¹⁶ *Id.*

¹¹⁷ Sitawa Wafula, *Why I Speak up About Living with Epilepsy*, TED (Feb. 2017), https://www.ted.com/talks/sitawa_wafula_why_i_speak_up_about_living_with_epilepsy?language=en [https://perma.cc/W4WR-GTBR].

One can ponder why states maintain such strict driving regulations for people with epilepsy despite the amount of positive data and research applicable to so many people. I can only assume that state legislators honestly do not fully understand that epilepsy is more than the seizures they have seen on television—that someone could be having a seizure while standing or talking in front of them and they never know.

I didn't know, but now I do.

X. APPENDIX

TABLE 1¹¹⁸
CURRENT STATE SEIZURE-FREE PERIODS &
EXCEPTIONS

STATE	Seizure-Free Period	FAS Exception	Nocturnal Seizure Exception	Prolonged Aura Exception
Alabama	6 months			
Alaska	6 months			
Arizona	3 months		X	X
Arkansas	1 year			
California	Range			
Colorado	No Set Period			
Connecticut	No Set Period			
Delaware	No Set Period			
D.C.	1 year		X	
Florida	6 months		X	
Georgia	6 months		X ^a	
Hawaii	6 months			
Idaho	No Set Period			
Indiana	No Set Period			
Illinois	No Set Period			
Iowa	6 months		X	
Kansas	6 months	X	X	
Kentucky	3 months			
Louisiana	No Set			

¹¹⁸ See *State Driving Laws Database*, *supra* note 54 (listing each state's pertinent epilepsy-related driving statutes and regulations, including any state departmental records supplementing relevant regulations).

	Period			
Maine	Range			
Maryland	3 months	X	X	X
Massachusetts	6 months			
Michigan	6 months			
Minnesota	3 months			
Mississippi	6 months			
Missouri	6 months			
Montana	No Set Period			
Nebraska	No Set Period			
Nevada	3 months			
New Hampshire	1 year			
New Jersey	6 months			
New Mexico	6 months			
New York	1 year			
North Carolina	6 months			
North Dakota	6 months			
Ohio	No Set Period			
Oklahoma	6 months		X ^b	
Oregon	3 months			
Pennsylvania	6 months		X ^c	X
Rhode Island	18 months			
South Carolina	6 months			
South Dakota	Range			
Tennessee	Range			
Texas	3 months			
Utah	3 months	X ^d	X ^e	
Vermont	No Set Period			
Virginia	6 months			
Washington	6 months			
West Virginia	6 months			
Wisconsin	3 months			
Wyoming	No Set		X ^f	

	Period			
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^a – A person who has only nocturnal seizures may be eligible for a limited license (e.g., daylight driving only) even if he or she has been seizure-free for less than six months.

^b – A person may be exempt from the seizure-free period if only having nocturnal seizures. However, the individual must first be seizure-free for three months and the person must submit proof that episode control has been established with reasonable certainty.

^c – A pattern of nocturnal seizures must have been established over a period of at least two years.

^d – Utah's statutory language includes an exception for seizures so limited as not to interfere with control, if stable for one year.

^e – A pattern of nocturnal seizures must have been established over a period of three or more years.

^f – Individuals who produce sufficient medical evidence to show that their disorder occurs only nocturnally may be licensed for daytime driving only.

