No. 25-238 and 25-566

IN THE
SUPREME COURT OF THE UNITED STATES

CUTBERTO VIRAMONTES, et al.,
Petitioners,

v.

COOK COUNTY, ILLINOIS, et al.,
Respondents.

EDDIE GRANT, JR., et al.,
Petitioners,

v.

RONNELL HIGGINS, IN HIS OFFICIAL CAPACITY AS COMMISSIONER OF THE CONNECTICUT DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC TRANSPORTATION, et al.,
Respondents.

On Writs of Certiorari
to the United States Courts of Appeals
for the Seventh and Second Circuits

BRIEF OF BALLISTICS EXPERTS AND SECOND AMENDMENT LAW PROFESSORS AS *AMICI CURIAE* IN SUPPORT OF PETITIONERS

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INTEREST OF AMICI CURIAE[1]

Ballistics Experts

J. Buford Boone III is a firearms and ballistics expert, sole member of Boone Ballistics, LLC, and retired Supervisory Special Agent (SSA) of the Federal Bureau of Investigation (FBI). He had primary oversight of the FBI Ballistic Research Facility from 1997-2012.

Gary K. Roberts is an oral surgeon and clinical professor at Stanford University Medical Center. He served on the Joint Service Wound Ballistic Integrated Product Team and was a consultant to the Joint FBI-USMC munitions testing program. He has performed military, law enforcement, and privately-funded wound ballistic testing and analysis.

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Amici law professors teach and/or write on the Second Amendment:

Randy Barnett (Georgetown)
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Nicholas Johnson (Fordham)
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[1] No party's counsel authored this brief in whole or in part. No one other than *amici* or their counsel contributed money to it.

Amici professors include those cited by this Court in *Heller* and *McDonald*, and oft-cited by lower federal courts and state high courts, authors of the first law school textbook on firearms law and many other books and law review articles on the subject, and those who regularly teach courses on the Second Amendment.

All amici strongly support the Second Amendment, and wish to describe to this Court how AR-15 platform rifles operate, the wounding potential of the ammunition they fire, and why they are not "unusually dangerous" when compared to other firearms.[2]

SUMMARY OF ARGUMENT

The AR-15 platform semiautomatic rifles banned by Cook County, Illinois, and Connecticut are excellent arms for lawful defense of self and others. The Seventh and Second Circuits claim these rifles are super-dangerous—too powerful and rapid-fire for citizens to have. They are not. They fire the same bullets, at the same velocity, as any other non-banned rifle of the same caliber. The banned rifles are not machine guns—they fire at the same rate as common handguns. The wounds they cause are generally less severe than wounds from other common long guns. They are not unusually dangerous just because they have been used in some mass public shootings.

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[2] Institutional affiliations are for identification purposes only. For biographies of *amici,* see firearmsresearchcenter.org/wp-content/uploads/2026/09/Viramontes-Amici.pdf.

It is telling that Connecticut and Illinois ban hunting deer with the most common AR-15 *bullet* because they believe it's too underpowered for humane kills, while at the same time Respondents ban the very *rifle* that fires that bullet claiming it is an "unusually dangerous" weapon of mass slaughter.

ARGUMENT

The Second Circuit in *Grant* incorrectly called the banned rifles "dramatically and reliably lethal" and claimed that the AR-15 is capable of "spray firing," inflicts wounds the size of a "Coke can," fires bullets that penetrate walls more than handguns, and is unsuitable for self-defense. *Grant v. Rovella,* 153 F.4th 213, 226, 238, 240-42 (2d Cir. 2025). The court held that Connecticut's "assault weapon" ban is consistent with the nation's tradition of prohibiting "unusually dangerous" weapons. *Id.* at 246-47.

The Seventh Circuit in *Bevis v. City of Naperville*, 85 F.4th 1175 (7th Cir. 2023)—the guiding precedent reaffirmed in *Viramontes*—incorrectly described the AR-15 as a "militaristic weapon" that fires "300 rounds a minute" and can inflict "grisly damage." *Id.* at 1196, 1199. It declared the banned rifles are not protected "arms" because they are "indistinguishable" from military machine guns. *Id.* at 1194-97.

The too-dangerous-for-citizens pretext has driven other lower courts to reject Second Amendment challenges to categorical bans on common semiautomatic rifles. "Using one or another label—'dangerous and unusual,' 'unusually dangerous,'

'especially dangerous,' 'particularly capable of unprecedented lethality'—these courts have coalesced around a largely overlapping set of historical regulations imposing targeted restrictions on weapons whose danger and lethality stand out." *Barnett v. Raoul*, 180 F.4th 1035, 1047 (7th Cir. 2026).

If the Second and Seventh Circuits' claims were true (which they are not), and these rifles actually are super-guns useful only for combat or mass slaughter, American citizens should not have them. Conversely, if these rifles are no more dangerous than other firearms, the rationale supporting such bans collapses.

Unless used as a club, firearms themselves do not cause injuries; rather, the projectiles they fire do. The only relevant feature about the gun is its ability to launch projectiles quickly and accurately. Beyond that, it's about the bullet, not the gun.

All projectiles launched by traditional firearms have the ability to kill. There is nothing more "dangerous" than death. Some projectiles, however, have a greater potential to wound than others, and thereby are more dangerous in their wounding power.

Previous litigation has focused on the wounding capacity of the .223/5.56 AR-15, yet these bans are sweeping—they are not caliber specific and include all AR-15-type rifles, even those chambered for handgun and rimfire cartridges.

The AR-15s and similar rifles banned by Cook County and Connecticut are produced in a variety of calibers, including rimfire (e.g., .22LR), centerfire pistol (e.g., 9mm, .45ACP), centerfire rifle (e.g., .223-inch/5.56mm, 6mm ARC, 6.5 Creedmoor, .300 Blackout, .308/7.62mm, .458 SOCOM), and shotshell. Within the various calibers, there are many different projectiles. All of these calibers and projectiles are readily available in non-banned firearms.[3]

The fact that the banned rifles are produced in so many different calibers renders impossible any meaningful application of the "unusually dangerous" generalization to all AR-15 platform and similar rifles. For example, no serious argument can be made that banned rifles chambered in .22LR or common handgun calibers are "unusually dangerous" compared to other common firearms.

Moreover, a bullet launched by an AR-15 will have exactly the same terminal performance if launched by a non-banned rifle with a similar barrel. The challenged statutes define the banned arms by their features, but detachable magazines, pistol grips, telescoping stocks, barrel shrouds, and flash hiders

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[3] The "caliber" of a firearm is the measure of the diameter of the bore, which usually determines the diameter of the projectile it fires. Most modern ammunition is "centerfire." The gunpowder explosion is initiated by the gun's firing pin striking the primer in center of the base of the cartridge. The most popular cartridge that is not centerfire is the very small .22LR. It is a "rimfire," meaning that the primer is contained in a rim inside the base of the cartridge. "Chambered" (used below) means built for a specific caliber and case configuration.

have absolutely no effect on the terminal performance of the projectile.

As proof that the banned rifles are "unusually dangerous," the courts below have offered inflated rates of fire, false assertions about overpenetration, misleading analogies to handguns, and hyperbolic descriptions of wounds.

I. The banned rifles fire at the same rate as most common handguns.

While the civilian AR-15 looks like a military M16, it is not a machine gun nor does it fire as rapidly as one.

A semiautomatic firearm fires one bullet for each trigger pull, while an automatic weapon (machine gun) fires continuously until the ammunition supply is exhausted, so long as the shooter presses and holds the trigger. *See Staples v. United States*, 511 U.S. 600, 602 n.1. (1994). "The AR-15 is the civilian version of the military's M-16 rifle, and is…a semiautomatic weapon. The M-16, in contrast, is a selective fire rifle that allows the operator...to choose semiautomatic or automatic fire." *Id.* at 603.

That is why semiautomatics, specifically AR-15 platform rifles, "traditionally have been widely accepted as lawful possessions," whereas machine guns have not. *Id.* at 612; *cf. Garland v. Cargill*, 602 U.S. 406, 430 (2024) (Sotomayor, J., dissenting) (semiautomatic AR-15s are "commonly available").

A. Because the banned rifles are not machine guns, they are not used by the military.

The Seventh Circuit in *Bevis* incorrectly declared the banned semiautomatic-only AR-15 rifles "indistinguishable" from military machine guns and therefore not protected by the Second Amendment. 85 F.4th at 1197. But AR-15 .223/5.56 platform rifles are neither machine guns nor used by the military.[4]

Heller suggests that "weapons that are most useful in military service—M-16 rifles and the like—may be banned." *District of Columbia v. Heller,* 554 U.S. 570, 627 (2008). This cannot mean that all military or military-grade firearms are outside the Second Amendment's protection.

Small arms in America have never been separated into distinct categories of "military firearms" designed for the battlefield and "civilian firearms" designed for self-defense, hunting, or target shooting. Historically, popular civilian firearms were designed for or used by the military—the iconic Browning-designed 1911 handgun, Glock handguns, Henry lever-action rifles, and Remington 870 shotguns, to name just a few. *See* E. Gregory Wallace, *"Assault Weapon" Myths*, 43 S. Ill. U.L.J. 193, 207-11 (2018).

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[4] While modern AR-15s come in many different calibers, the military's original AR-15 (later renamed M16) was designed for 5.56mm NATO caliber ammunition, which is nearly identical in size to the .223-inch caliber round. In the citizen market, the majority of AR-15 platform rifles use either .223 or 5.56 caliber ammunition.

Civilians have been buying and using "weapons of war" since musket days, with little if any significant differences between military and civilian versions of these firearms.

The most plausible reading of *Heller's* somewhat awkward description of weapons "most useful in military service" is that these are advanced weapons used exclusively by the military in modern warfare. This meaning is confirmed by the subsequent description two sentences later of such weapons as "sophisticated arms that are highly unusual in society at large." 554 U.S. at 627. These are arms most useful in military service—uniquely military arms having only military applications.

If civilian possession of the military M16 can be banned, as *Heller* hypothesizes, it likely is because the M16 is a machine gun. Justice Scalia viewed any reading of *United States v. Miller* to protect machine guns as "startling," lest the National Firearms Act restrictions on machine guns be held unconstitutional. *Id.* at 624. Machine guns are both "most useful in warfare" and "sophisticated arms highly unusual in society at large." *Id.*

The civilian AR-15 .223/5.56 is not "most useful" in military service; it is not used in military service at all. While the military M16 mostly is used in semiautomatic mode, there are certain combat applications that require fully-automatic (machine gun) fire, such as suppressive fire. The AR-15 fires only in semiautomatic mode. It can be used in war, but it lacks the automatic fire capability useful in

such applications. *See* Wallace, *Myths,* at 207-11. No military force in the world uses a standard service rifle that is semiautomatic only. Harold Johnson Decl., in *Heller v. District of Columbia*, 698 F. Supp. 2d 179 (D.D.C. Sept. 14, 2009).[5]

While the semiautomatic AR-15 is not "most useful" in military service, it still can be used for common and individual defense. *Heller* explains that dual-use "militia arms" (common arms useful in both war and at home) are protected under the Second Amendment. 554 U.S. at 624-25. The semiautomatic AR-15 is the quintessential modern "militia arm."

B. Semiautomatic rifles fire at a much slower rate than machine guns.

To squeeze the AR-15 into the unprotected arms category, the Seventh Circuit in *Bevis*—reaffirmed in *Viramontes*—relied almost exclusively on the AR-15's rate of fire to conclude that the banned rifle is "indistinguishable" from a machine gun. 85 F.4th at 1197. It claimed that the AR-15 fires 300 rounds a minute. *Id.* The Second Circuit in *Grant* likewise asserted that the AR-15 is more lethal because it can "spray fire" (machine-gun language) and can "empty a thirty-round magazine in five seconds." 153 F.4th at 238, 240. *Bevis* and *Grant* find no material difference between the semiautomatic AR-15's alleged rate of

[5] Johnson authored the Defense Intelligence Agency's Small Arms Identification and Operation Guide—Eurasian Communist Countries (editions in 1969, 1970, 1973, 1976, 1983).

fire and the automatic rate-of-fire for the military M16/M4. *Id.* at 241; 85 F.4th at 1196-97.

These claims are impossible. The U.S. military's M16/M4 rifles have a cyclic rate-of-fire of 700-to-900 rounds-per-minute in automatic mode. U.S. Dep't of the Army, *Field Manual 3-22.9, Rifle Marksmanship: M16/M4-Series Weapons*, Table 2-1 (2008). That is a rate of 12-to-15 rounds per second.

Any semiautomatic fires only one round for each trigger pull. To fire 300 rounds a minute, the user would have to pull the trigger five-to-eight times per second. That would require a superhuman trigger finger, especially when pulling against the several pounds of force required to pull a trigger. Anyone who actually has fired an AR-15 knows that the "300 rounds a minute" claim is absurd. This exaggerated rate is pseudo-fact from an unsourced claim by a gun-control advocate in 1991. See Wallace, *Myths,* at 214-22.

Louis Klarevas, one of the Respondent's experts, sets the average shooter's rates-of-fire for semiautomatic handguns and semiautomatic "assault rifles" at an identical two rounds per second, while the expert shooter can fire both weapons at three rounds per second. Louis Klarevas, *Rampage Nation: Securing America From Mass Shootings* 212 (2016); *see* Wallace, *Myths,* at 214-26 (rate-of-fire comparisons for AR-15, M16/M4, and handguns).

Justice Sotomayor wrote in *Garland* that "a regular person with an AR-15 can achieve a fire rate

of around 60 rounds per minute," while a "professional sport shooter can use the AR-15 to fire at a rate of up to 180 rounds per minute, pulling the trigger three times per second." 602 U.S. at 433.

The claim that the semiautomatic-only AR-15 is "indistinguishable" from a machine gun is not remotely true. An average shooter firing a military M16 in automatic mode can fire 100 rounds in less time than it would take the same shooter firing a semiautomatic AR-15 to fire 20 rounds. If that shooter fires indiscriminately into a crowded bar, church, or classroom, the fully-automatic M16 would launch some 80 more bullets into the crowd. This disparity belies Cook County's claim that the AR-15 "has the same destructive capacity" as military weapons. Brief in Opposition to Petition for Certiorari at 5.

The fact that the AR-15 and M16 share certain features like telescoping stocks, flash hiders, and barrel shrouds does not transform the AR-15 into a machine gun. Most of these features are ergonomic and common to other long guns. See Wallace, *Myths*, at 226-40. None of these features make AR-15 bullets fire more rapidly or strike more powerfully.[6]

The AR-15 is no more "dangerous" in its rate-of-fire than the vast majority of modern handguns.

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[6] *Bevis* asserts that even if the AR is not a machine gun, modifications like bump stocks can transform it into one. 85 F.4th at 1196-97. Such devices can substantially increase a rifle's rate of fire. But, as Judge Richardson points out in his dissent in *Bianchi v. Brown*, "the solution is to regulate the modifications, not the weapons themselves." 111 F.4th 438, 582 n.73 (4th Cir. 2024) (Richardson, J., dissenting).

II. Centerfire AR-15 bullets typically perforate walls less than handgun and shotgun projectiles.

The Second Circuit incorrectly asserts that "the AR-15 is more lethal to victims, bystanders, and law enforcement than ordinary handguns" because "with their high muzzle velocity, AR-15-style weapons are more likely to penetrate a house or apartment wall when fired in a self-defense scenario, threatening family members or the building's other occupants." 153 F.4th at 240, 241. This ignores the fact that some banned AR-15 rifles are chambered for these same ordinary handgun cartridges.[7]

Overpenetration of walls is a risk with all firearms. Almost all handgun, rifle, and shotgun projectiles will perforate (pass completely through) multiple walls. Respondents want to limit home defenders to only handguns, but the type of handgun bullets commonly used for self-defense typically will pass through several layers of sheetrock as well as exterior house walls. See R.W. Scheifke, *Penetration of Exterior House Walls by Modern Police Ammunition*, Canadian Police Research Centre (Oct. 1997).[8]

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[7] There frequently is little terminal difference between a handgun cartridge fired from a handgun versus fired from a rifle/carbine. Cartridges designed for handgun length barrels can totally consume their propellant prior to exiting the rifle muzzle, which creates drag and actually can slow the projectile.

[8] https://perma.cc/8V6N-8MK9.

It has long been known that many AR-15 .223/5.56 projectiles are less likely to overpenetrate building materials than common handgun and shotgun rounds. *See, e.g.,* Gary Roberts, *The Wounding Effects of 5.56MM/.223 Law Enforcement General Purpose Shoulder Fired Carbines Compared with 12 GA. Shotguns and Pistol Caliber Weapons*, 3 Wound Ballistics Rev. 16, 23-24 (1998) ("stray 5.56mm/.223 bullets" have "reduced risk of injuring innocent bystanders").[9] A Massachusetts Municipal Police training manual states that AR-15s are less dangerous to bystanders because "the most popular patrol rifle round, the 5.56mm NATO (.223 Remington) will penetrate fewer walls than service pistol rounds or 12 gauge slugs." Massachusetts Municipal Police Training Committee, *Basic Firearms Instructor Course: Patrol Rifle* 3 (Sept. 2007;[10] see Boone Decl. ¶¶ 38-41, in *Barnett v. Raoul*, 180 F.4th 1035 (7th Cir. 2026) (citing testing done by FBI and other law enforcement agencies).[11]

The AR-15's superior accuracy over handguns means that there will be fewer missed shots, thus posing less risk of danger to other building occupants. More accuracy makes the rifle less "dangerous" to innocent third parties.

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[9] Dr. Roberts served on the Joint Service Wound Ballistic Integrated Product Team, was a consultant to the Joint FBI-USMC munitions testing program, and is an amicus on this brief.

[10] https://perma.cc/M8VW-DUXR.

[11] Boone is a firearms and ballistics expert who directed the FBI Ballistic Research Facility for 15 years and is an amicus on this brief.

These are reasons why law enforcement officers often use AR-15s inside buildings. Founder and senior instructor of the LAPD's Tactical Rifle Team explains that "concerns about overpenetration and the danger to the populace presented by missed rounds have been greatly exaggerated.…[T]he 5.56mm/.223 is relatively safer than pistol bullets for everyone in close-quarter-battle (CQB) application." Gabriel Suarez, *The Tactical Rifle: The Precision Tool for Urban Police Operations* 38 (1999).

The Second Circuit also incorrectly claimed that AR-15 bullets are "more lethal" because they can penetrate police body armor. 153 F.4th at 240. Ordinary law enforcement officers wear soft body armor that is rated to stop various handgun and shotgun projectiles only. Some AR-15-type rifles are chambered for handgun and rimfire rounds, the exact threats that soft body armor is designed to stop.

Most centerfire rifle bullets will perforate police soft body armor. AR-15s firing .223/5.56 bullets do not perforate soft armor any more than the same projectiles fired from non-banned centerfire rifles with similar barrel characteristics.

Stopping those rifle bullets requires hard plates of steel, ceramic, or composites. *See* U.S. Dep't of Justice, *National Inst. of Justice Guide Body Armor* 12-13 (2014).[12] Combat soldiers usually wear hard plates, and so do law enforcement officers in high-risk situations.

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[12] https://www.ojp.gov/pdffiles1/nij/247281.pdf.

III. The banned rifles are more powerful than most handguns but less powerful than most other rifles.

Lower courts attempt to show that the banned rifles are "unusually dangerous" by comparing them to handguns, again ignoring the fact that some banned AR-15 rifles are chambered for handgun rounds.

Rifles, by their nature, generally are more powerful than handguns—they are more accurate and shoot farther, their longer barrels fire bullets at higher velocities, those bullets impact with greater energy and usually cause more severe wounds. That's why soldiers and hunters typically use rifles, not handguns.

Strangely absent from lower court decisions are comparisons between the AR-15 and non-banned rifles and shotguns. The AR-15's .223/5.56 ammunition actually is less powerful than ammunition from many other long guns.

A. Because .223/5.56 bullets are small, their terminal performance is inferior to many other centerfire rifle bullets and shotshells.

Like most modern rifles, AR-15s fire bullets that travel at higher speed than handguns (unless, of course, they are chambered for handgun or rimfire

rounds). But greater velocity does not necessarily mean greater wound severity—a ping-pong ball and a rifle bullet traveling at the same velocity will produce very different results when they strike.

Consider the wounding effects of three common rounds of ammunition, all having approximately the same muzzle velocity (the projectile's speed as it leaves the barrel). The diminutive .22LR rifle fires bullets weighing 30 to 40 grains. That caliber is a favorite for plinking tin cans. The .44 magnum revolver is a powerful defensive handgun (though not as powerful as claimed by fictional Detective "Dirty Harry" Callahan). Its bullets weigh around 200 grains. The 12-gauge 00-buckshot shotgun cartridge is so named because it is popular for deer hunting. It fires nine .33inch/8.4mm diameter pellets all at once, each weighing approximately 54 grains.

Each of the nine shotgun pellets is larger and weighs more than the single small .22 rifle bullet. Cumulatively, the shotgun projectiles weigh 486 grains. So at short range, they are expected to cause much more tissue disruption than the 200 grain big handgun bullet, and the big handgun bullet will cause far more disruption than the tiny rifle bullet. See Martin Fackler, *Civilian Gunshot Wounds and Ballistics: Dispelling the Myths*, 16 Emerg. Med. Clin. North Am. 17, 23 (1998);[13] Nicholas J. Johnson, *Newtown Lawsuit Proceeds under False Pretenses*, Law & Liberty (Dec. 29, 2014) ("When measured objectively, the specious claims about the AR-15—

[13] Dr. Fackler, military trauma surgeon, served as director of the U.S. Army's Wound Ballistics Laboratory for 10 years.

e.g., fantastic spray fire capabilities—are actually closer descriptions of ordinary repeating shotguns.").[14]

Many people believe the wounding power of a bullet primarily comes from the energy it imparts to the target. The standard formula for firearm bullets is: E (ft-lbs) = Bullet Weight (grains) x Velocity (fps)^2 / 450,400. Bullet energy comes from a combination of bullet weight and bullet speed.[15]

The following table compares the typical weight, velocity, and energy of some modern handgun, rifle, and shotgun projectiles, measured at the firearm's muzzle and at a distance of 100 yards.

[Table appears on following page]

[14] https://perma.cc/4NYH-393A.

[15] As explained below, additional factors determine wound severity, such as the location of impact, the bullet's physical characteristics (mass, shape, construction), and the type of tissues disrupted along the bullet's path.

Table 1. Ballistic Data

Caliber	Bullet weight (gr)	Velocity @ muzzle (fps)	Energy @ muzzle (ft-lbs)	Velocity @ 100y (fps)	Energy @ 100y (ft-lbs)
Handguns					
9 mm	115	1140	332	954	232
.357 Magnum	125	1500	624	1147	365
.40 S&W	175	1010	396	899	314
10mm	180	1275	650	1052	442
.44 Magnum	200	1500	999	1196	635
.45 ACP +P	230	950	461	872	388
Long guns					
.22LR Rimfire	40	1070	102	908	73
.223/5.56	**55**	**3240**	**1282**	**2854**	**995**
6.5 Creedmoore	143	2700	2314	2557	2076
.30-30	160	2400	2046	2151	1643
.308/7.62	165	2700	2670	2496	2282
.30-06	178	2750	2988	2582	2634
.300 Win Mag	180	2960	3501	2766	3057
.50 BMG	750	2820	13241	2728	12391
12-ga shotgun slug[16]	438	1610	2520	1139	1261

[16] While shotguns most often use cartridges that fire multiple small pellets, a "shotgun slug" is a single large lead projectile.

As the Table shows, rifle bullets of all sorts (other than .22LR rimfire) have more energy than handgun bullets.

Compared to other rifles, .223/5.56 ammunition has slightly higher velocity, but a smaller and lighter bullet. As a result, the .223/5.56 is on the lower end of terminal performance of the vast number of calibers available in centerfire rifles. Compared to three of the classic American hunting rifle cartridges (.308, .30-30, and .30-06 caliber), the 223/5.56 bullet has well under half their kinetic energy. These bullets also strike with less energy than a shotgun slug, which often is used for hunting deer and similar game.

Throughout American history, standard military cartridges have always been commonly used for hunting. See Craig Boddington, *5 Great Military Cartridges*, RifleShooter (Aug. 7, 2020).[17] This also has been true for the .223/5.56, except that in some states, it is illegal to hunt deer or larger game with the .223/5.56 because it is considered too underpowered to reliably cause immediate, humane kills. See, e.g., 2 Code of Colo. Reg. 406-2-I-203(A)(1); 4 Va. Admin. Code 15-270-10; Wash. Admin. Code 220-414-020(1)(c). Dr. Fackler called the .223 round "a 'varmint' cartridge, used effectively for shooting woodchucks, crows, and coyotes." Martin Fackler, *Literature Review*, 5 Wound Ballistic Rev. 39, 41 (Fall 2001).

[17] https://perma.cc/5KR7-AJCC.

Oddly, Connecticut and Illinois ban the use of the .223/5.56 *bullet* for hunting deer because of its lesser wounding potential, Conn. Gen. Stat. 26-86a(a), 520 ILCS 5/2.25, while at the same time banning the AR-15 *rifle* which fires that bullet because they deem it "unusually dangerous."

B. There are longstanding complaints within the military about the effectiveness of 5.56 bullets.

Respondents argue that the semiautomatic-only AR-15 is just as deadly as the M16 when the latter is fired in semiautomatic mode. *See, e.g., Grant*, 153 F.4th at 241. The unspoken assumption is that the military's 5.56 rounds are exceptionally dangerous, therefore so are those fired by the AR-15. However, the 5.56 rounds have proven less effective in many combat situations.

The 5.56 round is smaller and lighter, and hence less powerful, than the standard rounds of previous American combat rifles, such as the 7.62x51mm NATO the M14 automatic rifle used in the early part of the Vietnam War. During the first half of the twentieth century, the standard was the .30-06 (.30 caliber). It was used in the semiautomatic M1 Garand of World War II and Korea, and in bolt-action rifles beginning in 1906.

The 5.56mm round introduced in the 1960s was smaller and lighter, so soldiers could carry more. Being smaller, it needed less gunpowder, so recoil was reduced, and accuracy thereby improved.

However, the new, smaller 5.56 ammunition is less effective. As Major General Robert Scales testified to the Senate, the 5.56mm round "is simply too small for modern combat." Senate Committee on Armed Services, Subcommittee on Airland, Hearing on United States Military Small Arms Requirements, Cong. S. Hrg. 115-425, at 12 (May 17, 2017).

Former Army infantryman and small arms expert Jim Schatz explains, "The disturbing failure of the 5.56x45mm caliber to consistently offer adequate incapacitation has been known for nearly 20 years." Jim Schatz, *Do We Need A New Service Rifle Cartridge? End User Perspective and Lessons Learned*, Sm. Arms Def. J. 119 (Spring 2011).[18]

Schatz described a Special Forces (SF) mission in Afghanistan when an insurgent was shot with 5.56 rounds seven or eight times in the torso, got back up, climbed over a wall, and reengaged other SF soldiers, killing a SF medic. The insurgent then was shot another six-to-eight times from about 20-30 yards before finally being killed by a SF soldier with an M1911 handgun. *Id.* at 125. *See* Glenn Dean & David LaFontaine, *Small Caliber Lethality: 5.56mm Performance in Close Quarters Battle*, at 3 WSTIAC Q. (Jan. 2008) (multiple reports from soldiers in Afghanistan using 5.56mm rounds "experiencing multiple 'through-and-through' hits on an enemy combatant where the target continued to fight").[19]

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[18] https://www.yumpu.com/en/document/read/37272962/do-we-need-a-new-service-rifle-cartridge-hkprocom.

[19] https://perma.cc/682N-7E6S.

Mark Bowden's bestselling book *Black Hawk Down* vividly recounts the performance of the Army's 5.56mm bullet in the Battle of Mogadishu in 1993. One operator's rounds "were passing right through his targets….The bullet made a small, clean hole, and unless it happened to hit the heart or spine, it wasn't enough to stop a man in his tracks….he had to hit a guy five or six times just to get his attention." Mark Bowden, *Black Hawk Down: A Story Of Modern War* 208 (1999).

Partly because of such complaints, the U.S. military recently decided to adopt the larger-caliber 6.8mm rifle round. *See* C. Todd Lopez, *Army Announces 2 New Rifles for Close-Combat Soldiers*, U.S. Dep't of Defense (Apr. 22, 2022).[20] While some AR-15 platform rifles fire larger caliber rounds like the new 6.8mm round, that does not explain why those that fire the common .223/5.56 round are "unusually dangerous."

IV. AR-15 ammunition causes wounds typically no more severe than wounds caused by ammunition from other common long guns and even some powerful handguns.

There is nothing "unusual" about the .223/5.56 bullets launched by AR-15-type rifles. They are no more or less dangerous than if launched by any other type of rifle. Wounds caused by the 223/5.56 bullets typically are no more severe than wounds caused by

[20] https://perma.cc/34NR-AGRW.

projectiles fired by larger-caliber rifles, shotguns, and even some powerful handguns.

A. The AR-15's .223/5.56 bullets have less wounding power than bullets fired from many non-banned firearms.

Lower courts compare AR-15 wounds to handgun wounds and use the contrast as evidence that the AR-15 is "exceptionally dangerous." (Once again, they ignore the fact that some AR-15-type rifles are chambered for handgun rounds.).

Gunshot wounds are caused by the projectile launched by the firearm, not the firearm itself. A bullet launched by an AR-15 will have the same terminal performance if launched by a non-banned single-shot or lever-action or bolt-action rifle with similar barrel characteristics. Features like detachable magazines, pistol grips, telescoping stocks, barrel shrouds, and flash suppressors have no effect on the terminal effects of a projectile. Firearm design has nothing to do with the wounding ability of a particular bullet if the barrel characteristics are similar. [21]

[21] One firearm might fire a second bullet faster and with more accuracy than another firearm. The semiautomatic AR-15's rate-of-fire does not make it "unusually dangerous," as it fires at the same rate of common semiautomatic handguns. Better accuracy can mean fewer missed shots, thereby posing less danger to bystanders.

The AR-15, when chambered in centerfire rifle calibers, fires higher-velocity bullets that impact with much greater force than handguns, but that is true of virtually all rifles. That handguns typically are less terminally effective than rifles is nothing new.

Notably absent from the graphic descriptions of the AR-15's wounding power is any comparison to wounds caused by ammunition fired from non-banned rifles and shotguns.

Those comparisons are readily available. The Army Wound Ballistics Laboratory examined various aspects of firearms wounds. Compared to .223 and 5.56mm bullets, wound profiles of bullets from very common rifle hunting calibers, such as .308, .30-30, and .30-06, are at least as extensive and typically more so. Martin Fackler, *Wound Profiles*, 5 Wound Ballistic Rev. 25, 29-31, 33-34 (Fall 2001).

Most gun crimes, including mass shootings, take place at close range. Dr. Fackler observes that at close range "the 12 gauge shotgun (using either buckshot or a rifled slug) is far more likely to incapacitate than a .223 rifle. The 12 gauge shotgun is simply a far more powerful weapon." Martin Fackler, *Questions and Comments*, 5 Wound Ballistic Rev. 5 (Fall 2001). Dr. P.K. Stefanopoulos, trauma surgeon and former career military officer who has written extensively on wound ballistics, states that at distances of less than 10 feet "the shotgun produces the most devastating injuries of all small arms." P.K. Stefanopoulos, et al., *Wound Ballistics of Firearm-Related Injuries—Part 1: Missile Characteristics and Mechanisms of Soft*

Tissue Wounding, 43 Int. J. Oral Maxillofac. Surg. 1445, 1453 (2014).

Bullets from powerful handguns can cause similar wounding effects to those launched from a .223/5.56 AR-15. "A similarly deforming or disintegrating bullet from a powerful handgun cartridge (e.g., Magnum) can also produce 'high-energy' effects to tissue, resembling those from a much faster assault rifle bullet." P.K. Stefanopoulos, et al., *Wound Ballistics of Military Rifle Bullets: An Update on Controversial Issues and Associated Misconceptions*, 87 J. Trauma Acute Care Surg. 690, 696 (2019).

B. Descriptions of gruesome AR-15 wounds are often embellished.

Lower courts describe catastrophic wounds from the AR-15 as an indicator of the rifle's extreme dangerousness. *Grant* says an ordinary handgun causes injuries like being "stabb[ed] with a bullet," while the AR-15 causes injuries tantamount to being shot "with a Coke can." 153 F.4th at 240.

Embellishments of AR-15 wounds are common. *See* David Kopel & Gregory Wallace, *How Powerful Are AR Rifles?,* The Volokh Conspiracy (Feb. 27, 2023) (absurd claim by government expert that a single .223 bullet can decapitate or sever a human body in half).[22]

Media reports often describe AR-15 wound damage in overdramatized and unscientific terms.

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[22] perma.cc/3ZDC-LA5E.

The New York Times quotes a doctor who claimed that "exit wounds can be a foot wide" from the AR-15 .223/5.56 bullet. Gina Kolata & C.J. Chivers, *Wounds from Military-Style Rifles? 'A Ghastly Thing to See*,' N.Y. Times (Mar. 4, 2018).[23]

Some of these exaggerations unfortunately make it into judicial decisions. *See, e.g., Bianchi v. Brown*, 111 F.4th 438, 455, 456 (4th Cir. 2024) (AR-15 bullets produce "catastrophic damage" with "multiple organs shattered, bones exploded, and soft tissue absolutely destroyed"); *Bevis v. City of Naperville, Ill.*, 657 F. Supp. 3rd 1052, 1073 (N.D. Ill. 2023) ("[e]xit wounds can be the size of an orange").

The Second Circuit relied on *Rolling Stone* magazine for a quote from a doctor who claims that being shot with an AR-15 is like being shot "with a Coke can." 153 F.4th at 240 (citing Donohue Decl. ¶109, NAGR App'x 242) (quoting Rolling Stone)).[24]

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[23] perma.cc/5KFM-N77J.

[24] *Grant* cites the Donohue Decl. as authority for the AR-15's rate of fire, .223 bullet design, AR-15 "combat" features, overpenetration of walls, and wound ballistics, including the "Coke can" quote. 153 F.4th at 226, 240-41. Donohue is a law professor at Stanford whose expertise is statistical analysis. He does not claim to be firearms expert or to have training or expertise in wound ballistics. It seems that Donohue's only "expertise" on these subjects is quoting third parties. He lifted the "Coke can" quote from an article in *Rolling Stone* magazine. *See* https://www.rollingstone.com/politics/politics-features/all-american-killer-how-the-ar-15-became-mass-shooters-weapon-of-choice-107819. For the most part, Donohue's 66-page memorandum is nothing more than legal brief disguised as an expert declaration.

The doctor cannot mean that the entry wound is as wide as a Coke can. The diameter of a Coke can is 2.6 inches, while the diameter of a typical AR-15 bullet is .223 inches—the diameter of a pencil eraser.

The doctor also cannot be referring to the permanent cavity created by the bullet passing through tissue. The AR-15's .223/5.56 bullets typically are .75 to .98 inches long, so the cavity would be less than an inch even at maximum yaw, which does not always occur. Bullets from rifles and some handguns can cause a transient displacement of tissue known as the "temporary cavity," which can produce significant wound damage. But, as discussed below, the size of the cavity and severity of the injury is quite variable and erratic.

An exit wound might be that wide, but it's unlikely. Researchers examined autopsy records from 27 persons who were killed with 5.56mm ammunition during dispersion of a mass protest. Vichan Peonim, et al., *Entrance and Exit Wounds of High Velocity Bullet: An Autopsy Analysis in the Event of Dispersing the Mass Rally in Bangkok Thailand, May 2010,* 23 Legal Med. 10 (Nov. 2016). Of the 32 bullet impacts studied, only two produced exit wounds with measurements approximating the diameter of the Coke can. The remaining produced either much smaller exit wounds or no exit wounds because the bullets stopped before exiting.

These exaggerations are nothing new. Thirty-three years ago, Dr. Fackler described how media accounts embellished the injuries suffered in the 1989

elementary school shooting in Stockton, California, the crime that created the national "assault weapon" controversy. Dr. Fackler conducted ballistics testing on the ammunition used in the criminal's semiautomatic AK rifle. That rifle's 7.62mm bullets are around 123 grains, more than double the typical 55-grain weight of .223/5.56 bullets. Dr. Fackler reviewed the autopsies of the five children murdered. He explained:

> The myth of "shock waves" resounding from these "high velocity" bullets "pulverizing bones and exploding organs" (even if they were not hit by the bullet) "like a bomb" going off in the body was repeated by the media….None of the autopsies showed damage beyond the projectile path.…In the Stockton school-yard, the death rate was 14% and none of the [wounded] victims died later or required extremity amputation.

Martin Fackler, et al., *Wounding Effects of the AK-47 Rifle Used by Patrick Purdy in the Stockton, California, Schoolyard Shooting of January 17, 1989*, 113 Amer. J. Foren. Med. & Path. 185, 187-88 (1990).

C. The severity of wounds caused by all bullets greatly varies.

Lower courts suggest that catastrophic wounds from AR-15 .223/5.56 bullets are commonplace. Wound ballistics is far more complex than their unqualified and hyperbolic generalizations indicate.

There is no "one-size-fits-all" wound pattern for AR-15 bullets.

Absent use as an impact weapon, a firearm's only contribution to inflicting a specific wound is the launching of a projectile, which actually creates the wound. An AR-15 platform weapon possesses no more or less potential to cause that injury than non-banned semiautomatic, lever-action, pump-action, or bolt-action rifles chambered for the same caliber with similar barrel characteristics.

How bullets injure and kill has less to do with velocity and energy than with the location of impact, the bullet's physical characteristics, and the type of tissues disrupted along the bullet's path. See Fackler, *Civilian Gunshot Wounds*, at 19.

Rifle bullets generally do more damage to tissue than handgun bullets, but not always so, depending on where the bullets strike. A handgun bullet to the brain, spinal cord, heart, or other vital organ almost always will cause more serious damage than a rifle bullet to an extremity or other nonvital part of the torso.

Multiple variables affect how AR-15 bullets damage human tissue. These include the bullet's mass, shape, and construction, which determine its tendency to deform, fragment, or yaw once it strikes, the angle at which the bullet strikes the body, the distance the bullet travels in tissue before it yaws or fragments or whether it exits the body before significant yaw occurs, the size, weight, and body

form of the victim, whether the bullet impacts bone or only soft tissue, the elasticity of the soft tissue affected, and how many bullets strike the victim. *See* E. Gregory Wallace, *"Assault Weapon" Lethality*, 88 U. Tenn. L. Rev. 1, 34, 43-56 (2020) (detailed explanation of wound ballistics); Stefanopoulos, *Wound Ballistics of Military Rifle Bullets*, at 690-96.

If a bullet is traveling fast enough, the pressure wave following the bullet can cause transient displacement of tissue surrounding the wound track, which is called the temporary cavity. Martin Fackler, *Gunshot Wound Review*, 28 Annals of Emerg. Med 194, 197-99 (Aug. 1996). Temporary cavitation can cause significant wound damage, but the severity of the injury produced by temporary cavitation is quite variable, erratic, and highly dependent on both anatomic and physiologic considerations. *See id.* at 199. More elastic tissue such as muscle, lungs, skin, and blood vessels and empty or hollow organs such as the stomach, bladder, or intestines can stretch, making them much more resistant to injury caused by temporary cavitation. Bone fractures from temporary cavitation are rare—when a bone is shattered, it typically is due to being struck by the bullet. *Id.*

The distance non-deforming rifle bullets travel in tissue before they yaw affects wound severity. About 70% of military 5.56mm bullets travel point-forward an average of about five inches before beginning to yaw. *Id.* at 197, 200. The straighter the bullet hits the target, the longer it will take to yaw after it strikes. Stefanopoulos, *Wound Ballistics of Military Rifle Bullets,* at 695. Thus, despite its high-velocity impact,

a non-deforming rifle bullet can pass completely through a human target without significant yaw, causing minimal damage unless it strikes a vital organ, bone, or other critical structure. *Id.*

In short, injuries caused by bullets fired from AR-15s and similar rifles vary significantly and do not routinely produce the gruesome results described in lower court opinions. Any statement describing specific gunshot wounds which does not specify, at a minimum, the cartridge and projectile used, how many bullets impacted the victim, and what tissue was damaged should be dismissed as incomplete and misleading.

D. Reports of catastrophic AR-15 wounding in Vietnam were never confirmed or replicated.

Both Connecticut's merits brief below and Cook County's brief in opposition to certiorari cite military field tests from Vietnam in 1962 which report that the select-fire AR-15 (later renamed the "M16") inflicted catastrophic wounds, including one bullet that "took [the head] completely off" an enemy soldier, while another bullet "in the right arm, took it completely off, too." Br. of Appellee at 7, *Grant v. Rovella,* 153 F.4th 213 (2d Cir. 2025); Br. in Opposition at 8.

The testing was conducted as part of Project AGILE, a research program initiated by the Defense Department's Advanced Research Projects Agency (ARPA) (today known as DARPA). At the time, the military was considering whether to replace the M14

with the select-fire AR-15 as its primary combat rifle. Project AGILE supplied the rifles to South Vietnamese troops for field trials. ARPA's report claimed massive injuries from the AR-15, including two amputations and a decapitation. ARPA, *Test of Armalite Rifle, AR-15*, Annex A, at 5, 7 (July 31, 1962).[25]

Later, these gruesome anecdotes were exposed as gross exaggerations designed to convince the military to adopt the rifle. The Army's Ballistic Research Laboratory tested the effects of the rifle's projectiles in gelatin, animals, and cadavers but could not duplicate the "theatrically grotesque wounds" reported by Project AGILE. *See* C.J. Chivers, *The Gun* 283, 284-88 (2010); Blake Stevens & Edward Ezell, *The Black Rifle: M16 Retrospective* 110-16 (1994).

Attempting to reproduce the extreme results that purportedly occurred in Vietnam, the Army Laboratory even tried using hollow-point bullets. Hollow-points are widely used by American law enforcement and citizens, and generally produce more destructive wounds. Yet "even the hollow-points failed to duplicate anything like the spectacular effects recorded by the Vietnamese unit commanders and their American advisors, which had subsequently been taken as fact and much used in the...campaign to sell the AR-15." Stevens & Ezell, at 116.[26]

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[25] https://apps.dtic.mil/sti/pdfs/AD0343778.pdf.

[26] Ezell served as Curator of the National Firearms Collection at the National Museum of American History, which is part of the Smithsonian Institution.

C.J. Chivers, a Pulitzer Prize-winning New York Times journalist, extensively researched the testing for his book *The Gun*. "No matter what they did, they were unable to reproduce the effects that the participants in Project AGILE claimed to have seen." Chivers, at 288.

The Ballistic Research Laboratory's study was kept secret for more than four decades. As a result, "at the most important time, during the early and mid-1960s, the Project AGILE report, with its suspicious observations and false conclusions, remained uncontested." *Id.* at 289.

Dr. Fackler recounted how other claims in the 1960s and 1970s about M16s bullets causing "massive" and "devastating" injuries were disproven or contradicted by other reports. Martin Fackler, *Gunshot Wound Review*, at 194-97. Delegates to war surgery conferences in the early 1970s "reported no unusual problems associated with 'high-velocity' bullet wounds in Vietnam. There were no reports of rifle bullet wounds causing traumatic amputations of an extremity." *Id.* According to Dr. Fackler, "In my experience and research, at least as many M16 users in Vietnam concluded that [the M16 round] produced unacceptably minimal, rather than 'massive,' wounds." Fackler, *Literature Review*, at 40.

Since ARPA's report, there have been no confirmed examples of a single .223/5.56 bullet decapitating a victim or amputating limbs.

V. The deadliest firearms in mass shootings are handguns.

Mass shootings are unspeakable tragedies that take innocent lives, shatter families, and traumatize communities. Just because a mass-murderer picks an AR-15 or other "assault weapon" to perpetrate his crime does not necessarily make the firearm itself extremely dangerous.

Simply counting incidents and casualties misses the larger question, Would there have been fewer injuries or deaths if the criminal had used a different firearm? Ban proponents assume so, but they offer no proof. If the mass shooter's bullet strikes the victim's head, heart, or other vital organ, it is unlikely the firearm type will make much difference. If a mass shooter fires into a large, dense crowd in a venue with limited routes of escape (Las Vegas, Orlando, Aurora) or fires multiple rounds that strike stationary targets at very close range (Sutherland Springs, Orlando, Sandy Hook, Virginia Tech, Columbine, and others), the type of firearm used may not make a significant difference in the outcome. If the mass shooter uses multiple types of firearms (Orlando, Aurora, Columbine, and others), it must be determined how many casualties are associated with each weapon.

The handgun is the most common weapon used to commit mass shootings. Shooters armed with handguns perpetrated high-casualty shootings at Virginia Tech (58), Killeen, Texas (Luby's) (50), Ft. Lauderdale (48), Ft. Hood (45), and Thousand Oaks (33), where the total casualties approximate or exceed

mass shootings with "assault weapons" at Highland Park (55), El Paso (47), Sutherland Springs (47), Uvalde (39), and Parkland (34). *See* J. Peterson & J. Densley, *Mass Shooter Database*, The Violence Prevention Project (vers. 10.0 January 2026).[27]

Cook County incorrectly claims that "assault weapons" are the "weapons of choice" for mass shooters. Brief in Opposition at 1. Statistics show that "assault weapons" have been used in only 23% of mass shootings. J. Peterson & J. Densley, *Firearms Database*, The Violence Prevention Project.[28]

Researchers led by Dr. Babak Sarani, founder and chief of the Center for Trauma and Critical Care at George Washington University Hospital, examined the relationship between the type of firearm used, wounding characteristics, and probability of death in mass shootings. Babak Sarani, et al., *Wounding Patterns Based on Firearm Type in Civilian Public Mass Shootings in the United States*, 228 J. Amer. College Surgeons 228 (Mar. 2019). They studied firearm types and autopsy reports for 232 victims from 23 mass shootings, including high-casualty shootings with "assault weapons" at Orlando and Las Vegas.

To their surprise, they found that mass shootings with handguns produce more deaths than those with rifles because they result in more wounds per victim and more injuries to vital organs. *Id*. at 228-29, 232-33. "All of us were shocked," Dr. Sarani said. "We

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[27] https://www.theviolenceproject.org/databases/download.
[28] https://www.theviolenceproject.org/databases/firearms.

came to the table with our bias that an assault weapon would be worse." Carolyn Crist, *Handguns More Lethal Than Rifles in Mass Shootings*, Reuters (Dec. 31, 2018).[29]

Victims shot with a handgun were almost four times more likely to have three or more wounds compared to those shot with a rifle. Thus, "the probability of death is higher for events involving a handgun than a rifle." Sarani, at 232. Twenty-six percent of victims shot with handguns and 16% shot with shotguns had multiple fatal organ injuries; only 2% of those shot by a rifle had two or more fatal organ injuries. *Id.* Wounds to the brain and heart, which have the highest fatality rates, were most likely to occur when handguns were used. *Id.* at 233.

Recent studies also show that "assault weapon" bans do not deter mass public shootings. *See* Daniel Webster et al., *Evidence Concerning the Regulation of Firearms Design, Sale, and Carrying on Fatal Mass Shootings in the United States*, 19 Criminology & Pub. Pol'y 171, 188 (2020) ("[B]ans on assault weapons had no clear effects on either the incidence of mass shootings or on the incidence of victim fatalities from mass shootings."); Michael Siegel et al., *The Relation Between State Gun Laws and the Incidence and Severity of Mass Public Shootings in the United States, 1976-2018*, 44 Law & Human Behav. 347, 354 (2020) ("we did not find any significant association between assault weapons bans…and either of these outcomes").

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[29] https://perma.cc/N9VY-CVUX.

Nobody wants guns in the hands of mass shooters. The perception that the problem is more with the weapon than with the shooter obscures the complexities surrounding the actual causes of mass public shootings and diverts policymakers from effective prevention strategies.

CONCLUSION

AR-15s and other banned semiautomatic rifles are not "unusually dangerous." The assertions against them are implausible.

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