

# PERSONALIZED SMART GUNS: A FUTURISTIC DREAM OR A PRAGMATIC SOLUTION?

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## INTRODUCTION

After horrific mass shootings such as those that occurred in Sandy Hook, Las Vegas, and Orlando, both sides of the political aisle immediately debate heated topics like banning assault weapons and high capacity magazines.<sup>1</sup> This Note, however, will focus on a largely ignored alternative to the predictable and oftentimes unproductive back and forth that is endemic to the national gun debate. Personalized smart guns—firearms equipped with safety technology allowing only authorized users to fire them<sup>2</sup>—represent a novel, useful, and constitutional intervention in the gun debate.

This Note will explore the constitutional and practical viability of a smart gun mandate as a means to reduce certain kinds of firearm-related deaths such as those caused by suicide and accidental firearm discharges. While other legal articles have been written about smart guns,<sup>3</sup> this Note distinguishes itself from prior literature by extensively delving into the empirical data regarding both the firearm-related deaths that could be prevented by smart guns and the likelihood that a smart gun mandate would pass constitutional muster. Part I will provide background on Second Amendment legal doctrine. Part II will explore the smart gun technology itself, covering the main types of personalized smart guns to

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<sup>1</sup> See, e.g., Jonathan Weisman, *Senate Blocks Drive for Gun Control*, N.Y. TIMES (Apr. 17, 2013), <https://www.nytimes.com/2013/04/18/us/politics/senate-obama-gun-control.html> (stating that a ban on assault weapons and high capacity magazines failed to pass in the Senate in 2013); Dorottya Demszky et al., *Analyzing Polarization in Social Media: Method and Application to Tweets on 21 Mass Shootings*, ARXIV (Apr. 4, 2019), <https://arxiv.org/pdf/1904.01596.pdf> (identifying polarization in Democrats and Republicans' responses to mass shootings).

<sup>2</sup> GIFFORDS LAW CTR. TO PREVENT GUN VIOLENCE, SECURING A SAFER FUTURE 8 (2018), <https://giffords.org/wp-content/uploads/2018/06/Securing-a-Safer-Future-Giffords-Law-Center-6.13.18.pdf>.

<sup>3</sup> See, e.g., Drury D. Stevenson, *Smart Guns, the Law, and the Second Amendment*, 124 PENN ST. L. REV. 691 (2020); Jessica M. Lujan, *Half-Cocked: "Smart Gun" Mandates Are Premature And Unconstitutional Under The Prevailing "Undue Burden" Test*, 24 B.U. J. SCI. & TECH. L. 500 (2018), <https://www.bu.edu/jostl/files/2018/10/Lujan---FINAL.pdf>; Tyler J. Kimberly, *A Higher Caliber of Regulation: Is Making Smart-Gun Technology Mandatory Constitutionally Permissible?*, 65 CASE W. RES. L. REV. 251 (2014).

later highlight how the reliability of the technology plays into the constitutional viability of a smart gun mandate. Part III will then assess whether smart guns are effective in mitigating firearm-related deaths. Part IV will analyze the constitutionality of a smart gun mandate. Part V will examine the practical roadblocks that may impede smart gun legislation and funding. The Note concludes that smart guns themselves are constitutional and would reduce certain types of gun deaths. Further, although the roadblocks to smart gun implementation on a mass scale are quite burdensome, they are not insurmountable.

### I. THE SECOND AMENDMENT

This section provides the Second Amendment background necessary to discuss the constitutional viability of smart guns. Ratified in 1791 as part of the Bill of Rights, the Second Amendment of the United States Constitution declares that “[a] well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.”<sup>4</sup> These twenty-seven words are the subject of heated and controversial discussions among constitutional law scholars, policymakers, politicians, gun regulation supporters, and gun rights advocates.<sup>5</sup>

The Second Amendment debate centers around two opposing interpretations of the text: the militia-based interpretation and the private purposes interpretation.<sup>6</sup> Essentially, the militia-based interpretation limits the right to “keep and bear arms” to people, arms, and activities that have some connection to a “well regulated Militia.”<sup>7</sup> Conversely, the private purpose interpretation does not confine the right to the militia. Rather, it contends that the Second Amendment protects the right to keep and bear arms for individual purposes, such as protecting one’s own home in self-defense.<sup>8</sup> The question of which interpretation would prevail as a matter of constitutional law was resolved in the controversial 2008 Supreme

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<sup>4</sup> U.S. CONST. AMEND. II.

<sup>5</sup> See, e.g., James C. Phillips & Josh Blackman, *The Mysterious Meaning of the Second Amendment*, THE ATLANTIC (Feb. 28, 2020), <https://www.theatlantic.com/ideas/archive/2020/02/big-data-second-amendment/607186/> (highlighting the debate regarding the meaning of the Second Amendment); Michael T. O’Donnell, *The Second Amendment: A Study of Recent Trends*, 25 U. RICH. L. REV. 501 (1991) (stating that the “interpretation of these twenty-seven words has generated considerable debate since they were first declared in force in 1791”).

<sup>6</sup> See JOSEPH BLOCHER & DARRELL A. H. MILLER, THE POSITIVE SECOND AMENDMENT 59 (Alexander Tsesis ed. 2018).

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

Court case of *District of Columbia v. Heller*,<sup>9</sup> which officially turned the private purpose interpretation into constitutional law doctrine.

The statute in question in *Heller* was the District of Columbia's Firearms Control Regulation Act.<sup>10</sup> The statute made it practically illegal to possess a new handgun in the District of Columbia by simultaneously criminalizing the possession of an unregistered firearm and prohibiting the registration of new handguns.<sup>11</sup> Additionally, it required residents to keep their lawfully-owned firearms "unloaded or disassembled or bound by a trigger lock or similar device" except when being used for lawful recreational activities or when located in a place of business.<sup>12</sup> Dick Heller, a special police officer for the Thurgood Marshall Judiciary building who was permitted to carry a handgun while on duty, challenged the constitutional validity of the D.C. statute.<sup>13</sup> He wanted to keep a handgun at home for self-defense and applied for a permit, but D.C. rejected his application.<sup>14</sup>

In a majority opinion by Justice Scalia, the Supreme Court concluded that both the D.C. ban on handgun possession in the home and the statute's storage restrictions violated the Second Amendment.<sup>15</sup> In holding that "[t]he Second Amendment protects an individual right to possess a firearm unconnected with service in a militia, and to use that arm for traditionally lawful purposes, such as self-defense within the home,"<sup>16</sup> the Supreme Court elected to adopt the private purpose interpretation of the Second Amendment.<sup>17</sup>

While there is plenty of existing literature analyzing *Heller*,<sup>18</sup> none has directly addressed its application to smart guns. Two segments of the

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<sup>9</sup> 554 U.S. 570 (2008).

<sup>10</sup> BLOCHER & MILLER, *supra* note 6, at 52.

<sup>11</sup> *Heller*, 554 U.S. at 574–75.

<sup>12</sup> *Id.* at 575.

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.* at 635.

<sup>16</sup> *Id.* at 570.

<sup>17</sup> BLOCHER & MILLER, *supra* note 6, at 62.

<sup>18</sup> See generally Kyle Hatt, *Gun-Shy Originalism: The Second Amendment's Original Purpose in District of Columbia v. Heller*, 44 SUFFOLK U. L. REV. 505 (2011) (examining "the conflict between *Heller*'s reading of the Second Amendment's original purpose . . . and its holding about self-defense and dicta on the Amendment's limitations"); Andrew R. Gould, *The Hidden Second Amendment Framework within District of Columbia v. Heller*, 62 VAND. L. REV. 1535 (2019) (analyzing the *Heller* decision to articulate a standard of review for gun regulations); David C. Williams, *Death to Tyrants: District of Columbia v. Heller and the Uses of Guns*, 69 OHIO ST. L.J. 641 (2008) (exploring how "Scalia departs sharply from his own preferred interpretive method" to conclude that "the

majority opinion are relevant to this new issue: (1) the unconstitutionality of the D.C. law's particular trigger lock and gun storage requirements and (2) the constitutional limits on the Second Amendment individual right to keep and bear arms.

In determining the constitutionality of the D.C. law's requirement that "any lawful firearm in the home be disassembled or bound by a trigger lock at all times,"<sup>19</sup> Justice Scalia reasoned that the requirement essentially rendered lawful firearms inoperable in the home.<sup>20</sup> He concluded that the "unequivocal text"<sup>21</sup> of the D.C. law did not contain an exception for self-defense purposes; as such, the law made it "impossible for citizens to use [their firearms] for the core lawful purpose of self-defense."<sup>22</sup> Therefore, Justice Scalia determined that the law's requirement was unconstitutional.<sup>23</sup>

Justice Scalia, however, also emphasized that the "[individual] right secured by the Second Amendment is not unlimited."<sup>24</sup> He devoted a section of the opinion to listing some of the constitutionally permissible limits on the Second Amendment right. He emphasized that:

nothing in our opinion should be taken to cast doubt on longstanding prohibitions on the possession of firearms by felons and the mentally ill, or laws forbidding the carrying of firearms in sensitive places such as schools and government buildings, or laws imposing conditions and qualifications on the commercial sale of arms.<sup>25</sup>

He clarified that these "presumptively lawful regulatory measures" were only examples and that the list was not meant to be exhaustive.<sup>26</sup> Part IV will explain the importance of these two segments of *Heller* to the constitutionality of smart guns.

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Amendment protects a right of self-defense"); Nelson Lund, *The Second Amendment, Heller, and Originalist Jurisprudence*, 56 UCLA L. REV. 1343 (2009) (critiquing the majority's originalist analysis and other forms of reasoning as defective); Adam Winkler, *Heller's Catch-22*, 56 UCLA L. REV. 1551 (2009) (highlighting various "missteps and contradictions" in the decision); Jordan E. Pratt, *A First Amendment-Inspired Approach to Heller's "Schools" and "Government Buildings"*, 92 NEB. L. REV. 537 (2014) (interpreting *Heller*'s "presumptively lawful" regulations through a First Amendment approach).

<sup>19</sup> *Heller*, 554 U.S. at 628.

<sup>20</sup> *Id.* at 630.

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *Id.* at 626.

<sup>25</sup> *Id.* at 626–27.

<sup>26</sup> *Id.*

## II. SMART GUN TECHNOLOGY

This section provides a brief overview of personalized smart gun technologies that will be implicated in the constitutional analysis in Section IV. Generally, firearms work in the following way: “a trigger releases a firing pin, which strikes ammunition, causing a small and contained explosion which launches a projectile, or bullet, down a metal tube at a target.”<sup>27</sup> Smart guns use technology to enable, disable, perfect, or keep track of this process. There are multiple types of smart guns;<sup>28</sup> however, this Note focuses specifically on personalized smart guns. Also known as electronically controlled safety mechanisms (ECSMs) in the military context, personalized smart guns are weapons that only the owner or designated user can fire.<sup>29</sup> This section examines the two most common types of personalized smart guns and explains their underlying mechanisms, benefits, and drawbacks, which impact their usefulness, constitutionality, and the likelihood of their widespread adoption by the general population.

Biometric-based trigger lock guns are one of the two common types of personalized smart guns.<sup>30</sup> Generally, they consist of fingerprint or palm-based readers that unlock the firearm when the user’s biometric information is recognized, similar to the technology that allows smartphone owners to unlock their phones.<sup>31</sup> There are two main types of biometric-based trigger locks: those that use physical biometric scanners and those that use behavioral biometrics.<sup>32</sup> The former include fingerprint and palm print scanners — the most common types of scanners — as well as facial recognition and iris recognition scanners.<sup>33</sup> The latter recognize behavioral characteristics, such as characteristics of voice and grip.<sup>34</sup>

Kai Kloepfer, a teenager from Colorado, developed a prototype for a biometric smart gun in response to a mass shooting.<sup>35</sup> This prototype

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<sup>27</sup> Anthony W. Metzler, *Triggered: Mass Shootings, Smart Gun Technology and the Search for Solutions*, 19 J. HIGH TECH. L. 103, 109 (2018).

<sup>28</sup> See generally Stevenson, *supra* note 3 (examining semiautonomous or precision-guided firearms, precision-guided firearms, guns that track and store certain information like time of discharge, location, and angle of discharge, and “glockchain” firearms that use the blockchain to safely secure firing information).

<sup>29</sup> *Id.* at 693.

<sup>30</sup> *Id.* at 702.

<sup>31</sup> *Id.*

<sup>32</sup> *Id.* at 703.

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

<sup>35</sup> Metzler, *supra* note 27, at 122.

is a good example of how some biometric-based trigger locks work. As opposed to a traditional fingerprint scanner, the prototype:

uses a sensor to pass a very small electrical current through a fingerprint, which conducts electricity to create an image that allows the weapon to fire. Kloepfer states that the technology does not necessarily read your fingerprint in the way one would expect; rather it is similar to electronic signatures at the supermarket. Electronic signatures at supermarkets determine fraud by comparing metrics of the user, such as how a user holds the stylus. Kloepfer's design for a fingerprint scanner on a firearm acts in the same capacity, measuring how an individual holds the gun as opposed to reading the lines of their skin.<sup>36</sup>

While certainly innovative, biometric-based trigger locks are far from perfect. For example, the technology can misread a user's handprints or fingerprints if the user's hand is wet, dirty, or sweaty or if the user is wearing gloves, thereby preventing the gun from firing.<sup>37</sup> These problems have been overcome to some degree by using dynamic grip recognition instead of traditional scanners.<sup>38</sup> Additionally, battery issues may render the gun inoperative at times,<sup>39</sup> though this issue is mitigated by technologies that only use battery power when the trigger is pulled.<sup>40</sup>

Biometric technology has also been used in external firearm locking devices. Unlike smart guns in which the authentication technology belongs to the gun itself, these external devices are attachable to many traditional types of firearms.<sup>41</sup> Similar to biometric-based smart guns, these external locks have a fingerprint scanner that allows only the authorized user to unlock the gun.<sup>42</sup> The IdentiLock and Viking Biometric Trigger lock are two examples that are already commercially available.<sup>43</sup> Some of these biometric safety attachments are reasonably priced at eighty-nine dollars, have lasting battery power, rarely malfunction, and can be unlocked by the authorized user in milliseconds.<sup>44</sup> As will be shown

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<sup>36</sup> See *id.* (citing Katharine Gammon, *The Tech Behind Smart Guns*, INSIDE SCI. (Feb. 8, 2016), <https://perma.cc/BG3V-9LRF>).

<sup>37</sup> Stevenson, *supra* note 3, at 702; GIFFORDS LAW CTR., *supra* note 2, at 53.

<sup>38</sup> Stevenson, *supra* note 3, at 703.

<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> GIFFORDS LAW CTR., *supra* note 2, at 41.

<sup>42</sup> *Id.*

<sup>43</sup> IDENTILOCK, <https://getidentilock.com> (last visited May 5, 2020); VIKING BIOMETRIC TRIGGER LOCK, <https://vikingtriggerlock.com/> (last visited May 5, 2020).

<sup>44</sup> *Id.*; see also GIFFORDS LAW CTR., *supra* note 2, at 52–58 (listing other reliable personalized smart gun technologies, such as the GunGuardian and Vara).

in Part VI, the reliability of these technological features greatly affects the constitutionality of a smart gun mandate. Safety goals of storage mandates can be met without imposing on gun owners' right to bear arms in self-defense in a life-threatening situation. If the technology is as reliable as the smart gun manufacturers purport it to be, then they are attractive alternatives for gun owners who wish to safely store their firearms but do not want to deal with the potentially life-threatening burden of taking a few seconds to unlock a traditional gun safe with a key or combination.<sup>45</sup>

The second common example of personalized smart guns are firearms that are trigger locked by radio frequency identification (RFID) tokens and use radio frequency to fire.<sup>46</sup> These smart guns are equipped with a ferrous locking mechanism that blocks the firing pin from working.<sup>47</sup> They have an electromagnet that is only activated when it receives a radio wave token from an external device, such as an electronically matched chip in the form of a watch, key fob, pendant, or ring.<sup>48</sup> The token contains an electromagnetic transmitter that emits a signal to the gun, thereby disengaging the ferrous locking mechanism and magnetically dislodging the gun's firing pin, thus allowing the gun to be used.<sup>49</sup>

This smart gun technology is plagued by more issues than the biometric-based trigger locks and is therefore less likely to be constitutional (as discussed in Part IV). For example, if the paired token is lost, misplaced, or in another room, the gun cannot be fired.<sup>50</sup> Like biometric-based trigger locks, battery issues are also a problem. More importantly, however, RFID token trigger locks are less reliable than biometric-based trigger locks due to their susceptibility to hacking. A mere 15-dollar magnet placed near a firearm's electromagnet is all a hacker needs to unlock the firearm's firing pin.<sup>51</sup> This is the cheapest, easiest, and most effective way to hack an RFID-locked firearm.

In sum, while the technological inefficiencies and downsides of certain smart guns, particularly those that use RFID technology, should not be ignored, the current state of biometric smart gun technology seems

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<sup>45</sup> See *supra* note 43 and accompanying discussion; see also GIFFORDS LAW CTR., *supra* note 2, at 41.

<sup>46</sup> Metzler, *supra* note 27, at 120.

<sup>47</sup> *Id.*

<sup>48</sup> Stevenson, *supra* note 3, at 702.

<sup>49</sup> Metzler, *supra* note 27, at 120.

<sup>50</sup> Stevenson, *supra* note 3, at 712.

<sup>51</sup> See *id.* at 709 (citing Andy Greenberg, *Anybody Can Fire This 'Locked' Smart Gun With \$15 Worth of Magnets*, WIRED (July 24, 2017, 2:06 PM), <https://bit.ly/3dqzFpC>)).

to be reliable. This reliability will likely continue to increase with future technological developments.<sup>52</sup>

### III. SMART GUNS: A LIFE-SAVING TECHNOLOGY OR A WASTE OF RESOURCES?

This section addresses whether smart guns would help prevent firearm-related deaths and concludes that while smart guns may not prevent all types of firearm-related deaths, they would still help prevent youth firearm-related suicides and accidental firearm deaths—a worthy public health goal.

First, smart guns are an effective way to prevent youth suicides.<sup>53</sup> Firearm suicide rates among children and adolescents are particularly alarming. The suicide rate among children and adolescents has increased by sixty-five percent over the last ten years.<sup>54</sup> Out of all the gun-related deaths in children and adolescents in 2016, thirty-five percent were suicides.<sup>55</sup> In that same year, more than 1,100 adolescents (ten – nineteen years old) died by firearm suicide.<sup>56</sup> In 2017, forty-three percent of youth suicides involved a firearm.<sup>57</sup> Importantly, over eighty percent of children and adolescent firearm suicides involved a firearm belonging to a family member.<sup>58</sup> This statistic, coupled with the fact that 4.6 million children in the United States live in a home with an unlocked, loaded firearm, helps

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<sup>52</sup> See GIFFORDS LAW CTR., *supra* note 2, at 52–58 (describing different brands and types of reliable smart gun technology that is currently in development or on sale: Biofire Technologies, iGun Technologies, Sentinel, Vara, and GunGuardian). It is worth noting that the accuracy of the Biofire smart gun’s fingerprint scanner is 99.999% and is therefore more reliable than the firearm’s mechanical components. Additionally, the Biofire handgun “is about as hackable as a toaster.” *Id.* at 53.

<sup>53</sup> Stevenson, *supra* note 3, at 704.

<sup>54</sup> See generally EVERYTOWN FOR GUN SAFETY, *DISRUPTING ACCESS: ADDRESSING FIREARM SUICIDE IN THE U.S.* (Sept. 10, 2018), <https://everytownresearch.org/reports/disrupting-access/> (providing a statistical report of firearm suicides in the U.S.).

<sup>55</sup> See EVERYTOWN FOR GUN SAFETY, *FIREARM SUICIDE IN THE UNITED STATES* (Aug. 30, 2019), <https://everytownresearch.org/firearm-suicide/> (providing an updated report and analysis of firearm suicides in the U.S.).

<sup>56</sup> See Richard Florida & Nicole Javorsky, *Teen Suicide Rates Are Higher In States Where More People Own Guns*, CITYLAB (Jan. 29, 2019, 10:50 AM), <https://www.bloomberg.com/news/articles/2019-01-29/researchers-link-u-s-gun-ownership-and-youth-suicide> (providing statistics on youth suicide and gun ownership, concluding that teen suicide rates are higher in states where more people own guns).

<sup>57</sup> *Id.*

<sup>58</sup> EVERYTOWN (2019), *supra* note 55.

explain why firearm suicide among youths occurs at such high rates.<sup>59</sup> Further, studies suggest that unsafe firearm storage is highly associated with firearm suicide among children and adolescents.<sup>60</sup>

Additionally, teenagers with no access to firearms rarely find substitutive means to commit suicide.<sup>61</sup> Thus, making it harder for children and teenagers to access and operate family members' firearms decreases the likelihood of adolescent suicide. Smart guns accomplish this goal: by restricting the operation of the firearm to only the authorized users—such as the parents—smart guns prevent the situations in which a child or teenager finds a family member's firearm and uses it to commit suicide. While some may argue that smart guns would not be effective in preventing these types of suicides because the teenager would simply look for a suicide method that does not involve a firearm, this belief is mistaken: the most common alternative suicide methods to firearm are substantially less lethal.<sup>62</sup> Therefore, given that most youth suicides tend to be impulsive<sup>63</sup> and that firearm suicides are disproportionately lethal compared to other suicide methods, smart guns are an effective way to prevent these tragedies. It is important to note, however, that smart guns are likely to be ineffective in preventing the leading cause of firearm

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<sup>59</sup> EVERYTOWN (2018), *supra* note 54.

<sup>60</sup> See, e.g., Anita Knopov et al., *Household Gun Ownership and Youth Suicide Rates at the State Level, 2005–2015*, 56 AM. J. OF PREVENTIVE MED. 335–42 (2019), [https://www.ajpmonline.org/article/S0749-3797\(18\)32383-3/fulltext](https://www.ajpmonline.org/article/S0749-3797(18)32383-3/fulltext) (finding a positive association between gun ownership and youth suicides); Seema Shah et al., *Adolescent Suicide and Household Access to Firearms in Colorado: Results of a Case-Control Study*, 26 J. OF ADOLESCENT HEALTH 157, 157–63 (2000) (concluding that limiting household access to firearms may reduce teenage suicides).

<sup>61</sup> See Knopov et al., *supra* note 60, at 339 (observing no “substitution effect” when firearms are not present); see also AM. ACAD. OF PEDIATRICS, *Firearm-Related Injuries Affecting the Pediatric Population*, 130 PEDIATRICS e1416, e1418 (2012), <https://pediatrics.aappublications.org/content/130/5/e1416> (concluding that “[t]he association of a gun in the home and increased risk of suicide among adolescents has been well documented . . . this association is significant even in those teens without a previous psychiatric diagnosis”).

<sup>62</sup> See GIFFORDS LAW CTR, *supra* note 2, at 32 (noting that “[s]uicide attempters die 84% of the time when a gun is used, while suicide attempts by drug overdose have only a 2.5% fatality rate, jumping has a 20% fatality rate, and self-inflicted cutting has a less than 1% fatality rate. The bottom line: a suicide prevented by removing access to a gun may be a life saved”).

<sup>63</sup> See *id.* at 31 (stating that teenagers can act on suicidal ideations within five minutes); see AM. ACAD. OF PEDIATRICS, *supra* note 61 (stating that “[a]dolescents are at a relatively high risk of attempting suicide as a consequence of their often impulsive behavior”).

deaths, adult suicide,<sup>64</sup> as the various user authentication processes are rendered meaningless when the authorized, suicidal adult intends to use the smart gun.

Smart guns are also an effective way to protect children and teenagers from accidental shootings.<sup>65</sup> There have been at least 1,777 unintentional shootings by children since 2015, resulting in 656 deaths and 1,169 injuries.<sup>66</sup> While these types of deaths comprise a small percentage of all firearm-related deaths,<sup>67</sup> measures to mitigate the likelihood of accidental gun deaths in children should still be pursued. When it comes to firearms, these tragic deaths may be the most preventable: smart guns would help prevent them because most unintentional firearm injuries and deaths involve guns belonging to relatives.<sup>68</sup> By only permitting authorized users to fire the gun, smart guns would prevent children from unintentionally shooting, injuring, or killing each other or themselves if they find a relative's improperly stored gun.<sup>69</sup> Additionally, the potential of personalized smart guns to help reduce these sorts of deaths has become more relevant and the issue has become even more pressing with the recent increase in unintentional shootings by children during the COVID-19 pandemic,<sup>70</sup> which has coincided with an increase in gun sales.<sup>71</sup>

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<sup>64</sup> Stevenson, *supra* note 3, at 709.

<sup>65</sup> GIFFORDS LAW CTR., *supra* note 2, at 33.

<sup>66</sup> See EVERYTOWN FOR GUN SAFETY, #NOTANACCIDENT INDEX (2021), <https://everytownresearch.org/notanaccident/#15554> (providing an index for the total number of accidental firearm injuries and deaths in the U.S.).

<sup>67</sup> See Rebecca M. Cunningham et al., *The Major Causes of Death in Children and Adolescents in the United States*, 379 NEW ENG. J. OF MED. 2468, 2468 (2018) (stating that among total adolescents and children firearm deaths in 2016, 4% were unintentional deaths such as accidental discharge, while 59% were homicides and 35% were suicides).

<sup>68</sup> Stevenson, *supra* note 3, at 700.

<sup>69</sup> *Id.*; see also Deborah Azrael et al., *Firearm Storage in Gun-Ownning Households with Children: Results of a 2015 National Survey*, 95 J. OF URB. HEALTH 295, 296, 304 (2018) (demonstrating that there are strong correlations between laws that restrict children's access to guns and decreased child firearm deaths, as well as strong correlations between the presence of a firearm at home and an increased likelihood of accidental child firearm deaths).

<sup>70</sup> Erin Donaghue, "Alarming" spike in deadly unintentional shootings by kids as gun sales soar during lockdowns, CBS NEWS (May 8, 2020, 12:36 PM), <https://www.cbsnews.com/news/unintentional-shootings-guns-kids-sales-coronavirus-lockdowns/>.

<sup>71</sup> See EVERYTOWN FOR GUN SAFETY, COVID-19 GUNS: ADDRESSING GUN VIOLENCE AMID THE CORONAVIRUS 3 (2020), <https://everytown.org/documents/2020/04/21984.pdf/> (describing how the recent "surge in gun purchases" may increase firearm-related injuries and deaths in the home); see also Jackie Powder, *Surge of Gun Sales Amid COVID-19 Worries Experts*, JOHNS HOPKINS

Critics argue that smart guns would not prevent accidental discharges by children because research has shown that most people who would buy a smart gun already have other traditional firearms in their homes. Thus, the same risk would still be present in most homes regardless of the presence of a smart gun.<sup>72</sup> These concerns, however, are resolved if biometric-based trigger lock attachments are made mandatory through legislation.<sup>73</sup> Given that these attachments can turn most traditional firearms into smart firearms, they could make gun-owning homes safer by reducing the likelihood of an accidental discharge by a child while simultaneously enabling quick and easy access to the firearm by adults in the house.

Smart guns, however, would not prevent domestic violence cases involving firearms and many types of firearm-related homicides because the perpetrators in these situations usually use their own guns to commit such crimes.<sup>74</sup> Additionally, while smart guns may have helped prevent mass shootings in a minority of cases,<sup>75</sup> most firearms used in mass shootings are acquired legally.<sup>76</sup> Therefore, a personalized smart gun would not help prevent most of these atrocities because the gun is programmed to activate for the shooter.<sup>77</sup>

Smart gun technology, however, is likely to be an effective guard against gun theft.<sup>78</sup> Gun theft is a serious criminal issue in the United States because firearms are stolen from private citizens between 170,000 to 350,000 times each year.<sup>79</sup> Additionally, ten to fifteen percent of stolen

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BLOOMBERG SCH. OF PUB. HEALTH INSIGHTS (Apr. 9, 2020), <https://www.jhsph.edu/covid-19/articles/gun-sales-surge-amid-coronavirus-anxiety.html> (stating that there was an increase in gun background check filings of more than 1.8 million in February and March 2020 compared to the same period last year). While “[b]ackground checks don’t equate to individual gun sales, as one check may be for multiple gun purchases, . . . [background checks] are generally viewed as a proxy for firearm demand.” *Id.*

<sup>72</sup> Stevenson, *supra* note 3, at 709–10.

<sup>73</sup> See *infra*, Section IV.A.1.

<sup>74</sup> Stevenson, *supra* note 3, at 723.

<sup>75</sup> See Larry Buchanan & Josh Keller, *How They Got Their Guns*, N.Y. TIMES (Feb. 16, 2018), <https://www.nytimes.com/interactive/2015/10/03/us/how-mass-shooters-got-their-guns.html> (explaining that Adam Lanza, the twenty-year-old responsible for the Sandy Hook Elementary School massacre, used his mother’s guns to kill 26 people—mostly children).

<sup>76</sup> Metzler, *supra* note 27, at 124.

<sup>77</sup> See Buchanan & Keller, *supra* note 75 (covering how different mass shooters obtained their firearms and highlighting that most mass shooters obtained their firearms legally).

<sup>78</sup> GIFFORDS LAW CTR., *supra* note 2, at 35.

<sup>79</sup> *Id.* at 36, 98.

firearms are later used in crimes.<sup>80</sup> Smart guns may help prevent the issues associated with gun theft by making the gun inoperable and worthless to the criminals who are not able to successfully reengineer the stolen smart guns.<sup>81</sup> Further, not only could smart guns help reduce the number of guns available on the black market that are later used to commit crimes,<sup>82</sup> but smart guns could also prevent the criminal from using the owner's own gun against her in the course of the theft.<sup>83</sup>

Moreover, smart guns could prevent law enforcement officers from being attacked with their own weapons.<sup>84</sup> In 2018, for example, thirteen percent of officers feloniously killed were shot with their own weapons.<sup>85</sup> Smart guns could thus prevent these situations because the police officer's gun would be inoperable to the criminal who obtains it. It is important to note, however, that some law enforcement agencies have opposed smart guns both because of reliability concerns and because they worry that they may inhibit the officer's safety when she has to use her partner's gun to protect herself.<sup>86</sup> While this could be an issue, officers could program their smart guns to authorize their partners' fingerprints or other biometrical identification information.

#### IV. CONSTITUTIONALITY OF SMART GUNS

This Note has delved into the relevant background of the most influential Second Amendment case, the state of current smart gun technology, and smart guns' potential to mitigate certain firearm-related deaths. It is now essential to determine whether personalized smart guns are constitutional—if they are not, their potential benefits and the heated debates regarding their implementation and practicability should and will be confined to the realm of law school hypotheticals and science fiction novels. For that purpose, this section will first provide a brief background on the most common test that courts have used to assess the constitutionality of firearm regulations post-*Heller*. It will then delve into which standard of review is most likely to be used by courts in determining whether smart gun legislation is constitutional. Finally, it will apply different constitutional tests to assess whether a smart gun mandate would pass constitutional muster.

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<sup>80</sup> *Id.* at 36.

<sup>81</sup> Stevenson, *supra* note 3, at 701.

<sup>82</sup> *Id.*

<sup>83</sup> GIFFORDS LAW CTR., *supra* note 2, at 35–36.

<sup>84</sup> *Id.* at 36–37.

<sup>85</sup> FBI: UNIFORM CRIME REPORTING, TABLE 19 LAW ENFORCEMENT OFFICERS FELONIOUSLY KILLED FROM 2009-2018, <https://ucr.fbi.gov/leoka/2018/tables/table-19.xls>.

<sup>86</sup> Lujan, *supra* note 3, at 509.

## A. Background

### 1. Smart Gun Mandate: What Would it Look Like?

Before discussing what the appropriate test is for determining the constitutionality of a smart gun mandate, it is essential to define the mandate itself. Importantly, a mandatory firearm buy-back or trade-in program in which the government obtains citizens' firearms in order to either install smart-gun technology or replace their traditional firearms would be unconstitutional because it would temporarily deprive gun owners of their right to self-defense.<sup>87</sup> On the other end of the spectrum, there is essentially no question that a gun store's *decision* to sell smart guns is constitutional and in accordance with the Second Amendment because of the state action doctrine.<sup>88</sup> The more controversial question and the subject of this section, however, is whether a smart gun mandate from the legislature, one that only permitted the sale of smart guns and prohibited the sale of traditional firearms, would be constitutional. This section concludes that mandates that require all *new* firearms sold from a certain date onwards to be smart guns or that require all new guns to be smart guns while also requiring existing gun owners to implement external smart gun attachments at the government's expense are likely constitutional.

### 2. The Two-Part Test: The Most Common Constitutional Framework

As mentioned in Section II, the majority in *Heller* determined that the Second Amendment protects the right to keep and bear arms for individual purposes like self-defense while also emphasizing that such a right is "not unlimited."<sup>89</sup> Particularly relevant to the issue of smart guns, the majority mentioned that "laws imposing conditions and qualifications on the commercial sale of arms"<sup>90</sup> could still be constitutionally permissible. The majority also clarified that its list of specific examples of

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<sup>87</sup> Metzler, *supra* note 27, at 126–27.

<sup>88</sup> See LEGAL INFO. INST., *State Action Requirement*, [https://www.law.cornell.edu/wex/state\\_action\\_requirement](https://www.law.cornell.edu/wex/state_action_requirement) (last visited May 5, 2020) (stating that the Constitution generally prohibits only governmental infringement of constitutional rights, not the actions of private actors); see also Mike Kelly, *NJ's 'smart gun' law may get new life. But will it be effective?*, NORTHJERSEY.COM (Mar. 8, 2018, 10:10 AM),

<https://www.northjersey.com/story/news/columnists/mike-kelly/2018/03/08/njs-smart-gun-law-may-get-new-life-but-effective/331149002/> (quoting an NRA spokesman's statement that "[i]f a gun shop wants to sell [smart guns], fine, . . . It should be something left to the marketplace. Mandating every person sell products is just not acceptable.").

<sup>89</sup> *District of Columbia v. Heller*, 554 U.S. 570, 626 (2008).

<sup>90</sup> *Id.* at 626–27.

constitutionally permissible restrictions on firearms was not meant to be exhaustive.<sup>91</sup>

The *Heller* decision, however, still left many questions unanswered. Most pressingly, it did not clarify how lower courts were supposed to assess the constitutionality of firearm regulations. In other words, the *Heller* majority did not announce a standard of review for striking down or determining the constitutionality of gun regulations. While the majority specified that the rational basis scrutiny standard “could not be used to evaluate the extent to which a legislature may regulate a specific, enumerated right [such as] . . . the right to keep and bear arms,”<sup>92</sup> it emphasized that “[u]nder any of the standards of scrutiny that [the Supreme Court has] applied to enumerated constitutional rights, banning from the home ‘the most preferred firearm in the nation to keep and use for protection of one’s home and family,’ would fail constitutional muster.”<sup>93</sup> Justice Scalia refused to announce and apply a standard of review because he reasoned that the D.C. law was a categorically unjustifiable violation of the Second Amendment.<sup>94</sup> Constitutional law scholar Eugene Volokh has interpreted this to be a “per se invalidation” of an especially severe burden to the individual right to keep and bear arms.<sup>95</sup> Therefore, the only limits stated in *Heller* regarding the constitutional standard of review for gun regulations are that rational basis scrutiny and Justice Breyer’s “judge-empowering ‘interest-balancing inquiry’” are both inappropriate frameworks.<sup>96</sup> Thus, in determining whether a smart gun mandate is constitutional, a court is likely to have a decent amount of flexibility in deciding what constitutional standard of review to apply.

Courts and scholars agree that the most prevalent framework used by lower courts in determining the constitutionality of firearm laws is a two-prong inquiry.<sup>97</sup> The two-part test consists of the following elements: first, courts ask “whether a challenged law imposes a burden on conduct falling within the scope of the Second Amendment,” and, second, if it does, courts

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<sup>91</sup> *Id.* at 626 (stating that the Court is “not undertak[ing] an exhaustive historical analysis . . . of the full scope of the Second Amendment”).

<sup>92</sup> *Id.* at 628 n.27.

<sup>93</sup> *Id.* at 628–29 (quoting *Parker v. District of Columbia*, 478 F.3d 370, 400 (D.C. Cir. 2007)).

<sup>94</sup> Kimberly, *supra* note 3, at 263.

<sup>95</sup> Eugene Volokh, *Implementing the Right to Keep and Bear Arms for Self-Defense: An Analytical Framework and a Research Agenda*, 56 UCLA L. REV. 1443, 1462 (2009).

<sup>96</sup> *Heller*, 554 U.S. at 634 (quoting *id.* at 689 (Breyer, J., dissenting)).

<sup>97</sup> Eric Ruben & Joseph Blocher, *From Theory to Doctrine: An Empirical Analysis of the Right to Keep and Bear Arms After Heller*, 67 DUKE L.J. 1433, 1451 (2018).

ask “whether the law satisfies [the applicable level of] scrutiny.”<sup>98</sup> The Third, Fourth, Fifth, Sixth, Seventh, Ninth, Tenth, Eleventh, and D.C. Circuits have generally adopted the two-part test.<sup>99</sup> Whereas the two-part test has been more commonly used in federal courts than in state courts,<sup>100</sup> the majority of Second Amendment litigation has occurred in state courts.<sup>101</sup> While the most common level of scrutiny in evaluating the constitutionality of gun regulations is intermediate scrutiny,<sup>102</sup> it is also possible that a court could apply strict scrutiny.

### *3. Courts Are Most Likely to Use the Two-Part Test to Evaluate the Constitutionality of a Smart Gun Mandate.*

In future litigation, the most likely framework to be applied to a smart gun mandate is the common two-part test with intermediate scrutiny.<sup>103</sup> First, a court faced with a constitutional challenge to a smart gun mandate would likely apply the two-part test. Courts of Appeals have widely adopted this framework and the number of cases applying the test have continued to increase steadily in recent years.<sup>104</sup> Second, such a court would likely apply intermediate scrutiny in the two-part test because courts have tended to apply this level of scrutiny in cases concerning the constitutionality of gun regulations.<sup>105</sup> Additionally, “[i]ntermediate

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<sup>98</sup> GIFFORDS LAW CTR. TO PREVENT GUN VIOLENCE, POST-*HELLER* LITIGATION SUMMARY 3–4 (2020), <https://giffords.org/wp-content/uploads/2020/07/Giffords-Law-Center-Post-Heller-Litigation-Summary-July-2020.pdf>.

<sup>99</sup> Ruben & Blocher, *supra* note 97, at 1452 n.88.

<sup>100</sup> *Id.* at 1490 (stating that “[j]ust 32 percent of state appellate challenges applied the two-part test, compared with 46 percent of federal challenges”).

<sup>101</sup> *Id.* at 1473.

<sup>102</sup> *See id.* at 1496 (providing evidence that “[i]ntermediate scrutiny has been the most prevalent form of scrutiny, no matter which category of court one considers”).

<sup>103</sup> *See id.* at 1437 (quoting *Nat’l Rifle Ass’n of Am. v. Bureau of Alcohol, Tobacco, Firearms, & Explosives*, 700 F.3d 185, 194 (5th Cir. 2012)) (stating that “the two-part test . . . ‘has emerged as the prevailing approach’” in evaluating the constitutionality of gun regulations).

<sup>104</sup> *Id.* at 1490–91.

<sup>105</sup> *See* *N.Y. State Rifle & Pistol Ass’n, Inc. v. Cuomo*, 804 F.3d 242, 264 (2d Cir. 2015) (applying intermediate scrutiny to an assault weapons and large-capacity magazine ban); *Heller v. District of Columbia* (*Heller II*), 670 F.3d 1244, 1256 (D.C. Cir. 2011) (applying intermediate scrutiny to determine whether a law imposing firearm registration requirements and prohibiting assault weapons and large-capacity magazines was constitutional); *United States v. Schultz*, No. 1:08-CR-75-TS, 2009 U.S. Dist. LEXIS 234, at \*15 (N. D. Ind. Jan. 5, 2009) (applying intermediate scrutiny to determine whether the federal felon-in-possession ban applied to someone who had been convicted of failure to pay child support); *United States v. Williams*, 616 F.3d 685, 692–94 (7th Cir. 2010) (holding that a prohibition of firearm possession by felons survived intermediate scrutiny);

scrutiny has been the most prevalent form of scrutiny [in assessing the constitutionality of gun regulations], no matter which category of court one considers.”<sup>106</sup> For example, in *Jackson v. City of San Francisco*,<sup>107</sup> the U.S. Court of Appeals for the Ninth Circuit assessed the constitutionality of a San Francisco law that required guns in the home to be “stored in a locked container or disabled with a trigger lock that has been approved by the California Department of Justice.”<sup>108</sup> Using the common two-part test,<sup>109</sup> the court first asked “whether the challenged law burdened conduct protected by the Second Amendment.”<sup>110</sup> After concluding that the law was “within the scope of the Second Amendment,”<sup>111</sup> the court then determined the appropriate level of scrutiny. In doing so, the court analyzed (1) how close the law is to a Second Amendment right and (2) how severely the law burdens the right.<sup>112</sup> While the court observed that the law was a “core burden on the Second Amendment” because it made it more difficult for a gun owner to use her gun in self-defense, the court concluded that the burden was not substantial since a modern gun safe could be opened quickly.<sup>113</sup> The court then proceeded to apply intermediate scrutiny to the San Francisco law, concluding that the law survived that test.<sup>114</sup>

One potential criticism of the two-part test is that courts do not typically refer to it explicitly. An empirical study revealed that courts in just thirty-two percent of state appellate challenges and forty-six percent of federal challenges to gun regulations explicitly used the two-part test.<sup>115</sup> Thus, critics would argue that a court evaluating the constitutionality of a smart gun mandate would not apply the two-part test because only a minority of constitutional challenges to gun regulations have explicitly applied it.<sup>116</sup> However, the two-part test has likely been underreported in

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United States v. Marzzarella, 614 F.3d 85, 97 (3d Cir. 2010) (concluding that intermediate scrutiny was an appropriate standard of review in determining whether a statute prohibiting the purchase of guns with obliterated serial numbers was constitutional).

<sup>106</sup> Ruben & Blocher, *supra* note 97, at 1496.

<sup>107</sup> 746 F.3d 953, 958 (9th Cir. 2014).

<sup>108</sup> Kimberly, *supra* note 3, at 269 (quoting *Jackson*, 746 F.3d at 958).

<sup>109</sup> See, e.g., United States v. Chovan, 735 F.3d 1127, 1141 (9th Cir. 2013) (applying a two-step analysis to determine that intermediate scrutiny applied to a “prohibition on gun possession by domestic violence misdemeanants”).

<sup>110</sup> Kimberly, *supra* note 3, at 270 (quoting *Jackson*, 746 F.3d at 960).

<sup>111</sup> *Jackson*, 746 F.3d at 963.

<sup>112</sup> Kimberly, *supra* note 3, at 270.

<sup>113</sup> *Id.* at 270–71.

<sup>114</sup> *Id.*

<sup>115</sup> Ruben & Blocher, *supra* note 97, at 1490.

<sup>116</sup> See *id.* (discussing two-part test application data).

empirical studies because “courts may not be explicit when they are using the two-part test,”<sup>117</sup> instead skipping to the second step of the test and assuming that the law is covered by the Second Amendment.<sup>118</sup> Additionally, there is enough precedent from various United States Courts of Appeals establishing the two-part test as the appropriate framework for evaluating gun regulations that lower courts are likely to be bound by precedent. Therefore, even though courts applying the two-part test to gun regulations are seemingly in a minority, a court evaluating the constitutionality of a smart gun mandate is likely to apply such a test.

*B. Applying the Two-Part Test with Intermediate Scrutiny to a Smart Gun Mandate*

Given that a court is likely to apply the two-part test with intermediate scrutiny to a smart gun mandate, it is essential to determine whether such a mandate would survive the test. Under the first prong, a court would find that a smart gun mandate “imposes a burden on conduct falling within the scope of the Second Amendment”<sup>119</sup> because of smart guns’ potential impediment to self-defense and because the traditional firearms that would no longer be available for sale after the mandate are like those firearms in “common use at the time”<sup>120</sup> of ratification.

However, under the second prong of the test—the applicable level of scrutiny—a smart gun mandate is likely to survive intermediate scrutiny because it would satisfy both elements of the constitutional standard of review. To survive intermediate scrutiny, the statute in question must (1) further an *important* government interest and (2) do so by means that are *substantially related* to that interest.<sup>121</sup>

First, a court could easily find that in mandating biometric-based trigger lock attachments for traditional firearms and in restricting the sale of new firearms to only smart guns, the state or federal government proposing such law has a significant interest in preventing child gun deaths, teenage firearm suicides, and gun thefts. In concluding that a smart gun mandate serves an important government interest, a court could point

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<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

<sup>119</sup> See GIFFORDS LAW CTR. TO PREVENT GUN VIOLENCE, POST-HELLER LITIGATION SUMMARY 3 (2020), <https://giffords.org/wp-content/uploads/2020/07/Giffords-Law-Center-Post-Heller-Litigation-Summary-July-2020.pdf> (discussing the two-part test).

<sup>120</sup> See *United States v. Miller*, 307 U.S. 174, 179 (1939) (analyzing the second amendment’s historical purpose).

<sup>121</sup> See LEGAL INFO. INST., *Intermediate Scrutiny*, [https://www.law.cornell.edu/wex/intermediate\\_scrutiny](https://www.law.cornell.edu/wex/intermediate_scrutiny) (last visited Nov. 11, 2020) (defining intermediate scrutiny) (emphasis added).

to the type of empirical evidence mentioned in Section III above to support its conclusion. Second, a court would be likely to find that the law “further[ed] an important government interest”<sup>122</sup> because smart guns allow only authorized users to operate the guns, thus reducing the likelihood that a teenager would use the gun to commit suicide or that a child would find the gun and accidentally discharge it. Further, smart guns are more aligned with the right to self-defense than other gun safety storage mechanisms: they are easier and quicker to operate than the safes and other storage methods mandated under the constitutionally permissible San Francisco law in *Jackson*.<sup>123</sup> If other courts approach the issue in the same way as *Jackson*, a smart gun mandate is likely to pass the first element of the second prong.

While the first element under intermediate scrutiny is likely to be relatively uncontroversial, the second element—the tailoring requirement under intermediate scrutiny—is more likely to be a point of contention among litigants arguing the constitutionality of a smart gun mandate. Thus, this subsection will focus more extensively on this element.

Due to *Heller*’s emphasis on the right to keep and bear arms for personal purposes, a court applying the intermediate scrutiny tailoring requirement to a smart gun mandate would likely consider the reliability of smart gun technology to be an important issue in addressing the constitutionality of a smart gun mandate. Critics of smart guns argue that the technology is not reliable and would thus inhibit the firearms from being used effectively for self-defense purposes. Pointing to the hackability of RFID-based smart guns and the potential glitches of biometric-based smart guns, they argue that “[a]ny impediment to [a gun-owner’s] reaction time . . . could mean the difference between life and death.”<sup>124</sup> However, more research is currently needed to determine whether smart gun technology is as unreliable as the critics claim it to be, as some of the studies exposing the potential deficiencies of smart gun technologies are over five years old.<sup>125</sup>

The available evidence suggests that the current state of smart gun technology is substantially more reliable than what the critics purport.<sup>126</sup>

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<sup>122</sup> See *id.* (defining the requirements to pass intermediate scrutiny).

<sup>123</sup> See *supra* Section II (noting the extremely short time that it takes to unlock some smart guns).

<sup>124</sup> Lujan, *supra* note 3, at 505.

<sup>125</sup> See, e.g., Mark Greene, *A Review of Gun Safety Technologies*, NAT’L INST. OF JUST. RES. REP. (June 2013), <https://www.ncjrs.gov/pdffiles1/nij/242500.pdf> (this report is often cited by critics of smart guns, but it was published in 2013).

<sup>126</sup> See GIFFORDS LAW CTR., *supra* note 2, at 52–58 (describing how some types of smart guns for sale and in development are reliable—for example, the accuracy

For example, the Viking Biometric Fingerprint Trigger Lock releases in .03 seconds, has 360-degree fingerprint recognition, is weather and dust resistant, and has a false rejection rate of .001%.<sup>127</sup> If the manufacturer's claims are proven to be accurate by independent studies, then a mandate requiring the use of this technology would be constitutional because it would not inhibit gun-owners from effectively using their firearms in self-defense. Further, some advanced fingerprint scanners report false authentication rates as low as .01%, which are much lower than the rate of expected mechanical malfunctions in traditional firearms.<sup>128</sup> While critics may still worry that fingerprint scanners could be unreliable if used with dirty hands, as in the familiar smartphone context, dynamic grip recognition technology avoids this issue while still being "individual to the user, reproducible, and measurable."<sup>129</sup>

Finally, certain forms of smart guns have been embraced by law enforcement agencies,<sup>130</sup> which suggests that they are sufficiently reliable for self-defense purposes. When law enforcement officers' use of smart guns becomes more commonplace, a smart gun mandate is more likely to pass constitutional muster. Thus, the current state of smart gun technology, likely future improvements, and an increased use by law enforcement officers suggest that a smart gun mandate would be constitutional under *Heller* because the technology is likely reliable and would thus not infringe on the individual right to keep and bear arms.

In a similar vein, critics may also argue that legislation mandating smart guns would be categorically prohibited because it would be too similar to the D.C. law rejected in *Heller*.<sup>131</sup> Just like the D.C. law's requirement that guns be disassembled or kept under a trigger lock when stored in the home, a smart gun mandate might similarly render the guns inoperable. This argument falls shorts upon closer analysis. In contrast to the D.C. law that rendered firearms inoperable in the home, a smart gun mandate would not render firearms inoperable because the available evidence suggests that the technology is reliable and the mandate itself would not be intended to make them inoperable. Rather than rendering guns inoperable, the mandate would merely ensure that only the authorized user would be able to use the firearm. Additionally, smart gun technology is more likely to facilitate self-defense as compared to other forms of firearm storage. For example, as opposed to the burdensome process of

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of the Biofire smart gun's fingerprint scanner is 99.999%, which is more reliable than the firearm's mechanical components).

<sup>127</sup> VIKING TRIGGER LOCK, *supra* note 43.

<sup>128</sup> GIFFORDS LAW CTR., *supra* note 2, at 40.

<sup>129</sup> *See id.* (describing the dynamic grip technology).

<sup>130</sup> *Id.* at 37.

<sup>131</sup> Lujan, *supra* note 3, at 512.

retrieving a gun from an electronic or mechanical safe, a gun owner could simply store her smart gun in a bedside drawer, confident that she will be able to access it quickly in case of emergency while simultaneously ensuring that her child or teenager cannot operate it. Thus, a mandate that only allowed the sale of smart guns and required existing gun owners to attach biometric-based locks to their traditional firearms is constitutional and does not amount to a “destruction of the right.”<sup>132</sup>

Finally, such a smart gun mandate would be constitutional under *Heller* because it does not amount to a total ban on guns. Unlike the law rejected in *Heller* that practically banned handguns in D.C., a smart gun mandate would still allow gun owners to exercise their Second Amendment right. The right articulated in *Heller* does not extend to unauthorized and unintended users. In sum, “there is not yet a constitutional basis for objecting to [a] smart-guns-only regime”<sup>133</sup> under *Heller* and a smart gun mandate is likely to survive the second prong of the intermediate scrutiny standard.

### C. Alternatives to the Two-Part Test with Intermediate Scrutiny

This subsection will provide a brief survey of other frameworks, standards, and tests that could be used to evaluate the constitutionality of a smart gun mandate. Where relevant, this subsection will also explain why the best option is the two-part test with intermediate scrutiny.

#### 1. Two-Part Test with Strict Scrutiny.

While a smart gun mandate is likely constitutional under intermediate scrutiny, it is unclear whether it would be able to survive “the most demanding test in constitutional law”:<sup>134</sup> strict scrutiny. Strict scrutiny requires that the statute in question be (1) genuinely necessary to serve a *compelling* government interest and (2) *narrowly tailored* to achieve that interest.<sup>135</sup> If less restrictive means are available to accomplish the government’s compelling interest, then the statute fails strict scrutiny.<sup>136</sup>

The government does have a compelling interest in reducing certain firearm-related deaths and preventing gun thefts. However, given that there are other means to achieve the governmental interest of reducing firearm-related deaths and gun thefts, such as traditional gun safes and

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<sup>132</sup> See *District of Columbia v. Heller*, 554 U.S. 570, 629 (2008) (quoting *State v. Reid*, 1 Ala. 612, 616–17 (1840)) (listing previous examples of courts striking down gun restrictions).

<sup>133</sup> Kimberly, *supra* note 3, at 278.

<sup>134</sup> *City of Boerne v. Flores*, 521 U.S. 507, 534 (1997).

<sup>135</sup> Volokh, *supra* note 95, at 1465, 1470.

<sup>136</sup> *Id.*

mechanical trigger locks, it is possible that a smart gun mandate would be found to be insufficiently tailored and would thus fail strict scrutiny. However, because smart guns are the only existing firearm tool that could effectively reduce the likelihood of accidental gun deaths and teenage suicides while simultaneously being easy and quick to use for self-defense purposes, it is still possible that a smart gun mandate would survive strict scrutiny assuming no similar and competing technology arises.

In any case, intermediate scrutiny is still more likely to be applied than strict scrutiny in smart gun cases because “[s]trict scrutiny does not apply automatically any time an enumerated right is involved”<sup>137</sup> and intermediate scrutiny is the most common type of scrutiny used in Second Amendment cases in both state and federal courts.<sup>138</sup> Thus, a smart gun mandate is likely to be constitutional.

## 2. *History, Text, and Tradition Framework.*

A popular alternative to the two-part test is one based on history, text, and tradition.<sup>139</sup> In *Friedman v. City of Highland Park, III*,<sup>140</sup> rather than applying the two-part framework, the court instead asked “whether a regulation bans weapons that were common at the time of ratification . . . and whether law-abiding citizens retain adequate means of self-defense.”<sup>141</sup> Given that traditional firearms are more similar to those that were “common at the time of ratification,”<sup>142</sup> a court could declare a law mandating that all new firearms for sale be smart guns and requiring firearm owners to attach biometric based trigger locks to their traditional firearms to be unconstitutional because it goes against the history, text, and tradition of the Second Amendment. However, the type of “original historical analysis [that was seen in *Heller* has] not [been] the sole driving

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<sup>137</sup> *United States v. Marzzarella*, 614 F.3d 85, 96 (3d Cir. 2010). See *United States v. Chester*, 628 F.3d 673, 682 (4th Cir. 2010) (stating “[w]e do not apply strict scrutiny whenever a law impinges upon a right specifically enumerated in the Bill of Rights”); Adam Winkler, *Scrutinizing the Second Amendment*, 105 MICH. L. REV. 683, 700 (2007) (“mere fact of ‘fundamentality’ does not answer the question of what would be the appropriate standard of review for the right to bear arms”).

<sup>138</sup> Ruben & Blocher, *supra* note 97, at 1496.

<sup>139</sup> See generally Darrell A. H. Miller, *Text, History, and Tradition: What the Seventh Amendment Can Teach Us about the Second*, 122 YALE L. J. 852 (2013) (extensively analyzing how the Supreme Court could look to the Seventh Amendment’s “historical test” to formulate a framework for evaluating firearm laws and regulations).

<sup>140</sup> 784 F.3d 406 (7th Cir. 2015).

<sup>141</sup> *Id.* at 410.

<sup>142</sup> *Id.*

force in Second Amendment cases,”<sup>143</sup> and it is possible that courts’ reliance on the growing body of precedent may be displacing pure historical and originalist reasoning in Second Amendment cases.<sup>144</sup>

### 3. *Undue Burden Test.*

Some critics of using intermediate and strict scrutiny for gun regulations argue that *Planned Parenthood v. Casey*’s undue burden test<sup>145</sup> is more appropriate for dealing with regulations that implicate the Second Amendment.<sup>146</sup> In essence, under the undue burden test, the court conducts a three-pronged analysis. It determines whether (1) the right impacted by the law in question is a fundamental right, and, if it is, (2) whether the government has a legitimate interest in placing a restriction on the exercise of that right. If the court determines that the state does have a legitimate interest, the court then (3) analyzes whether the law poses an undue burden on the exercise of the fundamental right.<sup>147</sup> If the court determines that the law in question does pose an undue burden, the inquiry is over because an undue burden on a fundamental right is per se unconstitutional.<sup>148</sup> Supporters of the undue burden test argue that it is the best standard of review for gun regulations because “the rights at stake in the contexts of abortion and gun control” are similar.<sup>149</sup> Additionally, the undue burden test has been the test predominantly used in state gun control cases, and courts are more likely to regard Second Amendment rights as liberty rights.<sup>150</sup>

The two-part test with levels of scrutiny approach, however, is still the more appropriate standard of review for gun regulations because Justice Scalia explicitly acknowledged the level of scrutiny approach in

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<sup>143</sup> See Ruben & Blocher, *supra* note 97 at 1491; Lawrence Rosenthal, *The Limits of Second Amendment Originalism and the Constitutional Case for Gun Control*, 92 WASH. U.L. REV. 1187, 1200 (2015) (stating that “[t]he emerging consensus in the lower courts uses original meaning only as a threshold test, which screens out some claims, but contemplates that laws—even those limiting the extent to which individuals can exercise the textually recognized right to keep and bear arms—may be sustained upon sufficient justification.”); Eric M. Ruben, *Justifying Perceptions in First and Second Amendment Doctrine*, 80 LAW & CONTEMP. PROBS. 149, 163 (2017) (noting that “originalism has not been the primary means of deciding cases.”).

<sup>144</sup> Ruben & Blocher, *supra* note 97, at 1493.

<sup>145</sup> 505 U.S. 833, 878 (1992).

<sup>146</sup> Lujan, *supra* note 3, at 517.

<sup>147</sup> *Id.* at 513.

<sup>148</sup> *Id.* at 514.

<sup>149</sup> *Id.* at 517.

<sup>150</sup> See *id.* at 517–19 (noting that the undue burden test does not appear).

*Heller* and did not acknowledge the undue burden test.<sup>151</sup> In addressing Justice Breyer's dissent, Justice Scalia criticized him for "propos[ing] . . . none of the traditionally expressed levels (strict scrutiny, intermediate scrutiny, rational basis)"<sup>152</sup> of judicial review, and instead proposing a general interest-balancing test.<sup>153</sup> In doing so, Justice Scalia implied that levels of scrutiny should be used for evaluating Second Amendment restrictions. Furthermore, the use of the levels of scrutiny approach to determining the constitutionality of gun regulation has steadily increased in recent years, suggesting that a court evaluating the constitutionality of a smart gun mandate would be more likely to apply the levels of scrutiny approach than an undue burden test.<sup>154</sup> The levels of scrutiny approach is more appropriate because it is more in accordance with the language in *Heller* and other court precedents.

Even if a court does use the undue burden test in assessing the constitutionality of a smart gun mandate, such a mandate would still be likely to survive the undue burden test. Some proponents of the undue burden test argue that a smart gun mandate would fail the test because purported cost, functionality, and reliability issues associated with smart guns would pose an undue burden on gun owners.<sup>155</sup> However, this is still unlikely to be the case because the evidence suggests that smart gun technology is not prohibitively expensive and the available technology is more reliable than critics suggest.<sup>156</sup> Not only is an eighty-nine-dollar biometric trigger lock attachment unlikely to be deemed unduly expensive, but the government could offset the cost of such devices through subsidies, grants, and rebates, thus eliminating the price barrier for gun-owners who cannot afford the technology.

#### 4. Eugene Volokh's Framework.

Finally, some scholars reject both the levels of scrutiny approach and the undue burden tests for laws implicating the Second Amendment. Most notably, Eugene Volokh has argued that the traditional standards of review do not fit the Second Amendment context.<sup>157</sup> Instead, he proposes a framework of three categories of restrictions to the Second Amendment: how, who, and cost restrictions.<sup>158</sup> These categories focus on how guns are stored, who is restricted from owning guns, and the different measures that

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<sup>151</sup> See *District of Columbia v. Heller*, 554 U.S. 570, 634 (2008).

<sup>152</sup> *Id.*

<sup>153</sup> *Id.*

<sup>154</sup> Ruben & Blocher, *supra* note 97, at 1495.

<sup>155</sup> Lujan, *supra* note 3, at 520–21.

<sup>156</sup> See *supra* Section II.

<sup>157</sup> Volokh, *supra* note 95, at 1446.

<sup>158</sup> See Kimberly, *supra* note 3, at 265–66.

make owning a firearm more expensive.<sup>159</sup> Importantly, a smart gun mandate is likely to be in accordance with this framework. Not only have scholars argued that a smart gun-only regime would be constitutionally permissible under Volokh's how, who, and expense framework,<sup>160</sup> but Volokh himself has also suggested that smart guns are likely to be constitutionally permissible if certain criteria are met. A smart gun mandate would not be a substantial burden and should be upheld if "the extra cost is relatively modest, the technology is highly reliable, and the batteries are extremely long-lived . . . [and] [t]his sort of low cost / high reliability outcome seems quite possible as the technology matures."<sup>161</sup>

In sum, if independent studies confirm what the current data suggests about the reliability of smart gun technology, then a smart gun mandate is likely to be constitutional under the potentially applicable standards of review.

## V. PRACTICAL ROADBLOCKS

While a smart gun mandate is likely constitutional, there are many non-constitutional hurdles to the implementation, normalization, and large-scale adoption of smart guns. This section will delve into the practical hurdles impeding smart gun research and legislation.

From a practical standpoint, the most substantial hurdle to a smart guns mandate is the significant supply of traditional firearms that are currently in circulation in the United States, which makes the enforcement costs of a smart gun mandate very high. Critics of smart guns are right to point out that the 393 million firearms owned by civilians would make it prohibitively expensive and practically impossible to mandate replacement of these firearms with brand new smart guns.<sup>162</sup> Thus, even if smart guns themselves are able to prevent certain kinds of firearm-related deaths, they would only have a minimal impact because current gun owners would continue to possess traditional firearms.<sup>163</sup> A smart gun mandate requiring all new firearms to be sold with smart gun technology, they argue, would not prevent teenage firearm suicides or accidental child

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<sup>159</sup> *See id.*

<sup>160</sup> *See id.* at 265–67 (describing the three categories of restrictions).

<sup>161</sup> Volokh, *supra* note 95, at 1491–92.

<sup>162</sup> Christopher Ingraham, *There Are More Guns than People in the United States, According to a New Study of Global Firearm Ownership*, WASHINGTON POST (June 19, 2018), <https://www.washingtonpost.com/news/wonk/wp/2018/06/19/there-are-more-guns-than-people-in-the-united-states-according-to-a-new-study-of-global-firearm-ownership/>.

<sup>163</sup> Kimberly, *supra* note 3, at 256; Metzler, *supra* note 27, at 127.

gun deaths because traditional weapons would still be in millions of homes.

While critics are right that a traditional gun-buy-back or trade-in program would be impracticable, biometric based trigger lock attachments could improve the security of millions of existing firearms without requiring gun owners to buy new smart guns or trade in their traditional guns.<sup>164</sup> These attachments are reasonably priced, allegedly reliable, can be attached to the most common types of traditional firearms, and do not inhibit the right to use firearms for self-defense. A state or federal government mandate requiring the implementation of this type of smart gun technology to existing guns would be both constitutional and practicable.

Economic and market hurdles are also likely to impede the implementation of smart guns. First, critics point out that individual smart guns, some costing \$1,800, are prohibitively expensive.<sup>165</sup> Allowing only smart guns to be sold would thus bar a whole class of people—those who cannot afford the expensive price tag—from buying a gun. Second, they claim that there is a lack of market demand for smart guns: while most gun owners support the sale of smart guns concurrently with traditional guns, few of them are actually willing to buy smart guns.<sup>166</sup>

To lower the costs of individual smart guns, the government could provide supply-side incentives to manufacturers such as tax credits and subsidies as well as provide grants to private companies to incentivize research in this area.<sup>167</sup> The government could also perform its own research on smart gun technology. These methods would drive down the price of individual smart guns by encouraging their mass production. Additionally, governments could use similar strategies to increase consumer demand for smart guns. For example, by providing *consumers* with tax credits, rebates, and reimbursements for smart gun purchases, consumer demand for the guns may increase.<sup>168</sup>

Furthermore, critics' claims about the lack of market demand for smart guns may be overstated. For instance, a 2015 study revealed that

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<sup>164</sup> GIFFORDS LAW CTR., *supra* note 2, at 2.

<sup>165</sup> See Lujan, *supra* note 3, at 504 (noting that an \$1,800 RFID smart gun costs more than four times the price of “Glock’s G43 traditional concealed-carry handgun”).

<sup>166</sup> See *id.* at 501 (describing the factors limiting Americans’ readiness to embrace smart guns); Cassandra K. Crifasi et al., *Desirability of Personalized Guns Among Current Gun Owners*, 57 AM. J. OF PREVENTIVE MED. 191, 194–95 (2019), [https://www.ajpmonline.org/article/S0749-3797\(19\)30155-2/fulltext](https://www.ajpmonline.org/article/S0749-3797(19)30155-2/fulltext).

<sup>167</sup> GIFFORDS LAW CTR., *supra* note 2, at 23, 83.

<sup>168</sup> *Id.*

forty-three percent of gun owners—around twenty-four million people—would be willing to buy a childproof personalized gun,<sup>169</sup> and a 2016 survey revealed that sixty percent of Americans purchasing a new firearm would be interested in buying smart guns.<sup>170</sup> Thus, not only is there a high interest in smart guns, but the interest is increasing overtime.

The backlash from gun rights advocacy groups like the National Rifle Association (“NRA”) has been a significant hurdle to the innovation, legislation, and sale of smart guns.<sup>171</sup> For example, the NRA led boycotts against a gun manufacturer after the company agreed to dedicate some of its resources to developing personalized smart guns as a condition of settled litigation.<sup>172</sup> In addition to protesting manufacturers, gun rights advocates have also fervently opposed the retailers that sell smart guns.<sup>173</sup> After a gun store owner decided to sell Armatix’s smart guns at his store in Maryland, he received death threats and degrading messages from those who opposed the technology.<sup>174</sup>

A possible way to reduce this backlash would be to introduce smart guns through law enforcement and military use. If smart guns were used by law enforcement and the military, consumers would be more likely to deem them reliable.<sup>175</sup> Additionally, encouraging law enforcement and the military to consider smart guns would both increase research and development in the technology and foster civilian consumer appeal.<sup>176</sup> In sum, military and law enforcement use of smart guns would popularize them through a top-down approach, reducing the costs, spurring innovation, and signaling to consumers that smart guns are more reliable than the critics claim.

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<sup>169</sup> *Id.* at 61.

<sup>170</sup> Nicole Nguyen, *Here’s What’s Up With “Smart Guns” — And Why You Can’t Buy One In The US*, BUZZFEEDNEWS (Mar. 13, 2018, 5:02 PM), <https://www.buzzfeednews.com/article/nicolenguyen/what-is-smart-gun-technology#.lsA5edYw>.

<sup>171</sup> See Lujan, *supra* note 3, at 503 (explaining the groups’ smart gun fears).

<sup>172</sup> See GIFFORDS LAW CTR., *supra* note 2, at 18 (listing several NRA protests); Metzler, *supra* note 27, at 109 (“In 1998, Colt’s Manufacturing Company LLC developed a gun that required a radio-frequency prototype, but it [faced] . . . organized boycotts by the National Rifle Association. In 2005, the extrinsic pressure from the National Rifle Association led Congress to pass the ‘Protection of Lawful Commerce in Arms Act,’ which disincentivizes companies to test and develop smart guns.”).

<sup>173</sup> See Kimberly, *supra* note 3, at 251–52 (describing one gun owner’s experience with the opposition).

<sup>174</sup> *Id.*

<sup>175</sup> *Id.* at 256.

<sup>176</sup> See Stevenson, *supra* note 3, at 716.

Finally, prior legislative mishaps concerning smart guns are hurdles to potential smart gun mandates and even to the sale of smart guns.<sup>177</sup> For instance, New Jersey’s infamous 2002 smart gun law required “all handguns sold within the state to be personalized within two to three years after a qualifying personalized handgun is available for sale anywhere in the country.”<sup>178</sup> While the goal of the law was to incentivize smart gun development by ensuring that there would be a market for smart guns, the law had serious unintended consequences.<sup>179</sup> Gun rights activists deemed the New Jersey law too extreme, which played a large role in the mandate’s ultimate failure.<sup>180</sup> Because gun rights activists were unsuccessful in opposing the New Jersey law, they instead proceeded to impede its implementation by boycotting gun manufacturers and retailers who expressed interest in the technology.<sup>181</sup> Their efforts were largely successful, as there are only a few smart guns currently available on the market.<sup>182</sup>

A potential solution to smart gun backlash is to pass *incremental* smart gun legislation. While a mandate restricting the sale of guns to smart guns will be opposed by gun rights advocacy groups, a law encouraging the sale of both smart guns and traditional guns could help close the gap between the two extremes. New Jersey has tried to fix its fatal mistake through a recent amendment to the law: instead of requiring that smart gun technology be incorporated into all new handguns once the technology is approved, the amended law now requires firearm retailers to have at least one personalized handgun for sale within 60 days of the smart gun’s approval.<sup>183</sup> This legislation is less intrusive than the previous mandate,

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<sup>177</sup> See GIFFORDS LAW CTR., *supra* note 2, at 62 (noting issues with the New Jersey Mandate).

<sup>178</sup> *Id.*

<sup>179</sup> See Stevenson, *supra* note 3, at 701 (stating that “making rules and giving grants . . . [can] foster . . . widespread adoption by consumers.”); Metzler, *supra* note 27, at 117–18 (describing the challenges with smart gun laws in Maryland, New Jersey, and Massachusetts).

<sup>180</sup> See Stevenson, *supra* note 3, at 706 (highlighting that “[c]ritics, such as the National Rifle Association [], argued that such legislation would effectively be a handgun ban, which would implicate Second Amendment rights. Even today, smart gun advocates consider the New Jersey bill ‘a debilitating blow for the smart gun movement’ because it virtually halted all development in smart technology in the U.S.”).

<sup>181</sup> GIFFORDS LAW CTR., *supra* note 2, at 62.

<sup>182</sup> See *id.* at 53–57 (describing five available smart gun technologies).

<sup>183</sup> Giffords Law Ctr. to Prevent Gun Violence, *Smart Guns in New Jersey*, GIFFORDS.ORG (May 19, 2021), <https://lawcenter.giffords.org/smart-guns-in-new-jersey/>.

thus avoiding the harsh response from gun advocacy groups while still making smart guns more prevalent in the market.

Just because a smart gun mandate is likely to be constitutional does not mean that it should be implemented in full force right away. Enacting incremental legislation may be a more efficient way to achieve the same goal. If firearm retailers sell both smart guns and traditional firearms, smart guns are likely to be less taboo, and consumers could realize the potential benefits of smart guns on their own, thus reducing the seemingly insurmountable backlash from gun rights advocates.

Another potential legislative solution would be for a state legislature to enact a smart gun mandate that only goes into effect after a certain percentage of the police force in the state has adopted smart guns. This would be an objective and hopefully apolitical metric to determine smart guns' reliability and would likely mitigate backlash to a smart gun mandate because a community would trust that its police force's choice in weaponry is reliable.

#### CONCLUSION

While smart guns are likely constitutional and would reduce certain types of firearm-related deaths, the practical roadblocks to implementation are significant. Given that external biometric trigger lock devices are reasonably priced and are currently the most reliable smart gun technology available, they are the most realistic avenue for implementation through legislation. Additionally, while the technology already exists, more research is needed by independent institutions to determine whether smart gun manufacturers' claims of reliability are accurate. Finally, the key stakeholders in the firearm industry should look to other industries for guidance. For example, the automotive and pharmaceutical industries both researched and adopted life-saving technological modifications to their products that were deemed expensive and burdensome at the time but have proven to be valuable.<sup>184</sup> While the smart gun issues discussed in this Note raise more questions than answers, some points are certain: an effective approach to reducing firearm-related deaths should focus on researching and investing in technology and emphasize evidence-based solutions.

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<sup>184</sup> See GIFFORDS LAW CTR., *supra* note 2, at 29 (describing three simple design changes that saved lives).