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THE ULTIMATE INSURANCE POLICY: AUTONOMOUS VEHICLES AND ARTIFICIAL INTELLIGENCE, A STATUTORY PROPOSALE FOR A COMPLICATED PRODUCT

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Anthony Paolino III*

At the push of a button, you enter your home address. It's late. You're tired. You fall asleep. One hour later, you awake in your driveway. Home safe. Behold the self-driving car.

At the push of a button, a blind man enters his home address. Thirty minutes into the drive, his car hits a pedestrian. The pedestrian's estate sues the blind man, the car manufacturer, and the car dealer. Who's responsible? Beware the lawsuit that follows.

I. Abstract

First, this paper describes autonomous vehicles (also known as self-driving cars) and artificial intelligence (the software that helps them function). Second, this paper forecasts autonomous vehicles' relationship with products liability law, since it is a new technology—no current case law exists.[1] Third, instead of complex litigation under a risk-utility analysis, this paper proposes a federal preemption of state tort law for autonomous vehicles that mandates car manufacturers to buy liability insurance for their customers, so that when an accident involving an autonomous vehicle occurs, a no fault recovery would be available to those injured by a malfunction under a federal insurance policy.

As it stands today, the design defect test that courts use for products liability is not tailored enough to meet the complex intricacies of autonomous vehicles with artificial intelligence, and a legislative exception should be made. I argue that a no-fault system would be particularly useful for this unique frontier of technology because it would: 1.) ensure the stability and growth of fledgling autonomous vehicle companies, making them avoid the cost and institutional distraction associated with litigation and pay only enumerated damages to injured plaintiffs when an accident happens involving their cars

* Anthony Paolino III is a 2L student at Roger Williams University School of Law. Many thanks to David A. Logan, my torts professor, faculty advisor, and mentor.

[1] Mark A. Geistfeld, *A Roadmap for Autonomous Vehicles: State Tort Liability, Automobile Insurance, and Federal Safety Regulation*, 105 CAL. L. REV. 1611, 1630 (2017).

and 2.) guarantee compensation for the injured, regardless of whether artificial intelligence is negligent or legal cause of the accident is difficult to prove.

II. What is an Autonomous Vehicle?

An autonomous vehicle does not require a human operator to function; the design of the car enables a computer to operate on the roads, through traffic, through adverse weather conditions, etc., much like a human operator would.[2] But, unlike the human operator, an autonomous vehicle is programmed to be a model driver,[3] one who never gets distracted, one who obeys the rules of the road, who keeps passengers and pedestrians safe, and knows how to respond to a variety of emergency situations.[4]

Autonomous vehicles certainly deserve our attention because over 30,000 people die in America in car accidents a year, costing three-hundred billion dollars in healthcare, death and property costs, along with over one-hundred billion dollars spent in traffic congestion as a result of those accidents.[5] Manufacturers hope that autonomous vehicles will lower the number of deaths in car accidents because the computers in these vehicles will never get tired, drunk, or otherwise distracted like a human operator would.[6]

Building an autonomous vehicle is not easy. First and foremost, like traditional cars, autonomous vehicles need to get people from one place to the next, remaining stylish, functional, dependable, durable to withstand collision, and safe for thousands of miles.[7] Unlike traditional cars, however, autonomous vehicles "must perform well even when the driver does not."[8] One legitimate manufacturer goal is to make autonomous vehicles capable to navigate blind, handicapped, young, elderly, temporarily intoxicated, or just unskilled drivers safely to their destination, because only then is the driving mechanism trustworthy enough to handle our lives when we are incapable of driving.[9] During a drive, ideally, passengers should be able to do other things instead of looking at the road—like eat, sleep, read, or do work.[10]

The National Highway Transportation Safety Administration classifies six different levels of vehicles, ranging from Level 0 to 5.[11] Level 0 includes most traditional cars, ones that are not autonomous.[12] Distinguishing each level beyond that has to do with the amount a human driver retains control.[13] Human operators are primarily responsible for

[2] Jeffrey K. Gurney, *Sue My Car Not Me: Products Liability and Accidents Involving Autonomous Vehicles*, 2013 U. ILL. J.L. TECH. & POL'Y 247, 248-251 (2013).
[3] Matthew Blunt, *Highway to a Headache: Is Tort-Based Automotive Insurance on a Collision Course with Autonomous Vehicles?*, 53 WILLAMETTE L. REV. 107, 110-112 (2017).
[4] Geistfeld, *supra* note 1, at 1620-1629.
[5] Gurney, *supra* note 2, at 248-251.
[6] *Id.*
[7] James T. O'Reilly & Thomas G. Neltner, WHEN PRODUCTS KILL: LITIGATION & REGULATORY RESPONSES 55-80 (2016).
[8] *Id.*
[9] Gurney, *supra* note 2, at 253-256.
[10] *Id.*
[11] Amar Kumar Moolayilal, *The Modern Trolley Problem: Ethical and Economically-Sound Liability Schemes for Autonomous Vehicles*, 9 CASE W. RESERVE J.L. TECH. & INTERNET 1, 2-4 (2018).
[12] *Id.*
[13] *Id.*

driving functions in Levels 1-2, because the automated functions are side-features of the car.[14] Levels 3-5, on the other hand, are considered by the government as highly automated vehicles, or "HAVs," because the automated systems are primarily responsible for the drive.[15] Level 1 includes any car on the market today that uses optional automated systems to control dynamic braking and stability.[16] Level 2 includes the Mercedes-Benz S65, Mercedes-AMG, BMW750i, Tesla Model S, and InfinitiQ50s because these cars use automated systems and computers capable of multi-tasking, steering, acceleration, deceleration, parking and auto-pilot, but, for the most part, the human driver must cover these functions whenever data is unavailable.[17] Level 3 uses automated systems that can respond to changes in the driving environment, often referred to as "dynamic driving," but, Level 3 vehicles will ask the human operator to take over whenever it does not know exactly what to do.[18] Level 4 is almost the same as three, but does not ask the human operator to take over in emergency situations;[19] in the event of an emergency, a human can take over, but can alternatively opt not to.[20] In Level 5 vehicles a human passenger has no way of intervention because the pedals and steering wheels are completely removed from the car.[21] Vehicles in Levels 3, 4, and 5, the truly autonomous vehicles, are not currently on the market.[22]

Google is the current frontrunner in autonomous vehicle technology.[23] Google plans on adding autonomous technology to pre-existing vehicles, instead of making a new vehicle entirely.[24] Currently, Google "places a structure on top of [Toyota Priuses, Audis, and Lexuses] that navigates, detects traffic, and measures and analyzes the surroundings through the use of radar sensors, laser range finders, video cameras, global positioning systems (GPSs), and maps."[25] As the laser rangefinder maps out the drive, the cameras and radar sensors detect obstacles, while the GPS determines the vehicle's location, keeping it on course.[26] All of this information is sent to Google's data center, which in turn shares it with other electronic devices including other autonomous cars on the road, stop lights, and electronic signs.[27] Finally, Google sends this information to the vehicle, so the human passenger can monitor the vehicle's activity.[28] This particular Google model *requires* a driver behind the wheel who can take over control any time by using the gas pedal or the steering wheel—making it a Level 3 according to the NHTSA.[29] When the vehicle doesn't know what to do because of some adversity, it relinquishes control back to the human driver and provides a warning that autonomous mode is turning off.[30] The

[14] *Id.*
[15] *Id.*
[16] *Id.*
[17] *Id.* Data is unavailable when the weather and surrounding environment prevents the Level 2 vehicle from analyzing road structures and highways.
[18] I*d.* at 4-5.
[19] *Id.*
[20] *Id.*
[21] *Id.*
[22] *Id.*
[23] Gurney, *supra* note 2, at 251-253.
[2424] *Id.*
[25] *Id.*
[26] *Id.*
[27] *Id.*
[28] *Id.*
[29] *Id.*
[30] *Id.*

driver can also switch self-driving mode completely off and drive as if in a traditional, non-autonomous car.[31]

Google's technology is not the only autonomous vehicle in development, however. John Krafcik, the CEO of Waymo (an independent autonomous vehicle company owned by Alphabet),[32] believes vehicles that never allow humans to take over are actually safer.[33] Waymo, unlike Google, is directly pursuing Level 5 autonomous driving technology.[34] In sum, autonomous vehicle technology is so advanced that it will not only be different from traditional cars, it will also be quite different amongst each competing company—making it all the more complicated when it comes to the realm of litigation.

III. What is Artificial Intelligence?

The "brain" of these autonomous vehicles is called artificial intelligence or "AI." AI is the process of trying to get computer programs to understand human intelligence and mimic human thinking—not only to include the thoughts you and I could have, but all possible calculations that me, you, and every possible human could make.[35] "AI will be able to supply genuinely useful decision-making programs which operate in the real world and make decisions unforeseen by humans."[36] Ideally, for autonomous vehicles, a successful AI should replicate the decision-making process behind a model driver's human brain, a daunting task.

Despite some obvious advantages, AI makes "pathological" decisions.[37] Although primitive in comparison, Microsoft Word's spell check is an example of a computer program that makes pathological decisions. Spell check executes commands that at some point were "spoon fed" by a human, to model the English language and create a word processing grammar correction program on the home computer.[38] Commands like "I before E except after C," change the misspelling of "recieve" to "receive," lower the number of spelling errors in papers we type, and speed up the process of revision. Similarly, an autonomous vehicle's AI will be able to collect information about the weather, road conditions, local construction and pedestrians—even when we don't ask it to—in order to avoid obstacles and facilitate passenger safety along the drive.[39] The latter is much more complicated because it requires an ability to take in new data, data that has

[31] *Id.*
[32] Waymo Company Page, https://x.company/waymo/ (last visited July 02, 2018).
[33] Christopher Mims, *In Self-Driving-Car Road Test, We are the Guinea Pigs*, THE WALL STREET JOURNAL (Updated May 13, 2018, 1:59 PM), https://www.wsj.com/articles/in-self-driving-car-road-test-we-are-the-guinea- pigs-1526212802?mod=searchresults&page=1&pos=2.
[34] *Id.*
[35] William J. Connell, *Artificial Intelligence in the Legal Profession – What You Might Want to Know*, 66 R.I. BAR JOURNAL 5, 5 (2018).
[36] Curtis E.A. Karnow, *Liability for Distributed Artificial Intelligences*, 11 BERKELEY TECH. L.J. 147, 148-150 (1996).
[37] *Id.* at 159-161.
[38] *Id.* at 156 and 168.
[39] *Id.* at 150-153.

not been inputted by a human before.[40] Still, the execution of commands is the same, in being automatic and without human intervention.[41]

Pathological decisions create uncertainty and sometimes undesirable results. In Microsoft Word's spell check, whenever I want to type a Capital "C" inside a parenthesis to form an outline for my notes, it turns into a copyright sign ©. Since that was not my intention, I have to backspace and then retype "(C)." In the context of an autonomous vehicle, pathological decisions become dangerous when the anticipated human decision is ignored, and the AI's code selects an unusual command more narrowly tailored to its programming.[42]

For example, assume AI Code #123 tells a car to slow down and swerve right whenever a sizable object is in the road to avoid running it over: but what happens if a child is in the breakdown lane where the vehicle wanted to swerve? To avoid the object, the pathological decision-maker, the narrowly tailored AI code, might obey AI Code #123 and run the child over because it was unable to balance the child's life versus the programming embedded in AI Code #123. Obviously, a human car operator would find it preferable not to swerve, run the object over, and avoid hitting the child. An automated vehicle's AI might not be that sophisticated when dealing with many adverse factors, particularly if every possible weather condition, in conjunction with every possible human action, in conjunction with every rule of the road, is not programmed into the AI's code properly—Microsoft Word's spell check is certainly not that sophisticated.[43]

When the number of variables such as weather, road conditions, driver activity and pedestrian activity add up, AI becomes more difficult to program.[44] Gary Marcus, a professor of psychology, describes AI as "brittle, opaque and shallow [intelligence.]"[45] Brittle, because AI cannot relate one driving context to another.[46] Opaque, because humans cannot psycho-analyze AI's decision-making procedures, to explain the why and how.[47] Shallow, because AI can be fooled rather easily.[48]

Autonomous vehicles with AI, therefore, expose the community to damages not typically associated with traditional cars. Upon an AI code's failure, not only is a driver, its passengers, and the opposing cars at risk of injury; all surrounding pedestrians and third parties could be harmed based on how the AI reacts. If the AI responds by telling the vehicle to drive right, the vehicle could continue on path until driving into a bakery, a cable utility, a local park, or even a gas station. Property owners will need to be even more alert when abutting the streets. Pedestrians might have a greater skepticism when walking near the streets. While many risks associated with distracted drivers in traditional cars will be reduced by AI,[49] flaws in design, in software updates, and in anti-virus protection will create new injuries.

[40] *Id.* at 155-157.
[41] *Id.*
[42] *Id.* at 159-161.
[43] *Id.* at 155-157.
[44] *Id.* at 148-150.
[45] Mims, *supra* note 33, at 1-3.
[46] *Id.*
[47] *Id.*
[48] *Id.*
[49] Gurney, *supra* note 2, at 255-256.

An autonomous vehicle's AI depends on data centers, which opens up a whole new area of risk. The information centers, established by Google or other companies, relay an autonomous vehicle's information to all other computerized cars and electronic stop lights.[50] Those data centers will be vulnerable to viruses in the age of cyber-attacks. Viruses can "delete," "mutate," or cause an entire network to crash, which exposes manufacturers of autonomous vehicles to products liability considerations due to damages caused by third party hackers.[51] The AI's code will never be able to anticipate all possible viruses created by third party hackers, some of which could be intentional terror attacks.[52]

Together, the diversity of autonomous vehicles and uncertainty of AI should persuade lawmakers to think about a sensible approach for handling compensation claims brought by accident victims, while, at the same time fostering growth for a likely useful technology. The right way to do that is through first evaluating our current products liability laws and their applicability to highly automated vehicles.

IV. Background on Products Liability

Products Liability is a term for the liability of a manufacturer, dealer, or distributor of a chattel, to a consumer or bystander who suffers a physical harm caused by the chattel's malfunction or misuse.[53] Products liability claims often pit the growth of technology and the desire of manufacturers to make money off their inventions against the government's interest in creating a market where manufacturers have a duty to make safe products, warn and describe them accurately to the consumer, and are held accountable to injured individuals whenever those products fail to do so.[54] The ideal products liability law neither inhibits good product development nor exposes the consumer (or bystanders) to unnecessary risk from new products.[55]

There are three categories of products liability claims: manufacturing defects, design defects, and warning defects.[56] Manufacturing defect claims arise when a product deviates from the way it was intended to be made, when it is an abnormality from the general supply, and the resulting injury would have been prevented had the product been consistent with its norm.[57] Generally, modern manufacturing procedures yield a low rate of manufacturing defects, because procedures are constantly improved.[58] Design defect claims involve injuries arising from intentional choices made by manufacturers for an entire product's line, choices that make a product less safe than what it reasonably could have been if those choices were different.[59] A design defect claim is successful when foreseeable risks could have been reduced or avoided altogether had an alternate design been used.[60] If no safer option is available, then a manufacturer will not be held liable for

[50] Karnow, *supra* note 36, at 161-163.
[51] *Id.* at 167-168.
[52] Karnow, *supra* note 36, at 167-168. Geistfeld, *supra* note 1, at 1623.
[53] Gurney, *supra* note 2, at 257-58.
[54] *Id.* at 259-261.
[55] *Id.*
[56] *Id.* at 258.
[57] *Id.* at 257-259.
[58] *Id.* at 258-259.
[59] *Id.* at 258.
[60] *Id.* at 257-259.

a design defect.[61] A warning defect claim is based on the instructions that accompany a product, and is successful when the instructions fail to show: 1.) how to use the product properly, or 2.) the inherent risks that follow even with proper use of that product.[62] Since manufacturers are making so many decisions regarding autonomous vehicles, particularly for the products' safety, the tort system needs to find an appropriate way to evaluate those decisions while factoring in the complexity of the product.

While all three of these claims certainly have a role to play with autonomous vehicles, this paper focuses on design defects because they present the greatest threat to autonomous vehicle development.[63] Since design defects attack the entire product's line, the result of a losing lawsuit could be "massive recalls, massive class-action lawsuits, or a combination" for autonomous vehicle manufacturers.[64] Car companies could go bankrupt from a single design defect before they even have a chance to improve their constantly evolving technology.

V. Design Defect: Consumer Expectations Test

Courts typically use two different tests for design defect claims: the consumer expectations test and the risk-utility test.[65] The Restatement (Second) of Torts prescribes the consumer expectations test for design defects, and defines it as a "defect that is unreasonably dangerous beyond the contemplation of the consumer."[66] This means that a defect exists when a product exceeds the level of danger that an ordinary consumer would expect after purchase and intended use.[67] Courts will look at how much danger the average consumer would anticipate from a product and then ask if the manufacturer's design fell below that expectation.[68] If that happens, a manufacturer will be held liable, regardless of whether or not the defendant manufacturer was negligent in the design process.[69] However, under consumer expectations, a manufacturer does not have to make his product "perfectly safe."[70]

An example of the consumer expectations test in action comes from *Vincer v. Esther Williams All-Aluminum Swimming Pool Co.* (1975), a case where the plaintiff, an unsupervised two year old, fell into in an above ground swimming pool and remained in the water for a period of time, causing brain damage.[71] The plaintiff argued that the pool had a design defect, that the pool should have had a self-closing gate, and was not child-proof.[72] The Court denied plaintiff's claim, concluding that a lack of a self-closing gate is dangerous for kids, but, the average consumer (i.e. the parents who bought the swimming

[61] *Id.* at 262-263.
[62] *Id.* at 257-259.
[63] *Id.*
[64] Blunt, *supra* note 3, at 124-125.
[65] Gurney, *supra* note 2, at 257-259.
[66] Restatement (Second) of Torts § 402A cmt. g (1965). Gurney, *supra* note 2, at 259-261.
[67] *Id.*
[68] *Id.*
[69] Blunt, *supra* note 3, at 125-127.
[70] Gurney, *supra* note 2, at 259-261.
[71] *Vincer v. Esther Williams All-Aluminum Swimming Pool Co.*, 230 N.W.2d 794, 796-799 (Wis. 1975).
[72] *Id.*

pool) should have been completely aware of this risk.[73] Under consumer expectations, this pool was not defective in design.[74]

There are several drawbacks to the consumer expectations approach to determining defective design. Consumer expectations has been abandoned or criticized by courts because: 1.) it doesn't properly account for risks to third party bystanders, who might have no expectation of a product's risk while a consumer is using a product nearby; 2.) it is compromised when a product's dangers are obvious, therefore denying compensation even if there is something fundamentally wrong with the product; and 3.) it is inadequate when dealing with the typical consumer's ignorance about unique products.[75] Oftentimes, consumers use a product like a chainsaw, a lawnmower, or a car that present risks not only to themselves, but to other people around them.[76] In these instances, injured third-party victims look to products liability law to fix their injuries and for manufacturers to indemnify them for the product-caused harm.[77] Consumer expectations only looks to the "expectations of the risk controller rather than to those of the victim" for design defect.[78] This means that manufacturers can escape liability even when they make products that are seriously dangerous to third party bystanders so long as the product isn't seriously dangerous to the operator.[79] Other times, no matter how cheap it would be for manufacturers to make their product safer, when a buyer uses a product that is *obviously* dangerous, that buyer assumes the risk of injury to himself or to a third person—which means the buyer has to compensate for injuries caused by the product's defective design.[80] This "rewards manufacturers for failing to adopt cost-effective measures to remedy glaring dangers to human life and limb," because manufacturers escape liability if their product is obviously dangerous.[81] Finally, consumer expectations is more difficult to ascertain when the operator is using a product so unique that common risks associated with use has not been considered, particularly because of lack of experience.[82]

Autonomous vehicles are complex products—the average consumer is not likely to understand the dangers posed by everyday use.[83] Consumers' safety expectations of autonomous vehicles will vary significantly from customer to customer such that courts will never be able to formulize an objective standard. Therefore, we should not anticipate consumer expectations to be applied to autonomous vehicles and the AI that helps them function.[84] Courts were already hesitant to apply this consumer expectations test to *airbags*, a much simpler product than autonomous vehicles with artificial intelligence.[85]Although many states continue to use consumer expectations, the risk-utility test is much more appropriate for this product.[86]

[73] *Id.*
[74] *Id.*
[75] David G. Owen, PRODUCTS LIABILITY LAW 487-489 (3d ed. 2015).
[76] *Id.* at 487.
[77] *Id.*
[78] *Id.*
[79] *Id.*
[80] *Id.* at 487-488.
[81] *Id.*
[82] *Id.*
[83] Blunt, *supra* note 3, at 125-127.
[84] Gurney, *supra* note 2, at 259-261.
[85] Blunt, *supra* note 3, at 125-127.
[86] Gurney, *supra* note 2, at 259-261.

VI. Design Defect: Risk-Utility Test

The Restatement (Third) of Torts endorses the risk-utility test for design defects.[87] Section 2(b) says "A product... is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller... and the omission of the alternate design renders the product not reasonably safe."[88] Plaintiffs can recover under this test when they show by a preponderance of the evidence that a reasonable alternate design could have made the product line safer.[89] This does not mean a manufacturer has a duty to create the "safest design possible"; manufacturers fail this test only if the "safety benefits" from the altered design proposed by plaintiff exceeds the "cost of such alteration."[90] Factors that help courts with this inquiry are: 1) the product's usefulness as designed, 2) the likelihood of injury, 3) the availability of a substitute product that is able to meet a similar need, 4) the manufacturer's ability to remove the unsafe characteristics without inhibiting the usefulness, 5) the user's ability to avoid danger with reasonable care, 6) the anticipated awareness of danger when using the product by common knowledge or adequate warning, and 7) the ability of the manufacturer to spread the loss or acquire insurance.[91]

An example of the risk-utility test in action comes from *Prentis v. Yale Mfg. Co.* (1984), a case where plaintiff fell off a forklift.[92] The Court held that the forklift's design was defective because there was no seat, and that the forklift's original design did not consider a human operator's fatigue during a long workday.[93] The plaintiff recovered under the risk-utility test because a seat was a reasonable alternative design that would have prevented his fall and injury,[94] but would not have rendered the forklift too pricy or taken away from its intended purpose.[95]

On the other hand, in *Smith v. Louisville Ladder Co.* (2001), the court used the risk-utility test and denied recovery to a plaintiff who fell off a ladder.[96] The Court held that the plaintiff's proposed design of adding a U-ring at the top of the ladder plus a latch to link on to whatever the ladder was adjacent to was not a reasonable alternative design because it was merely hypothetical.[97] The Court reasoned that a proposed design must be able to be tested by a finder of fact under the risk-utility test.[98] A design that is not invented yet cannot be factored in to a court's risk-utility analysis.[99]

Risk-utility has been praised by legal experts because it is essential to "intelligent cost-benefit decision-making," one that weighs the likelihood of injury with the burden of

[87] *Id.* at 261-263.
[88] Restatement (Third) of Torts: Prods. Liab. §2(b) (1998). Gurney, *supra* note 2, at 261-263.
[89] *Id.*
[90] *Id.*
[91] Blunt, *supra* note 3, at 125-127; Owen, *supra* note 75, at 499.
[92] *Prentis v. Yale Mfg. Co.*, 365 N.W.2d 176, 176-191 (421 Mich. 670 1984).
[93] *Id.*
[94] *Id.* at 187.
[95] *Id.*
[96] *Smith v. Louisville Ladder Co.*, 237 F.3d 515, 518-520 (5th Cir. 2001).
[97] *Id.*
[98] *Id.*
[99] *Id.*

making a product safer.[100] However, critics of risk-utility argue that the test is unfair when courts require plaintiffs to actually develop the prototype for an alternative, safer product—which can be very expensive.[101] Risk-utility also favors products that are seen as "essentials" over "luxuries," the latter of which, have a much more difficult time passing.[102] My criticism of the test is that it punishes manufacturers who aspire to replace a current technology that is adequate under risk- utility but still dangerous to some number of people, where a safer, future product (albeit more dangerous at this point in time) could be much safer than the norm after years of improvement.

Nevertheless, the risk-utility test is better than consumer expectations when dealing with autonomous vehicles and artificial intelligence because the former can apply to either a tangible part of the car or the car's software.[103] The risk-utility test is more equipped to handle third-party bystanders' interests as well as dealing with products that are obviously dangerous, like automobiles.[104] At this point, I pivot to the heart of my argument: that the risk-utility test, our standard for products liability law, might not be the adequate doctrine for a complicated type of product, like autonomous vehicles with artificial intelligence.

VII. Is Risk-Utility an appropriate test for Autonomous Vehicles with Artificial Intelligence?

The first problem with risk-utility is the unpredictable nature of AI and manufacturers' inability to test all possible AI coding scenarios before releasing the vehicle into the stream of commerce.[105] AI code failures can be so complicated that it would take thousands of years to make a totally safe standard for a code.[106] Some faults in coding cannot be tested before a product is released and actually used by the public—particularly when a non-obvious chain of events creates a "stress factor" on the AI's programming and an injury results.[107] Courts' understanding of the likelihood of injury from a code (that may or may not be faulty) or the cost of replacing a code with a more ideal one (when we have no way of knowing if that ideal code is in fact ideal until it's on the market) would be arbitrary at best.

The second problem with risk-utility is that sophisticated AI software experts will be limited in number, making the required expert testimony expensive and difficult to acquire.[108] In order to recover under risk-utility, not only does the injured person need to show that the vehicle's AI caused a car accident, the injured also needs to present a

[100] Owen, *supra* note 75, at 500.
[101] *Id.*
[102] *Id.*
[103] Gurney, *supra* note 2, at 263-265.
[104] Owen, *supra* note 75, at 487-499.
[105] Karnow, *supra* note 36, at 161-163.
[106] *Id.*
[107] *Id.* Recall my section II hypothetical, where a child is in the breakdown lane where an autonomous vehicle wanted to swerve. This example might be difficult to test for until the product is actually in the stream of commerce, until this complicated scenario actually happens in real life. Alternatively, even if this scenario was tested for: what about all the types of weather conditions, all the seasons, or all hours of night? What happens if this vehicle was negligently maintained? There are too many variables to adequately test AI is an efficient amount of time.
[108] Gurney, *supra* note 2, at 263-265.

software expert to testify that the AI's code could have been "written" in a better way that would have actually prevented the accident from happening.[109] There might be only one or two software experts in the world to testify on that specific AI code for a particular autonomous vehicle: one of whom works for the defendant car manufacturer, the other of whom works for the defendant's main competitor.[110] Any other plaintiff's expert needs to remember that proposed solutions to bad software programs cannot be hypothetical, they need to be ones that can physically be tested for risk-utility factors and proven to a court of their enhanced safety features.

For the remainder of this paper, I will argue for an alternative system to risk-utility, one that can more appropriately and efficiently handle design defect claims caused by autonomous vehicles with artificial intelligence. If it were litigated tomorrow, I concede that autonomous vehicles would be tested through a risk-utility analysis. But, cars are used so frequently in our lives and present a risk to virtually everyone that leaves their home during the day, that a special legislative carveout is needed to replace litigation. As we will explore, autonomous vehicles with AI share some characteristics with the three historical legislative exceptions to the risk-utility test, the three major products where Congress[111] decided to preempt state products liability law.

VIII. Historical Statutory Exceptions to Risk-Utility: Handguns, Small Planes & Food

Because of legislative action, risk-utility is not applied for defective design for three products: handguns, small planes, and food.[112] The next part of this paper compares autonomous vehicles with AI to these three products, reviews the legislative history of each, and explains why they serve as useful precedents for removing autonomous vehicles from litigation based injury claims. Admittingly, a statutory preemption is not routine; federal preemption of state tort law is a deviation from the norm.[113]

a. Handguns

The first federal preemption of state tort law to discuss is handguns. Plaintiffs have tried to bring lawsuits against handgun manufacturers under products liability law.[114] These plaintiffs have argued that handguns create a greater risk of injury to society than their overall utility, and that the marketing of handguns is "defective" in that it makes it too easy for criminals to obtain handguns to hurt people.[115] In litigation, the risk-utility test has proven to be inappropriate for this problem, because "it makes little sense to characterize as 'defective' a handgun that performs as intended and causes injury only

[109] *Id.*
[110] *Id.*
[111] Or, in the case of food products, a majority of the states' legislatures.
[112] Protection of Lawful Commerce in Arms Act, 119 STAT. 2095, 109th Cong. (2005). General Aviation Revitalization Act of 1994, STAT. 1552, 108th Cong. (1994). Personal Responsibility in Food Consumption Act, H.R. 554, 109th Cong. (2005).
[113] David G. Owen, *Inherent Product Hazards*, 93 KY. L.J. 377, 422 (2004)
[114] People who have been injured by guns, particularly those who have been injured by intentional misuse of guns.
[115] Harvard Law Review Association, *Handguns and Products Liability*, 97 HARV. L. REV. 1912, 1912-1914 (1984).

because it is intentionally misused."[116] Risk-utility falls short because manufacturers are making products that function property—a misuse of a product is completely different from that product's defectiveness and courts only want to hold manufactures accountable under products liability law when products don't function properly.[117]

As a legislative response to this issue, Congress passed the "Protection of Lawful Commerce in Arms Act," which limits actions brought against "manufacturers, distributors, dealers or importers of firearms or ammunition [...] resulting from the misuse of their products by others," [118] and preempts the states' tort law risk-utility test.[119] This exception shows a respect in our legal system for manufacturers who release products free from design defects, regardless of what some may think of the product.[120] Maintaining true to that principle, "when a product is intentionally and illegally misused, or improperly distributed by another party to those who will misuse it, there is little a manufacturer can do to prevent injury."[121] That question changes the conversation from a products liability risk-utility test in court to a societal question of whether or not we want that product in our world, a decision that should be made by the legislature.[122]

Handguns and autonomous vehicles with AI are similar in that their manufacturers are at risk of being held liable for design defect even when their products perform as intended. Similar to handguns, an autonomous vehicle's AI data center can be used by a third party to inflict intentional harm, through a system hack.[123] Holding an automobile manufacturer liable for his vehicle even though his vehicle performs as intended goes against the recognized principles of design defect because it has nothing to do with the competence of the vehicle itself.[124] Even when the data center's security system is subpar, handgun preemption shows us that the success or failure of a product, under design defect, has never depended on a few third party wrongdoers paving the way for manufacturer liability. Autonomous vehicles, a product that could save 30,000 lives annually from traffic accidents, might outweigh the risk of third party hacks, especially if those hacks cost less than 30,000 lives a year.

Nevertheless, AI data centers have a duty to use reasonable care when protecting their customers' autonomous vehicles and information; but, as a society, we might not want to hinder the technology when something goes wrong because of a sophisticated criminal wrongdoer. Accordingly, the question of whether or not we want autonomous vehicles in society (similar to handguns) should be a question for the legislature and not the courts.

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[116] *Id*
[117] Gurney, *supra* note 2, at 261-263.
[118] Protection of Lawful Commerce in Arms Act, 119 STAT. 2095, 109th Cong. (2005). Elizabeth T. Crouse, *Arming the Gun Industry: A Critique of Proposed Legislation Shielding the Gun Industry from Liability*, 88 MINN. L. REV. 1346, 1346-1348 (2004).
[119] Jenny Miao Jiang, *Regulating Litigation Under the Protection of Lawful Commerce in Arms Act: Economic Activity or Regulatory Nullity?*, 70 ALB. L. REV. 537, 537-539 (2007).
[120] Harvard Law Review Association, *supra* note 115, at 1912-1914.
[121] *Id.*
[122] *Id.*
[123] Jiang, *supra* note 119, at 537-539.
[124] *Id*

b. Small Planes

The second federal preemption is small planes. Products liability claims caused a significant decline in small aircraft sales.[125] People didn't want to buy small planes, manufacturers' insurance rates skyrocketed, and companies' sales plummeted, which made some small aircraft companies go out of business.[126] As a result, the aviation community, machinist unions, and manufacturers, called for national reform of products liability for aviation lawsuits.[127]

To address this issue, Congress passed the "General Aviation Revitalization Act of 1994," a statute of repose, which limited the liability of "general aviation aircraft and components in accidents occurring more than eighteen years after the aircraft left the manufacturer or after the component was installed."[128] Basically, there was an eighteen year cutoff for successful lawsuits: if an injured plaintiff sued a small aviation company regarding the products liability of a plane whose sale was more than eighteen years ago, plaintiff was unlikely to succeed.[129] But, for any subsequent component installation to the plane, the component company who installed parts some years after the original sale, is held strictly liable for any injuries in the following eighteen years, no matter the plane's original age.[130] This Act also allowed claims made by injured third-party passengers on those planes, factoring in the same cutoffs.[131] Although tort law is generally "judge made law," Congress proceeded with extreme precaution to preempt state law because of the "unique nature of the general aviation industry."[132] After this act was passed, production increased and the market was saved.[133]

While there are fewer similarities between autonomous vehicles and the history of small planes, protecting a future for the product's market is certainly a common goal. Just like this small planes exception, where Congress preempted state tort law's risk-utility test because of the market's vulnerability to collapse, the market for autonomous vehicles is equally vulnerable to high insurance rates and massive recalls of products.[134] As it stands right now, the market for autonomous vehicles is incredibly small, as no highly autonomous vehicles are on the market. General products liability law could bankrupt new, upcoming companies before they even get started. For small planes, Congress had a unique goal in mind, to save an industry from collapse. The autonomous vehicle industry might need to be saved before it even takes off.

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[125] J. Anthony Salmon, *Aviation Products Liability as the Cause of the Decline in Small Aircraft Manufacturing: An Examination of Possible Solution*, 19 AM. J. TRIAL ADVOC. 171, 181-183 (1995).
[126] *Id.*
[127] *Id.*
[128] General Aviation Revitalization Act of 1994, STAT. 1552, 108th Cong. (1994). Salmon, *supra* note 125, at 188- 189.
[129] Salmon, *supra* note 125, at 189.
[130] *Id.* at 188-191.
[131] *Id.* at 189.
[132] *Id.* at 188-191.
[133] *Id.* at 188-196.
[134] Caleb E. Mason, *Doctrinal Considerations for Fast-Food Obesity Suits*, 40 TORT TRIAL & INS. PRAC. L.J. 75, 98- 104 (2004).

c. Food and Obesity[135]

The third product to discuss is food products and their potential to cause obesity or other diseases. In response to the many lawsuits Americans filed against fast food companies and their advertisers for weight gain and related diseases, the House of Representatives passed the "Personal Responsibility in Food Consumption Act."[136] This bill attempted to bar "obesity suits" related to weight gain against food manufacturers, distributors, and retailers of food, including design defect claims under a risk-utility analysis.[137] Even though arguments can be made that food is not as reasonably safe as what it could be, the House of Representatives tried to ban these lawsuits in part because of the mitigating factor that people can decide what they eat for themselves.[138]

Practically speaking, this manufacturer immunity from products liability lawsuits would have been an efficient legislative decision. There is an infinite number of ways McDonald's or other food companies' can make meals safer, such as reducing: portion size, salt, cholesterol, and sugar.[139] But, these fixes are rendered useless if people decide afterward to simply order more food quantities.[140] Consumers' decisions are impossible to litigate after that point, because legal causation of the injury is impossible to discover: which meal, which food distributor, and which lifestyle decision actually causes the food-related illness—or is it a combination of all three?[141] Successful products liability judgments against unhealthy food companies, particularly where legal cause is difficult to establish, opens the floodgates for litigation against alcohol, soft drink, candy, sugary, and salty food companies.[142] Had consumer lawsuits been successful, I assume that many foods we enjoy would not be on the market and that every food entity could be exposed to frivolous product evaluation such that nobody would want to enter the business.

Autonomous vehicles with AI are similar to this obesity exception because of the causation issue and the underlying threat of numerous lawsuits that follow from a risk-utility analysis. When an autonomous vehicle's AI tells a car to run a red light and a pedestrian injury follows, the true legal cause contains a plethora of events, perhaps impossible to determine: was the pedestrian at fault for jay-walking, did the driver update his AI system recommended by the manufacturer, was the data center hacked, or was the coding negligent? Similar to the long-term health consequences of eating, where the cause

[135] This section references the Personal Responsibility in Food Consumption Act, H.R. 554, 109th Cong. (2005). Unlike the Protection of Lawful Commerce in Arms Act and General Aviation Revitalization Act of 1994, the Personal Responsibility in Food Consumption Act was passed by the House of Representatives but failed in the Senate, meaning that design defect claims against food manufacturers are not preempted. However, a majority of the states' legislatures have taken their own action to limit food manufacturers' liability. Christopher S. Carpenter and D. Sebastian Tello-Trillo, *Do 'Cheeseburger Bills' Work? Effects of Tort Reform for Fast Food,* NBER Working Paper Series, National Bureau of Economic Research 1, 2-3 (2015). Nevertheless, despite this distinction, food products are similar to handguns and small planes in that plaintiffs' design defect claims against their manufacturers are limited by some legislative action. The legislative history of all three products is more important for autonomous vehicles than the issue of which federal or state government provides the law. Pat Hartman, *"Whatever Happened to the Cheeseburger Bill?" http://childhoodobesitynews.com/2012/02/29/whatever-happened-to-the-cheeseburger-bill/* (last visited October 16, 2018).
[136] H.R. 554, 109th Cong. (2005). Mason, *supra* note 134, at 98-104.
[137] *Id.*
[138] *Id.*
[139] Mason, *supra* note 134, at 92.
[140] *Id.* at 98-104.
[141] *Id.* at 98-101.
[142] *Id.* at 93-104.

is difficult to pinpoint, driving autonomous vehicles has just as many variables, and litigating under a risk-utility or negligence theory would be too expensive and time-consuming. Another commonality is that everybody drives and everybody eats; the number of lawsuits would overwhelm the system if legislatures allows design defect claims. Removing autonomous vehicles from the tort system, just like food, handguns and small planes, would provide an efficient but necessary solution for the complications surrounding AI.[143]

Since injuries from autonomous vehicles are similar but not identical to those caused by handguns, small planes, and food, I argue for a different public policy decision: one that is less than a full legislative immunity for manufacturers. The differences between food and autonomous vehicles is the main reason why something lesser than a full legislative immunity for autonomous vehicle manufacturers is necessary. Although both products warrant an exception from risk-utility to prevent a floodgates of litigation, autonomous vehicles with AI are different from food in that the former has a larger scope of risk per life-choice: the man with the cheeseburger only endangers himself, his life choices contribute to his nutritional health; but, the man with the brand-new autonomous vehicle endangers everyone on the road, including those who chose not to buy one, and those who wanted to stick with the traditional car. While food manufacturers are immune from design defect because people have the autonomy to decide what they eat,[144] a bad decision involving dangerous cars actually takes away from other people's freedoms when it causes road fatalities. The advantage of autonomous vehicles is that the product is not finished yet; public policy has some time to develop.

IX. A Statutory Alternative: What is Liability Insurance?

Liability insurance is a way to pay for the injured, so long as there is a legal obligation. It is an insurance policy purchased by an autonomous vehicle manufacturer to compensate for injuries caused by the manufacturer's products.[145] Policy coverage begins once a consumer purchases an autonomous vehicle sold by that manufacturer, making that manufacturer legally liable to the consumer and any third party injured from that consumer's autonomous vehicle. Policy coverage includes all personal injuries and property damage from traffic accidents as a matter of strict liability so long as 1.) an accident happened and 2.) that accident was caused by an autonomous vehicle made by the manufacturer/policyholder.[146] No comparative fault or driver culpability analysis is required.[147] If mandated by law, this system recognizes that autonomous vehicle manufacturers profit from dangerous, but important products and therefore should insure against those dangers.[148]

A liability insurance statutory exception to the risk-utility test should be used for autonomous vehicles to 1.) recognize the complexity of autonomous vehicles with AI; 2.)

[143] *Id.* at 102-104.
[144] *Id.* at 102-106.
[145] William L. Prosser, LAW OF TORTS 541 (4th ed. 1971).
[146] *Id.*
[147] Interview with James Kovach, Editorial Staff, Roger Williams University Law Review, in Bristol, R.I. (July 2018).
[148] *Id.* at 542.

avoid litigation and the resources necessary to assess whether a particular AI's code was acceptable under risk-utility; 3.) justify a system of compensation to injured consumers or bystanders through a no-fault system, requiring only that the injured show a.) an injury occurred and b.) that injury was caused by an autonomous vehicle with AI; and 4.) facilitate longevity of autonomous vehicle and artificial intelligence companies by making them pay a lower dollar amount for each injury than what they would have paid in civil action using a traditional risk-utility system (not to mention saving the expense of attorneys' fees and related expenses)—which would be like workers' compensation insurance. A mandatory autonomous vehicle manufacturer liability insurance policy could require each car company to pay a portion of a statutory pool of insurance based on the percentage of autonomous cars they have sold.[149] When an injury happens involving one of that company's autonomous vehicles, money is paid out through that federal pool, and the company's yearly insurance premium would increase the following year to reflect the product experience. This insurance statute can be put in check with a sunset provision, making it a temporary policy that expires and reverts back into the risk-utility products liability system once a proven autonomous vehicle with artificial intelligence standard is established. Since this recommendation differs from the earlier three immunities, I turn the last part of my argument toward the Swine-Flu vaccine: the only historical example where Congress granted manufacturers a partial immunity from design defect claims surrounding their products.

X. The Legislative Exception to Risk-Utility that is *not* an Immunity: Swine-Flu Vaccine

a. Swine-Flu Vaccine

In 1976, the swine-flu threatened the United States and the government looked for a vaccine to prevent a pandemic.[150] President Ford recommended on television "a nationwide influenza vaccination program to include 'every man, woman and child in the United States.'"[151] Manufacturers were hesitant to release their vaccines however, because it was risky: a very small percentage of people who took the vaccine—even though they did not contact the virus before— would end up getting the swine flu.[152] In response, Congress passed a partial immunity for these vaccine manufacturers, preempting the risk-utility test, and shifting liability to the government.[153] Claims involving the swine-flu vaccine were therefore only allowed if filed against the government.[154] The rationale was that the United States had a unique role[155] in this

[149] And on the roads.
[150] George W. Conk, *Will the Post 9/11 World be a Post-Tort World?,* 112 PENN ST. L. REV. 175, 182, 238-239 (2007). Hon. Karen Shichman Crawford & Jeffrey Axelrad, *Legislative Modifications to Tort Liability: The Unintended Consequence of Public Health and Bioterrorism Threats,* 45 CREIGHTON L. REV. 337, 338-340 (2012).
[151] Crawford & Axelrad, *supra* note 150, at 338-340.
[152] Conk, *supra* note 150, at 238-239.
[153] *Id.*
[154] *Id.*
[155] Joanna B. Apolinsky & Jeffrey A. Van Detta, *Rethinking Liability for Vaccine Injury,* 19 CORNELL J.L. & PUB. POL'Y 537, 548 (2010).

vaccine's marketing and sales, so it was the government's responsibility to compensate for damages as well.[156]

After release, the swine-flu vaccine proved to be a success because there was no pandemic,[157] but, an unfortunate consequence was that 5,200 people ended up getting Guillain- Barre disease,[158] a neurological disorder that causes paralysis.[159] Scientific evidence, at the time, provided no indication to manufacturers that Guillain-Barre could result from the vaccine, but now epidemiological evidence recognizes Guillain-Barre as a rare complication.[160] Under a risk- utility test, at that point in time, the swine-flu vaccine had a greater utility to society than risk; the masses were saved at the expense of 5,200.[161] The Guillain-Barre victims would not have recovered under traditional design defect.[162] But, the United States paid ninety million dollars to those victims anyway, so long as they could show Guillain-Barre after taking the vaccine.[163] Joseph Califano (the Secretary of Department of Health, Education, and Welfare), said that the government's goal of preventing a swine flu influenza pandemic included the recognition of unexpected injuries that come with it, including Guillain Barre Syndrome.[164] As a matter of public trust, it was the government's responsibility to pay out claims caused by a product that it essentially forced onto the market.[165]

This vaccine is unique to products liability because it passed a design defect test, but nevertheless compensated the injured minority for injuries caused by that design decision. This unorthodox compensation was justified on both a social insurance level as a matter of public health and tort liability based on the government's hard-sell vaccination campaign.[166]

A preemption of state tort law's risk utility test for autonomous vehicles would be similar to the swine-flu vaccine's preemption because both products require a hard-sell government campaign motivated by a goal for the greater good: to save lives in the aggregate.[167] Both the swine-flu vaccine and autonomous vehicle are important and complex products, that are expensive to develop, and require a bit of faith on the marketplace to save lives over the long term. The risks in testing these products must precede the benefits of a safer world built by these products. The day that the government allows highly autonomous vehicles on the road is a powerful endorsement of the product's safety, much like the swine-flu vaccine's endorsement. Some injuries will occur that no manufacturer can foresee, but, since government is the entity that permits a lifesaving vaccine or a revolutionary transportation vehicle into the stream of commerce, government should organize compensation efforts as well.[168] The sooner autonomous

[156] Conk, *supra* note 150, at 238-239.
[157] *Id.*
[158] *Id.* at 239-241.
[159] National Institute of Neurological Disorders and Stroke, *Guillain-Barre Syndrome Fact Sheet, https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Guillain-Barré-Syndrome-Fact- Sheet* (last visited July 20, 2018).
[160] Conk, *supra* note 150, at 239-241.
[161] *Id.*
[162] *Id.*
[163] *Id.*
[164] *Id.* at 242-243.
[165] *Id.*
[166] *Id.* at 246-248.
[167] Crawford & Axelrad, *supra* note 150, at 337-338.
[168] *Id.*

vehicles are allowed on the public roads, the sooner 30,000 lost lives a year will be reduced.[169] Keep in mind, the goal is a fully vaccinated society or accident-free cars.

Autonomous vehicles differ from the swine-flu vaccine in that the earlier is not a product related to biomedical health. Congress could decide to ban autonomous vehicles outright and prevent AI driving-related risks, which was not an option with the threat of swine-flu. Ultimately, 30,000 annual driving-related fatalities from traditional cars has been a permissible number for many years, so an argument could be made to refrain from the technology altogether.[170] But, a more appropriate legislative decision, in my opinion, would be to pass an insurance policy before autonomous vehicles reach the market. Quickly taking action would incentivize companies to make their products safer, immediately and Congress would not be pressured later on to find a remedy.

XI. Federally Mandated Autonomous Vehicle Manufacturer Liability Insurance

A federally mandated autonomous vehicle manufacturer liability insurance policy would pay damages to injured victims and injured third parties on a no-fault basis, so long as they were injured in an autonomous vehicle-related accident. Under this plan, the federal insurance policy would compensate for economic damages that stem from the autonomous car accident, including medical payments, funeral expenses, death benefits, and property damages to injured drivers, passengers and third parties.[171] However, the plan should severely limit or not cover at all non- economic damages like emotional distress, fear of future injury, and punitive damages. The plan would also compensate the legal fees reasonably necessary to recover under the insurance policy. Similar to workers' compensation, this plan is a compromise—meant to replace the uncertainty of an injured person not being able to recover at all.[172]

Funding for this policy would be based on the sum of yearly premiums paid by all of the autonomous vehicle companies selling products in the country. Each company's yearly premium would be proportional to the number of autonomous cars that company produced and currently has on the roads in that given year.[173] Government data centers can determine how many autonomous vehicles are being used, and how many were produced by each car company. If there are four major companies, divided equally in car sales/representation, then each car company would fund 25% percent of the total fund for that given year. If, in the following year, three companies' sales skyrocket, and the fourth company only has 10% of autonomous cars in active use, then that fourth company's

[169] Gurney, *supra* note 2, at 248-251.
[170] Conk, *supra* note 150, at 242-243.
[171] Insureon, *"What Does Workers' Compensation Insurance Cover?"* BIN Insurance Holdings Agency, date accessed July 07, 2018, https://www.insureon.com/products/workers-compensation/five-things-benefits-cover.
[172] Geistfeld, *supra* note 1, at 1659.
[173] "Produced and currently on the roads" means current functioning autonomous vehicles. This includes company sales from one year and all previous years. Waymo would have to pay 50% of the federal insurance premium if 50% of autonomous vehicles in active use in the United States are made by Waymo.

premium would be reduced the following year to 10% of the federal fund while the others' premiums would be increased proportionally.

Premium adjustments can be made based on the safety (or lack thereof) of each company's cars, providing incentives for manufacturers' to make their cars safer than competitors. For instance, if Google, sold 25% of autonomous cars on the road, pays 25% of the federal fund, but proves on a consistent basis that only 20% of the accidents involve Google vehicles, the premium in the following year should be reduced by 5%, making Google only responsible for 20% of the federal fund.[174] This insurance model can maintain capitalistic competition by incentivizing the best possible product: whoever makes the safest artificial intelligence will be not hindered by the problems of the rest.

XII. Conclusion

In 2018, a future with autonomous vehicles is still an abstraction. Taking action on something that has not happened yet is difficult to do. But, insurance can be used as a guide through technological uncertainty, especially because the product is still an automobile. Since autonomous vehicle manufacturers understand and accept strict liability for their products' failures, [175] they might be more willing to compromise with the federal government in exchange for knowing the monetary consequences of releasing their product to the market, for risk assessors to have a better understanding of what their up against.

Once autonomous vehicle technology is perfected, the legal world will change: 13% of all personal injury cases, those which involve traditional car accidents, could be reduced or eliminated altogether.[176] With a decrease in car accidents, "several fields can expect [a lower volume] of subrogation, dram shop actions, insurance coverage cases, [and medical malpractice claims that would have stemmed from traditional car injuries.]"[177] Public policy debate will scrutinize over the latest autonomous vehicles.[178]

What is not an abstraction, but abundantly clear, however, is that autonomous vehicles will create a new legal regime in some way. This new tort regime could be even more far reaching than its predecessor workers' compensation.[179] Hopefully, it will be just as successful.

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[174] While the more dangerous car companies' premiums increase.
[175] Geistfeld, *supra* note 1, at 1629.
[176][176] Brad E. Haas, *Autonomous vehicles may impact the legal profession,* VOL. 17, NO. 20 THE JOURNAL OF THE ALLEGHENY COUNTY BAR ASSOCIATION 1, 1-2 (2015). http://www.marshalldennehey.com/media/pdf-articles/O%20383%20by%20B.%20Haas%20%2810.02.15%29%20Journal%20Allegheny%20County%20Bar.pdf.
[177] *Id.*
[178] *Id.*
[179] Kenneth Abraham and Robert Rabin, *INSIGHT: Driverless Vehicles and Manufacturer Responsibility for Accidents—A New Legal Regime for a New Era, https://news.bloomberglaw.com/product-liability-and-toxics- law/insight-driverless-vehicles-and-manufacturer-responsibility-for-accidentsa-new-legal-regime-for-a-new-era* (last accessed October 16, 2018).