

Deadly By Design: Emerging Opportunities To Hold Gunmakers Liable in the Era of Smart Firearms

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ABSTRACT

The Protection of Lawful Commerce in Arms Act (PLCAA), a 2005 federal statute, grants broad legal protections to the gun industry, shielding it from a range of civil liabilities. Gun violence prevention advocates have criticized the law's sweeping civil immunities for fueling the U.S.'s unprecedented rate of gun-related deaths, which have increased fifty-nine percent since the passage of PLCAA.¹ But innovations in biometric technology, which can now be used to secure guns, highlight a key limitation to PLCAA's immunity protections.

This Article examines the impact of the so-called "smart" gun, which uses biometric sensors to prevent unauthorized users from firing it, on PLCAA's exception for design defects. It explores the potential effects of smart guns on courts' analysis of defective design claims with respect to firearms. Drawing from court decisions addressing the impact of emerging technology as well as child-safety protections on defective design claims, doctrines of criminal intent governing young children, and social science research into unintentional gun deaths caused by children, this Article argues that the advent of smart guns leaves the manufacturers of legacy firearms² increasingly vulnerable to products liability claims.

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1. See *Firearm Deaths in the US: Statistics and Trends*, USA FACTS (last visited Dec. 5, 2023), <https://perma.cc/RG4Y-XV8A> (reporting 48,830 firearm deaths in 2021 and 30,694 in 2005).

2. To differentiate them from smart guns, I refer to those that lack smart technology as legacy firearms.

Table of Contents

I.	INTRODUCTION	229
II.	PLCAA’S EXCEPTION FOR DESIGN DEFECTS	233
III.	DESIGN DEFECTS.....	233
	A. The Risk-Utility Test	234
	1. Impact of New Technologies:	235
	2. Child Resistant Products:	236
	B. Litigating the Alleged Defect: The Legal Arguments.....	237
IV.	VOLITIONAL ACTS, MENS REA, AND CHILDREN	239
	A. Volition and Mens Rea in Children: The Infancy Defense	239
	B. Parental Criminal Liability: An Intervening Criminal Act?.....	240
	1. Common Law Parental Criminal Liability	241
	2. Statutory Parental Criminal Liability	242
V.	CONCLUSION.....	243

I. INTRODUCTION

America’s surging gun violence epidemic is a devastating public health crisis. A “leading cause of premature death” in the U.S.,³ gun violence takes tens of thousands of American lives each year, nearly as many as were lost—both directly and indirectly—from the Vietnam War.⁴ Gun violence explains a significant portion of the difference in life expectancy for men in the U.S compared to peer countries⁵ and has a particularly dramatic impact on children. The number of shootings that killed children soared in the U.S. by eighty-seven percent between 2011 and 2021.⁶ Shootings are now the leading cause of death for children and adolescents, having surpassed car accidents in 2020 and then by a widening margin in 2021.⁷

3. *Gun Violence*, APHA (last visited Apr. 22, 2024), <https://perma.cc/SS9J-2J2V>.

4. *See Vietnam War U.S. Military Fatal Casualty Statistics*, NAT’L ARCHIVES, <https://perma.cc/VCA6-5RMS> (last visited Mar. 26, 2024) (observing that, as of April 29, 2008, 58,220 members of the U.S. military died as a result of the Vietnam War, including deaths because of illnesses contracted in the war and self-inflicted wounds).

5. *See NATIONAL RESEARCH COUNCIL AND INSTITUTE OF MEDICINE, MEASURING THE RISKS AND CAUSES OF PREMATURE DEATH* 15, 30, 33 (2001) (listing preventable causes of U.S. deaths in Table 3-1, studying differences in longevity in the U.S. versus other developed countries, and finding that “homicides account for the biggest proportion (19 percent) of the difference in [longevity] for men between the United States and other countries, the majority of which are due to firearms”).

6. *See* Rebecca Sokol et al., *Gun Deaths Among Children and Teens have Soared—but There Are Ways to Reverse the Trend*, CONVERSATION (Oct. 16, 2023), <https://perma.cc/QB8N-7C2W> (analyzing findings of Cordelia Mannix et al., *Trends in Pediatric Nonfatal and Fatal Injuries*, 152 PEDIATRICS (2023)).

7. *See* Annette Choi, *Children and Teens Are More Likely to Die by Guns Than Anything Else*, CNN, <https://perma.cc/4M8S-4DJA> (last updated March 29, 2023)

Unintentional shootings, which kill nearly 500 Americans every year, are one substantial segment of the gun violence epidemic.⁸ A disturbing number of these shootings involve children, with researchers estimating that unintentional firearm deaths kill 110 children annually in the U.S.⁹ Many unintentional firearm deaths involve young shooters who manage to access a gun despite being legally prohibited from possessing firearms: for example, an eight-year study of such deaths across sixteen states found that at least twenty-eight fatalities involved a shooter ages four and under, and at least eighteen other fatalities involved a shooter ages five through ten.¹⁰ Legislators, gun violence advocates, and the Biden administration have pursued various avenues to curb these deaths. For example, legislators in twenty-one states have enacted laws that require the safe storage of a firearm and criminalize negligent or reckless gun storage.¹¹ Additionally, the federal government has announced proposals to provide education aimed at facilitating the safe storage of firearms.¹²

(reporting CDC data showing that gun violence exceeded all other causes of mortality in 2020 and again, by an even greater margin, in 2021, the last year for which data is available).

8. See *Unintentional Shootings*, EFSGV (last visited Mar. 26, 2024), <https://perma.cc/8PAU-V7PN> (reporting 486 unintentional gun deaths in 2019, “about 1.2% of gun deaths”).

9. See David Hemenway & Sara J. Solnick, *Children and Unintentional Firearm Death*, INJURY EPIDEMIOLOGY, Oct. 12, 2015, at 3.

10. See *id.* at 2 & Table 1 (finding that, of fatal shootings of victims fourteen and younger, twenty-eight were self-inflicted shootings performed by a child under the age of five and eighteen were such shootings performed by a child age five through ten). Because this figure only accounts for *self-inflicted* shootings of children, it is likely that the number of children in these age ranges who kill a person via an unintentional shooting is higher. See also David Hemenway et al., *Unintentional Firearm Deaths: A Comparison of Other-Inflicted and Self-Inflicted Shootings*, 42 ACCIDENT ANALYSIS & PREVENTION 1184, 1187 (2010) (making two important findings: among unintentional shootings in which the victim did not fire the gun, 35% involved a shooter who was fourteen years old or younger; and among unintentional self-inflicted shootings, 9% involved a victim/shooter who was fourteen years old or younger). Only seven states generally allow those who are sixteen years old or younger to possess firearms, though some have exceptions for possession in limited circumstances such as firearm safety lessons. *Minimum Age to Purchase & Possess*, GIFFORDS L. CTR., <https://perma.cc/42LH-3RRB> (last visited Mar. 26, 2024). Although more states allow children to possess long guns, handguns cause more unintentional shooting deaths than all other kinds of long guns combined. See Hemenway et al., *supra*, at 1186.

11. See *Child Access Prevention & Safe Storage*, GIFFORDS L. CTR., <https://perma.cc/YTL4-K43D> (last visited Apr. 22, 2024).

12. See *Which States Have Child Access and/or Secure Storage Laws?*, EVERYTOWN, <https://perma.cc/84B7-RY7U> (last visited Mar. 26, 2024). Lawmakers in other states such as Minnesota have introduced bills that would mandate such storage procedures. E.g., Caroline Cummings, *Minnesota Bills Requiring Safe Storage, Mandatory Reporting of Stolen Guns Get a Second Look at the Capitol This Year*, CBS NEWS, <https://perma.cc/8NU9-S7TB> (last updated Feb. 22, 2024, 7:34pm). In January of 2024, the White House announced an initiative spanning the U.S. Department of

Advancements in biometric sensor technology offer another means of preventing unintentional shootings. So called “smart guns,” which are already available for sale in the U.S., cannot be fired except by authorized users.¹³ These weapons require purchasers to program themselves as authorized users using facial recognition or fingerprint sensors on the firearm.¹⁴ Unless the technology malfunctions, any other non-authorized person who wields the gun cannot fire it.¹⁵ Because children may be able to unlock guns stored in safes or other devices that comply with firearm storage laws, smart guns could be even more effective than any storage requirements at preventing the problem of unintentional shootings by children.

Yet despite the emerging availability of smart guns at a price consistent with other firearms,¹⁶ their market penetration remains low. Major gun manufacturers have declined to bring smart guns to market, apparently fearing blowback from influential gun rights advocates such as the National Rifle Association (NRA) and National Shooting Sports Foundation (NSSF). One incident that underlies gunmakers’ concerns involved the gun giant, Smith & Wesson, which faced criticism from the NRA and a boycott by gun buyers after it agreed to develop a smart firearm as part of a consent decree with the Clinton Administration.¹⁷

Education and the Department of Justice to educate the families of children about the importance of safe storage. See *White House Announces New Actions to Promote Safe Storage of Firearms*, WHITE HOUSE (January 25, 2023), <https://perma.cc/HK8D-FSLD>.

13. Daniel Trotta, *Smart Guns Finally Arriving in U.S., Seeking to Shake up Firearms Market*, REUTERS (Jan. 11, 2022), <https://perma.cc/UGT4-DVXC>.

14. See *id.*; see also Ryan Lucas, *The First Smart Gun with Facial and Fingerprint Recognition Is Now For Sale*, NPR (Apr. 29, 2023), <https://perma.cc/FE8W-5K8Z>.

15. See Lucas, *supra* note 14.

16. While smart guns currently cost more than the equivalent legacy firearm, some are significantly cheaper than other popular legacy guns. For example, the BioFire Smart Gun currently costs \$1499, compared to about \$500 for a Glock pistol. See Patrick Lineham et al., *Colorado Company Introduces “Smart Gun” It Hopes Will Lower the Number of Firearm Deaths*, ABC NEWS (May 22, 2023), <https://perma.cc/YN4J-PP85>; see also *Build Your Own Smart Gun*, BIOFIRE, <https://perma.cc/H8TU-9MWR> (last visited Apr. 22, 2024) (noting that the pistol will ship in early 2025). By comparison, a mid-tier AR-15 costs \$1,000–1,500, with high-end models costing more than \$3,000. See *What Does an AR-15 Cost?*, PRIMARY SOURCE (Feb. 28, 2023), <https://perma.cc/V8ZN-22Q5>.

17. See GUN OWNERS OF AMERICA, *GOA Announces Boycott of Clinton & Wesson—Sell-out worse than originally reported*, GOA, <https://perma.cc/JAR2-REYA> (last visited Nov. 16, 2024); see also Lucas, *supra* note 14; Josh Harkinson, *Welcome to the Future of Gun Control*, MOTHER JONES (March 01, 2016), <https://perma.cc/TW3Y-AE9U>. Although the NRA and NSSF currently maintain that they do not oppose smart guns, they each opposes legal mandates requiring dealers to sell them. See *Facts First*, CNN (last visited Mar. 26, 2024), <https://perma.cc/V6WX-DQZT>. Furthermore, the lobbying arm of the NRA argued several years ago that smart guns would “raise the price of handguns that would be allowed to be sold and . . . imbed into handguns a device that would allow guns to be disabled remotely.” “*Smart” Guns/Personalized Firearms*, NRA-ILA (archived Dec. 10, 2015), <https://perma.cc/VX2L-SWUK>.

Other large players in the gun industry have avoided developing smart guns in the years since.¹⁸

PLCAA, the federal statute that grants broad civil immunities to gun manufacturers for many crimes that others commit using firearms, undermines gunmakers' incentive to make their products safer. A refrain among gun violence prevention advocates is that by "block[ing] legal responsibility for gun manufacturers that have failed to innovate and make guns safer," PLCAA disincentivizes gunmakers from adopting safety measures.¹⁹

This Article does not dispute the truism that granting civil immunities to manufacturers for certain injuries resulting from their products reduces those manufacturers' incentive to make their products safer. But this Article argues that previous accounts of PLCAA have overstated the immunities it provides to gunmakers in one important way: ignoring increasingly viable and potentially costly defective design recoveries by people injured using guns or on behalf of those killed. In particular, this Article argues that, in light of emerging smart gun technologies, the exception in PLCAA's immunity for design defects leaves gunmakers vulnerable to civil suits involving shooters who lack the legal capacity for volitional action or cannot satisfy criminal mens rea requirements.²⁰ It focuses on one prototypical example of such shooters: children who may reasonably be too young to understand the effects of pulling a gun's trigger. To determine whether PLCAA exposes the makers of legacy firearms to civil suits regarding the harm caused by

18. See Harkinson, *supra* note 17.

19. *Repeal Gun Industry Immunity*, EVERYTOWN GUN SAFETY, <https://perma.cc/VCR4-TVJ8> (last visited Mar. 25, 2024) ("Since PLCAA passed in 2005, not a single gun manufacturer accused of negligence has gone to trial."). See also *Immunizing the Gun Industry*, CENT. AMER. PROGRESS (Jan. 15, 2016), <https://perma.cc/AE4R-C7KZ> ("[C]ivil litigation is . . . important to incentivize industry actors to act responsibly; take steps to prevent negligent and criminal use of their products; and improve product safety.").

20. A second significant vulnerability to PLCAA's immunity via design defects claims concerns legacy gun deaths by suicide. Given that suicide is not a crime in the U.S., these incidents would likely overcome PLCAA provided that the plaintiffs can prove the design defect was the actual and proximate cause of the harm. See *Suicide*, CORNELL L. SCH.: LEGAL INF. INST., <https://perma.cc/ZMN4-BQUM> (last visited Apr. 22, 2024). Proving causation in this way would likely require the plaintiffs to show that the decedent was not an owner of the firearm used and therefore would not have been an authorized user had the instrument been a smart gun. Gun deaths by suicide numbered 26,993 in the U.S. during the last year for which data is available. See JOHNS HOPKINS: CTR. FOR GUN VIOLENCE SOL., *Provisional Data: Gun Suicides Reach All-Time High in 2022, Gun Homicides Down Slightly from 2021* (July 27, 2023), <https://perma.cc/B4B4-EHJT>. A third vulnerability to PLCAA's immunity exists for similar cases brought to recover for injuries resulting from legacy firearm suicide attempts commissioned in states where attempted suicide is not a crime. See *Suicide*, *supra*. While these vulnerabilities demand further analysis, they are beyond the scope of this Article.

these shooters, I examine the viability of proving each of the elements necessary to hold gunmakers liable for injuries resulting from the shootings.

II. PLCAA'S EXCEPTION FOR DESIGN DEFECTS

PLCAA grants gunmakers expansive protections against civil lawsuits. It immunizes gun manufacturers from civil lawsuits concerning harm that “result[s] from the criminal or unlawful misuse of a [firearm] by . . . a third party.”²¹ But PLCAA provides several key exceptions to these civil protections. Relevant to this Article, PLCAA carves out an exception for any harm that meets the following elements: (1) it was the result of a defective design; (2) the gun that fired was used “in a reasonably foreseeable manner”; and (3) the firing of the gun was either not volitional, not a criminal offense, or both.²² As at least one complaint against gunmakers has pointed out, the apparent feasibility of safety mechanisms embedded in smart guns raises questions about whether PLCAA immunizes gun manufacturers from actions alleging that legacy firearms are defectively designed.²³ Namely, does there exist a subset of shootings involving legacy firearms in which the firing of the gun was either not volitional or not criminal, and the gunmaker could have reasonably foreseen that the gun would be fired in such a manner?²⁴ And if so, could the gunmaker have reasonably produced smart guns that would have prevented the shooting? While courts have not yet ruled on the merits regarding a claim alleging that legacy firearms are defectively designed due to their lack of smart technology, a trove of jurisprudence regarding design defects and who has the mental capacity to engage in volitional or criminal conduct will guide how they would analyze these questions. I discuss this jurisprudence in Parts III and IV.

III. DESIGN DEFECTS

Courts typically determine if a product's design is defective using one of two standards—a consumer expectations test or risk-utility test.²⁵ The consumer expectations test, the formerly dominant standard in

21. 15 U.S.C. §7903(5)(A).

22. 15 U.S.C. §7903(5)(A)(v).

23. See Complaint, at 87, *Estados Unidos Mexicanos v. Smith & Wesson Brands*, 1:21-CV-11269 (D. Mass. Aug. 4, 2021) (“Defendants could also have developed and used more sophisticated safety features that employ biometric, radio frequency, or magnetic technologies that would enable only recognized users to fire the gun. Inventors have created such devices since at least the 1970’s [sic].”).

24. The reality of several fatal shooting incidents annually in the U.S. in which a toddler or infant was the shooter makes their foreseeability not a particularly close issue. See Hemenway & Solnick, *supra* note 10. Therefore, I do not analyze it.

25. See David G. Owen, *Design Defects*, 73 Mo. L. REV. 291, 299 (2008).

courts, asks “whether the design meets the safety expectations of . . . consumers.”²⁶ Legal scholars have long criticized a major weakness in the test: some products have obvious risks, resulting in a situation where the dangers are “virtually always contemplated or expected by the user or consumer who thereby is necessarily unprotected by the consumer expectations test, no matter how probable and severe the likely danger nor how easy and cheap the means of avoiding it.”²⁷ Guns are a prime example of such a product. Perhaps responding to the criticism that a consumer-expectations analysis fails to protect people from obvious but easily mitigated dangers, courts in recent decades have more frequently abandoned the consumer-expectations standard.²⁸ Instead, these courts apply the risk-utility test to defective design claims, which asks “whether the safety benefits of designing away a foreseeable danger exceed the resulting costs.”²⁹ Due to their well-known risks, firearms are a product for which courts may be especially likely to apply the risk-utility test.

A. *The Risk-Utility Test*

The risk-utility test provides that a “[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 . . . and the omission of the alternative design renders the product not reasonably safe.”³⁰ Courts evaluate whether a design is a reasonable alternative based on whether “it was feasible to design the product in a safe manner,” where feasibility includes economic and technical considerations.³¹ The former consideration is evaluated either by examining the “feasibility on the part of the manufacturer of spreading

26. *Id.* at 299–300, 307–08 (noting that the consumer expectations test, “the first standard for evaluating design defectiveness,” is now “embattled . . . in many states”; and that “liability for design defects was more commonly based on the consumer expectation test in the 1960s and early 1970s”).

27. *Id.* at 304.

28. *See id.* at 306–09, 308 n.76 (discussing how some courts have limited their application of the consumer-expectations test to certain products and general trend away from using consumer-expectations test).

29. *Id.* at 299, 307–09 (“The risk-utility test is [now] the principal standard for judging the safety or defectiveness of a product’s design As courts over the decades have turned away from the consumer expectations test in design danger cases, they have substituted some form of cost-benefit (‘risk-utility,’ ‘risk-benefit,’ or ‘benefit-risk’) standard of liability, which is the liability standard for design defectiveness adopted by the *Restatement (Third) of Torts: Products Liability*.”). *See Restatement (Third) of Torts: Prod. Liab.* § 2 cmt. g (AM. L. INST. 1998) (“[C]onsumer expectations do not play a determinative role in determining defectiveness.”).

30. *Restatement (Third) of Torts: Prod. Liab.* § 2(b) (AM. L. INST. 1998).

31. *Adamo v. Brown & Williamson Tobacco Corp.*, 900 N.E.2d 966, 968 (N.Y. 2008) (stating that plaintiffs in products liability case had to prove that “it was feasible to design the product in a safer manner.”).

the loss by setting the price of the product or by insurance”³² or by simply comparing the cost of the product sold to that of the reasonable alternative.³³ The latter consideration asks whether, given the state of the art, skilled engineers can technically create a useful alternative design.³⁴

Courts apply the risk-utility test in two distinct ways that would point their analysis of smart guns toward divergent outcomes.³⁵ Some courts have implicitly construed the test to involve what one researcher described as a “fundamentally flawed” “*macro*-balancing” approach.³⁶ Rather than analyzing individual design choices, this approach inquires as to whether “the product’s aggregate risk exceeds its aggregate social utility.”³⁷ The risk-utility test that courts contend to apply, however, asks a different question:

whether the manufacturer might have avoided the accident (and possibly others) by changing the product’s design in some manner that was relatively inexpensive, that did not unduly diminish the product’s usefulness, and that did not introduce excessive new dangers which the chosen design did not possess.³⁸

This form of “*micro*-balancing” interrogates “the costs and benefits of adopting the particular alternative design *feature* proposed by the plaintiff.”³⁹

1. Impact of New Technologies:

Under the *micro*-balancing test, innovations play a particularly important role in the analysis. Regardless of the overall utility of a legacy product, a newer technology—once it is economically feasible to deploy—can render the legacy product defective. An Illinois Supreme Court case, *Hansen v. Baxter Healthcare Corporation*,⁴⁰ demonstrates this possibility.

32. *Rainbow v. Albert Elia Bldg. Co.*, 436 N.Y.S.2d 480, 483 n.2 (N.Y. Sup. Ct. 1981), *aff’d*, 434 N.E.2d 1345 (N.Y. 1982) (citing John W. Wade, *On the Nature of Strict Tort Liability for Products*, 44 *Miss. L.J.* 825, 837–38 (1973)).

33. *See Denny v. Ford Motor Co.*, 87 N.Y.2d 248, 253, 662 N.E.2d 730, 732 (N.Y. 1995)

34. *See Rypkema v. Time Mfg. Co.*, 263 F. Supp. 2d 687, 692 (S.D.N.Y. 2003) (discussing “practical engineering feasibility” analysis, which examines not only whether it is possible to design a safer alternative given the state of the art but also the financial cost of the alternative design).

35. *See infra* Part III.B.

36. *Owen*, *supra* note 25, at 243–44.

37. *Id.* at 243.

38. *Id.* at 244–45. It is worth noting that this question, unlike that of the *macro*-balancing approach, directly addresses the issue litigated in a design defects case. *Id.*

39. *Id.* (emphasis added).

40. *See Hansen v. Baxter Healthcare Corp.*, 764 N.E.2d 35 (Ill. 2002).

Hansen was brought on behalf of a woman who suffered an air embolism due to an intravenous (IV) tube that became detached from her catheter, ultimately causing her death.⁴¹ The plaintiff alleged that the IV tubing used, a “friction-fit” connector, which could be inadvertently disconnected, embodied a defective design in light of a newer alternative connector on the market, the “Luer-lock,” which “screws onto the hub of the catheter” and prevents inadvertent disconnections.⁴² Applying both the consumer expectations test and the risk-utility test, the court found that a reasonable factfinder could conclude under either approach that the friction-fit connector was defective.⁴³ It noted, in reaching this conclusion with respect to the risk-utility test, that the plaintiff’s expert had “opined that the friction-fit connectors became obsolete once the Luer-lock was invented.”⁴⁴

2. Child Resistant Products:

Other precedents demonstrate that the failure to design child-safety protections into a potentially dangerous product could lead the product to fail the risk-utility test. *Calles v. Scripto-Tokai Corporation*,⁴⁵ for instance, a case involving a utility lighter that was appealed up to the Illinois Supreme Court, analyzed this issue. In *Calles*, a three-year-old died in a fire started by the child sliding the trigger of a utility lighter, which lacked a child-resistant safety device, into the “ON” position.⁴⁶ The Illinois District Court had examined the question of whether the absence of a safety device amounted to a defective design.⁴⁷ After the district court granted the defendants’ motion to dismiss the case, finding the danger of the product so obvious that it would be unnecessary for a factfinder to apply the risk-utility test, the Appellate Court of Illinois reversed the summary judgment ruling on the defective design claim. The Appellate Court concluded that “the utility of the Aim ‘n Flame design does not outweigh the risks of that design so obviously that no genuine issue of fact remains for trial.”⁴⁸ The state’s highest court affirmed the appellate court’s ruling on this issue, concluding that “reasonable persons could differ as to whether the [product] was unreasonably dangerous.”⁴⁹

41. *See id.* at 37.

42. *See id.* at 38.

43. *Id.* at 43.

44. *Id.* at 39.

45. *Calles v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 263-64 (Ill. 2007)

46. *Id.* at 251, 253-54.

47. *See id.* at 256-66.

48. *See Calles v. Scripto-Tokai Corp.*, 832 N.E.2d 409, 416 (Ill. App. Ct. 2005), *aff’d*, 864 N.E.2d 249 (Ill. 2007).

49. *Calles*, 864 N.E.2d at 269.

B. Litigating the Alleged Defect: The Legal Arguments

Courts' willingness to find that legacy guns fired by young children are defectively designed will likely hinge on two determinations: (1) which defective design test—and which variation of the respective test—the court employs, and (2) whether the court concludes that smart guns are economically feasible.

If a court opts to apply the consumer expectations test, plaintiffs will face the likely insurmountable challenge of proving that an ordinary consumer would not have anticipated the danger in the legacy firearm that caused the harm. Courts using this standard have found dangers much less obvious than the firing of a gun make products not defective as a matter of law.⁵⁰ For example, one federal district court examined a defective design claim brought after a humidifier burned a child.⁵¹ It concluded that because “[h]ot water is an inherent property of a steam humidifier,” an “ordinary consumer would presume that a steam humidifier could become [dangerously] hot.”⁵² The advantages of this test for manufacturers of inherently dangerous products will motivate gunmakers to argue that the court should apply this test. Plaintiffs are likely to argue in response that these inherent dangers make the consumer expectations test inappropriate because they leave the manufacturers of dangerous products with no incentive to pursue reasonable safety innovations.⁵³

If a court applies the risk-utility test, then the parties will likely dispute how broadly the court should construe the design at issue. Gunmakers will probably contend that the macro-balancing approach is appropriate. This application of the test examines the full scope of the product's design, weighing the social benefits of the firearm against its risks.⁵⁴ The analysis could take a range of forms. It might, for instance, weigh the often touted (if empirically uncertain) social benefits of the firearm, such as its utility for law enforcement or for civilians arming themselves in self-defense,⁵⁵ against its large social costs, such as

50. See e.g., *Blue v. Env'tl. Eng'g, Inc.*, 828 N.E.2d 1128, 1138 (Ill. 2005) (finding that injuries are “not compensable in products liability if they derive merely from those inherent properties of a product which are obvious to all who come into contact with the product”).

51. See *Brand v. Holmes Air Taiwan, Inc.*, 500 F. Supp. 2d 1043, 1044 (S.D. Ill. 2007).

52. *Id.* at 1047.

53. See Owen, *supra* note **Error! Bookmark not defined.**, and accompanying text.

54. *Id.* at 243–44.

55. Compare David Hemenway & Sara J. Solnick, *The epidemiology of self-defense gun use: evidence from the National Crime Victimization Surveys 2007–2011*, 79 *PREV. MED.* 22, 25 (2015) (finding a positive association between the use of a gun in self-defense and sustaining an injury), with Gary Kleck & Marc Gertz, *Armed Resistance to Crime: The Self-Prevalence and Nature of Self-Defense with a Gun*, 86 *J. CRIM. L. &*

homicides and suicides. Or, assuming the firearm at issue is in common use—as many legacy guns certainly are—a court might find the analysis inappropriate on constitutional grounds, compelling the conclusion that defective design theories cannot be applied to the inherent dangers of legacy firearms.⁵⁶ Either approach to the macro-balancing standard would give the gunmaker strong arguments that its product is not defective.

However, the court could apply the micro-balancing version of the risk-utility test, as I argue would be proper.⁵⁷ If so, the facts of the claims envisioned by this Article—an infant, toddler, or young child fires a legacy gun, injuring or killing a person—could readily support a finding that the gun’s design was defective. Like a “luer-lock” in *Hansen* or a child-resistant lock in *Calles*, technology clearly exists that could have been designed into the legacy firearm and prevented the harm. Furthermore, the technology—biometric sensors that prevent unauthorized users from firing the weapon—would “not introduce excessive new dangers which the chosen design did not possess.”⁵⁸ There is therefore no question that the alternative design is technically feasible.

The gunmaker’s best argument against imposing liability centers on the economic feasibility of smart guns, which currently cost more than the equivalent legacy firearms.⁵⁹ A court could find that gunmakers are able to spread the cost of the design alternative through higher prices.⁶⁰

CRIMINOLOGY 150, 151–52 (1985)(observing that research indicates “that victims who resist by using guns or other weapons are less likely to be injured compared to victims who do not resist or to those who resist without weapons”).

56. This argument involves applying the Second Amendment to the defective design claim. Although the Second Amendment does not limit private restrictions on gun ownership, a gunmaker defending against design defects claims may argue that even a civil award implicates state action—and therefore the Second Amendment—either because the award hinges on the respective state’s products liability laws or because the remedy is enforced in a court. Applying interest balancing, such as the risk-utility test, to Second Amendment rights is unconstitutional. *See New York State Rifle & Pistol Ass’n, Inc. v. Bruen*, 597 U.S. 1, 2 (2022) (citing *District of Columbia v. Heller*, 554 U.S. 570, 635 (2008)). Even though the dispute I describe would concern products liability claims, rather than the right to bear arms, the gunmaker could argue that authorizing interest balancing for determining liability could make firearms in common use so prohibitively expensive that it would practically prevent law-abiding citizens from possessing guns. For an example of how a private dispute can be unenforceable because it violates the Constitution, see generally *Shelley v. Kraemer*, 334 U.S. 1 (1948) (finding racial covenant unenforceable because it violated Fourteenth Amendment and court enforcement would constitute state action). For an explanation of how the Second Amendment protects the right of law-abiding citizens to possess guns in common use, see *Heller*, 554 U.S., at 627.

57. *See Owen*, *supra* note **Error! Bookmark not defined.**, and accompanying text.

58. *Id.* at 244–45.

59. *See supra* note 16.

60. In support of such a conclusion, courts might point to the fact that many legacy firearms sell at prices higher than smart guns that are on the market. *See supra* note 16

But if a court follows the other economic feasibility inquiry—comparing the cost of designing and manufacturing a smart gun with that of a legacy gun—then plaintiffs will face longer odds of succeeding, as the first smart gun in the U.S. market currently retails for about three times the price of a similar legacy gun.⁶¹ Regardless of the version of the risk-utility test applied, several gun industry and economic trends promise to make plaintiffs' claims grow stronger over time: the increased number of smart gun offerings hitting the market,⁶² the resulting economics of scale for product inputs, and advancement of technology.⁶³

IV. VOLITIONAL ACTS, MENS REA, AND CHILDREN

A. *Volition and Mens Rea in Children: The Infancy Defense*

Recall that PLCAA blocks defective design suits based on a lack of proximate causation if an intervening voluntary or criminal act is an actual cause of the harm.⁶⁴ Plaintiffs seeking damages from gunmakers on design defects theories involving incidents where children fire guns will therefore need to prove that the shootings were not voluntary or criminal acts.

For sufficiently young shooters, their age very likely disposes of this question. American courts have long recognized that children ages six and under lack the mental capacity to be criminally or civilly liable for certain acts,⁶⁵ a doctrine that became known as the infancy defense.⁶⁶ Courts largely continue to agree that “children under age seven [are

and accompanying text. Alternatively, courts could rely on different assumptions to conclude that gunmakers cannot spread the cost of the design alternative through higher prices. For example, courts might assume that many consumers would not purchase pistols, even if they are smart, at the higher price points where rifles are often sold.

61. See *supra* note 16. This assessment assumes the differential in retail price more or less reflects a differential in production costs.

62. See Joshua Melvin, *A Safer Gun?: “Smart” Pistols Headed to US Market*, TECH XPLORE (Jan. 15, 2022), <https://perma.cc/R9RE-GXXV> (discussing smart gun makers developing or having already released products such as LodeStar Works, Armatrix, and SmartGunz).

63. See Rokon Zaman, *10 Principles of Economics and Technology*, WAVES (Aug. 31, 2018), <https://perma.cc/B3MH-4P4Q> (“Through the advancement of technology, not only per unit cost of production keeps falling, but also the minimum efficient scale keeps growing.”).

64. See *supra* Part II.

65. See Sanford J. Fox, *Responsibility in the Juvenile Court*, 11 WM. & MARY L. REV. 659, 660 (1970) (“[From] early in the evolution of American law, the infancy defense [provided that] children under the age of seven could be guilty of no offense.”)

66. See, e.g., D. Keith Foren, *In Re Tyvonne M. Revisited: The Criminal Infancy Defense in Connecticut*, 18 QLR 733, 736 (1999) (describing how under Connecticut common law, prior to the creation of the juvenile justice system, “the defense [of infancy] provided for the complete legal incapacity of children under seven”).

irrebuttably] too young to form the intent to commit a crime”⁶⁷ or to have the mental capacity to violate civil law.⁶⁸ Although courts have at times found that teenage shooters are engaging in criminal acts under PLCAA’s causation-severing provision, notwithstanding that the juvenile justice system prevents most minors from being *criminally* charged,⁶⁹ courts do not appear to have applied this reasoning to child shooters under age seven. In fact, in the only design defects case I identified involving such a shooter, which was brought against the world’s largest pistol manufacturer, the gunmaker did not dispute that a three-year-old shooter could not engage in a criminal act pursuant to PLCAA’s causation-severing provision.⁷⁰ As the gunmaker’s attorneys may have reasoned, courts’ appreciation for the lack of capacity among very young children would likely compel them to conclude that the dozens of children four-and-under who fatally discharged guns in recent years were legally incapable of engaging in a criminal act.⁷¹

B. Parental Criminal Liability: An Intervening Criminal Act?

Gunmakers defending against defective design claims have used PLCAA’s causation-severing provision in another way: contending that even when the firing of the weapon was unintentional and non-criminal, they cannot be held liable because an intervening criminal act was the sole proximate cause.⁷² Potential intervening acts could be based in common law or, across some states, in gun storage statutes, as I discuss in the following Sub-Parts.

67. *Juvenile Crimes & The Legal System*, JUSTIA (last visited Apr. 20, 2024), <https://perma.cc/YRR8-EE57>.

68. *See, e.g.*, *Horn v. Am. Emp. Ins. Co.*, 386 F.2d 360, 361–62 (5th Cir. 1967) (noting that children under age seven cannot be found negligent in the state of Louisiana and other courts).

69. *See, e.g.*, *Adames v. Sheahan*, 909 N.E.2d 742, 759–60 (Ill. 2009); *Travieso v. Glock, Inc.*, 526 F. Supp.3d 533, 546 (D. Ariz. 2021).

70. *Chavez v. Glock, Inc.*, 144 Cal. Rptr. 3d 326, 333, 354–55 (Cal. Ct. App. 2012), concerns defective design claims following a three-year-old’s discharge of a Glock pistol. The court found that triable issues of fact existed as to whether the child’s father negligently stored the firearm. *See id.* at 354–55. The case was ultimately disposed on the ground of untimely service of process. *Chavez v. Glock, Inc.*, No. BC394135, 2014 WL 11512074, at *1 (Cal. Super. Dec. 31, 2014).

71. *See supra* note 10 and accompanying text.

72. *See, e.g.*, *Ryan v. Hughes-Ortiz*, 959 N.E.2d 1000, 1008 (Mass. Ct. App. 2012) (dismissing defective design claim because, as defendant argued, the shooter had engaged in a criminal act by possessing a firearm as a felon).

1. Common Law Parental Criminal Liability

Parents and guardians are generally not held liable for offenses that their children commit.⁷³ However, courts impose criminal liability on parents who “engage in gross negligence in the supervision of their child.”⁷⁴ This liability standard applies to the parental context the same criminal negligence test that exists elsewhere: parents are criminally liable for the crimes of their child only when they knew or should have known that the harm at issue was a probable result of their conduct.⁷⁵

The inquiry into common law parental criminal liability for a young child’s accidental shooting hinges in large part on the facts of the incident. To be sure, there are easy cases. A court would struggle to avoid holding a parent criminally liable who left a loaded gun in the crib of a toddler and then left the room; but a court would probably not hold a parent criminally liable if their young child had managed to access a firearm by picking a safe’s lock. But whether less extreme situations rise to the level of criminal negligence depends on a wide range of factors, such as whether the gun owner knew a child would be present in the area, whether the gun was kept out of reach of the child, whether it was loaded, and whether the gun owner should reasonably expect that the child could successfully pull the trigger.⁷⁶ Imagine that a five-year-old unintentionally shoots himself after finding a loaded gun hidden in a sock in the top drawer of his parents’ dresser. Whether the parents knew or should have known that the shooting was a probable risk may depend on the answers to questions like these: Did the parents have reason to believe the child could access the drawer—for example, was there a

73. *See, e.g.*, *State v. Akers*, 400 A.2d 38, 39–40 (N.H. 1979) (finding it unconstitutional to hold parents criminally liable for the crimes of their children “unless [the parent’s] criminal liability is based on conduct that includes a voluntary [a]ct or the voluntary omission”); *see* Susan Buckner, J.D., *Parental Liability*, FINDLAW, <https://perma.cc/SJA3-KQDU> (last updated June 30, 2023) (explaining that although parents and guardians are often civilly liable for crimes their children commit, they are rarely held criminally liable).

74. *Parental Criminal Liability*, FINDLAW, <https://perma.cc/8QPQ-ZRBB> (last updated Aug. 24, 2023).

75. *See, e.g.*, *People v. Rodriguez*, 8 Cal. Rptr. 863, 868 (Cal. App. 1960) (concluding that holding a parent criminally liable for negligent homicide requires a finding that the parent had actual or constructive knowledge that their conduct was likely to result in the death); *Williams v. Garcetti*, 853 P.2d 507, 514 (Cal. 1993) (discussing the application of the criminal negligence standard to parents who do not exercise “reasonable supervision or control” in light of “actual or constructive knowledge of [a] risk”).

76. *People v. Heber*, 745 N.Y.S.2d 835, 837, 842–43 (N.Y. Sup. Ct. 2002) (denying defendant uncle’s motion to dismiss criminal negligence charges relating to death of his four-year-old nephew who fired a handgun at himself because the defendant knew his nephew was staying at the home and left a loaded handgun with a “light trigger pull” in an “[a]ccessible area”—here, under a chair cushion).

nearby chair that the child could stand on in order to gain access, or did he need to move furniture in order to gain access? If the latter, did the parents have reason to believe their child was capable of moving furniture?⁷⁷ Did the parents have reason to believe their child had the dexterity required to remove the firearm from the particular sock that contained it?

2. Statutory Parental Criminal Liability

Statutes in twenty-one states criminalize the negligent or reckless storage of a firearm.⁷⁸ California's law, among states' broadest,⁷⁹ imposes criminal liability when the following elements are met:

[1] the person keeps any firearm within any premises that are under the person's custody or control and [2] negligently stores or leaves a firearm in a location where the person [3] knows, or reasonably should know, that a child is likely to gain access to the firearm . . . unless reasonable action is taken by the person to secure the firearm against access by the child.⁸⁰

Other state laws require similar elements.⁸¹

In defending against design defect complaints brought pursuant to these statutes, manufacturers of legacy guns fired by young children are likely to rely on primarily the same arguments as in the common law

77. Many different facts could be relevant in answering this question, such as the child's size, strength, or experience moving large objects, as observed by the parents.

78. *Child Access Prevention & Safe Storage*, *supra* note 11. The primary implication of these laws for parental liability is that many criminalize the act of improper storage itself, whether or not that act results in harm. *See id.* (“[Child Access Protection (CAP)] laws impose liability on a gun owner after they have failed to keep a gun inaccessible to a minor. The strongest CAP laws hold people accountable for storing a gun unsafely in a manner that makes it likely that a minor could access it, regardless of whether the minor actually gained access or used the firearm to harm themselves or others. The weakest CAP laws only impose liability on an adult who leaves a firearm accessible to a minor if that minor both accesses the firearm and uses it to cause bodily injury or death.”). In contrast, proving negligent supervision under the common law requires that an injury such as a shooting results from the negligence.

79. *See id.* (discussing how California's law, unlike many other states', imposes criminal liability even when firearms are not loaded and imposes criminal liability on non-parents or guardians who “leave a firearm accessible to a person prohibited from firearm possession”).

80. Cal. Penal Code § 25100(c) (providing the elements of “criminal storage of a firearm in the third degree”). Second and first degree violations of the California law require the same criteria as well as additional elements. *See* Cal. Penal Code § 25100(a)–(b).

81. *Child Access Prevention & Safe Storage*, *supra* note 11. For examples of these statutes, see, e.g., Minn. Stat. § 609.666 (imposing criminal liability when a child is likely to gain access to a loaded firearm); Nev. Rev. Stat. Ann. §§ 41.472, 202.300(1)–(3) (imposing criminal liability when a child may gain access to a firearm, even if it is unloaded).

context—namely that the firearm was negligently stored. Courts analyzing these statutes have looked to similar factors as those adjudicating the common law claims, such as the accessibility of the firearm and the gun owners’ awareness of the presence of children.⁸² One court found that a lack of baby gates “or anything else to prevent a child from gaining access” to firearms stored in an unlocked closet was enough to convict a California parent of negligent storage in the third degree.⁸³ Similarly, a jury found that a Minnesota man was guilty of criminal storage of his firearm after he left a handgun “underneath the [driver’s] seat . . . protruding into the rear passenger compartment,” where two juveniles were riding.⁸⁴ Like with respect to common law negligent supervision claims, safe storage statutes can prevent gunmaker liability but only under certain facts.

V. CONCLUSION

In light of the entrance of smart firearms into the U.S. gun market, PLCAA’s exception for defective design claims presents a viable, if narrow, path for plaintiffs to recover for injuries caused by young children who unintentionally fire legacy guns. Still, only a subset of such shootings can meet the criteria necessary for a recovery: In particular, unless other facts demonstrate the shooting to be unintentional, the shooter must be sufficiently young that a court would find them incapable of voluntarily or criminally firing the gun. And the shooter must obtain the gun from a place sufficiently inaccessible that the factfinder does not conclude another person is responsible for criminal negligence.

Even among the incidents meeting these criteria, the path to victory for plaintiffs is lined with obstacles. A court could apply the consumer expectations test to the plaintiff’s claim, virtually guaranteeing that, so long as long as legacy guns continue to dominate the gun market, it finds such firearms are not inherently defective. Even if the court instead applies the risk-utility test, it could construe the analysis broadly, assessing the benefits and dangers of the entire product in such a way

82. *See, e.g.*, *People v. Sevilla*, No. E065921, 2017 WL 5507946, at *1, *3 (Cal. Ct. App. Nov. 17, 2017); *State v. Johnson*, No. A14-1880, 2015 WL 5194956, at *2–*3 (Minn. Ct. App. Sept. 8, 2015). Perhaps the most notable difference between common law parental negligence cases and statutory criminal storage cases is the fact that common law claims invariably require an injury. But this discrepancy is not relevant to this Article because the claims I focus on necessitate that an injury resulted from the design. *See supra* note 21 and accompanying text.

83. *People v. Sevilla*, No. E065921, 2017 WL 5507946, at *1, *3 (Cal. Ct. App. Nov. 17, 2017).

84. *State v. Johnson*, No. A14-1880, 2015 WL 5194956, at *2–*3 (Minn. Ct. App. Sept. 8, 2015).

that favors gunmakers. Or if it applies the test only to the specific design feature at issue, the court could point to the cost of implementing smart technology to conclude that smart guns are economically infeasible, and therefore not a reasonable alternative to legacy firearms, defeating the defective design claim.

But two trends suggest the future will be brighter for plaintiffs looking to hold gunmakers responsible for defective design claims. First, the growing dominance of the risk-utility test for design defects continues to relegate the consumer expectation standard to a declining number of product categories and jurisdictions. Second, economic principles and industry trends threaten to weaken gunmakers' infeasibility defense. Specifically, as more gunmakers enter the smart firearm market, competition and economies of scale for the products' inputs promise to decrease the marginal cost of implementing the smart technology.