

# **Position Paper in Favor of Firearm Suppressors to Prevent Hearing Loss**



Doctors for Responsible Gun Ownership  
A Project of the Second Amendment Foundation

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## Introduction

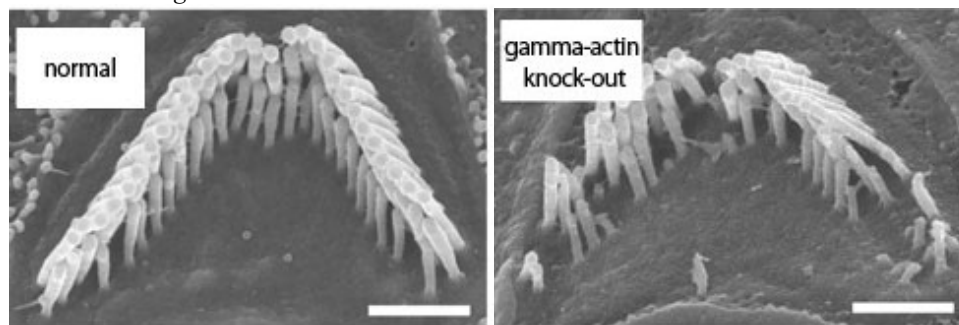
The Hearing Protection Act of 2017 ([H.R. 367](#)<sup>1</sup> and its companion bill [S.59](#)<sup>2</sup>), are being considered to aid in protecting the hearing of hunters and recreational firearms users. The ***causal relationship between loud noise exposure and irreversible hearing loss*** has long been recognized by medicine and the U.S. government. Chronic tinnitus (ringing in the ears) may accompany such permanent hearing loss.

Decades ago, the Occupational Safety and Health Administration (OSHA) [defined](#) noise levels that are risks to human hearing and standards to ameliorate them.<sup>3</sup> These standards are soundly based on research on the effects of escalating sound levels on inner ear hair cell damage resulting in permanent hearing loss and tinnitus.

## Cochlear Hair Cells and Noise Induced Hearing Loss

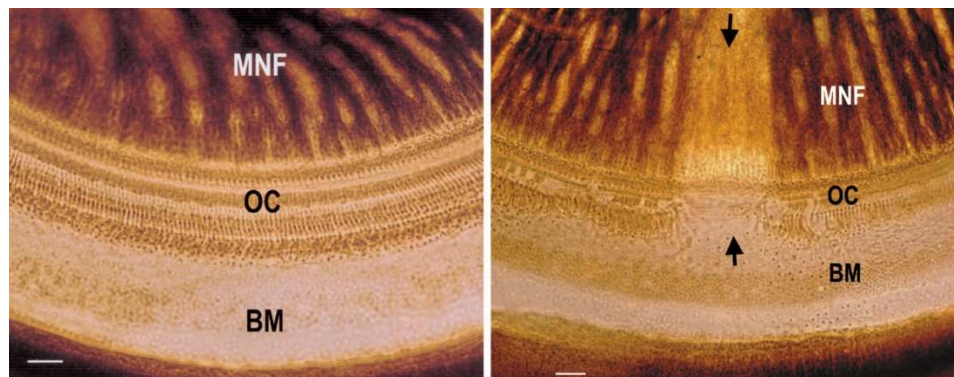
The National Institute on Deafness and Other Communicative Disorders (NIDCD) [discusses](#) cochlear hair cell damage in the inner ear that results in Noise Induced Hearing Loss (NIHL):<sup>4</sup>

*Normal v damaged stereocilia:*



A protein called gamma-actin helps [repair](#) mild to moderate ciliary damage, but cannot restore permanent damage from high-decibel noise such as from jet engines, loudly amplified music and, worse yet, explosive blast damage from gunfire.<sup>5</sup>

In this photomicrograph from a 1999 article [Effects of Noise on Hearing](#) in the *Journal of the American Medical Association*, intact and healthy sensory cells of the inner ear are shown on the left, and damaged cells from excessive noise exposure on the right:<sup>6</sup>



MNF = auditory nerve fibers    OC = Organ of Corti    BM = basement membrane

## Explosive blast hearing damage

Particularly harmful for firearms enthusiasts is the explosive blast (or impulse) generated when firing a handgun or rifle. This explosive blast generates 1,000 times more pressure than the actual noise of a gunshot. Such blasts can result in significant, permanent hearing loss with a single exposure of 140 decibels or more, according to OSHA in the above referenced [report](#).<sup>3</sup> This is the same “acoustic blast trauma” suffered by survivors of IEDs on the battlefield. ***Muzzle blast sound levels for most firearms (handguns, rifles and shotguns) range from 140 to over 170 decibels, more than sufficient to cause instant, permanent hearing damage.***

An [article](#) from *Military Medical Research* in 2015 that discusses the etiology, pathology and impact of hearing loss from such powerful blast noise (particularly from munitions and aircraft) concludes: ***“Prevention is still the mainstay of treatment and soldiers need to be educated with regards to the use of hearing protection devices.”***<sup>7</sup> According to the [U.S. Department of Veterans Affairs](#): ***“Hearing loss, including tinnitus, which is a ringing, buzzing or other type of noise that originates in the head, is the most prevalent service-connected disability among Veterans, with many Veterans suffering from a form of it due to frequent exposure to loud noises from weaponry and aircraft.”***<sup>8</sup> According to the Centers for Disease Control in [Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2012](#), ***“15% of adults aged 18 and over had some hearing trouble without a hearing aid,”*** which amounts to nearly 38 million Americans.<sup>9</sup> [*Emphases added.*]

Auditory injuries sustained by bystanders are the same as for shooters. In fact, bystanders may not be prepared with any ear protection, and not anticipate the gunshot. Dr. Gianoli has “encountered several patients who had hearing loss from someone else shooting when they weren’t ready.”

Any intervention that reduces these morbidities, and certainly one that firearms users will gladly pay for themselves if it becomes affordable and readily available, could save billions of dollars in costly interventions. There is no treatment for this kind of hearing loss.

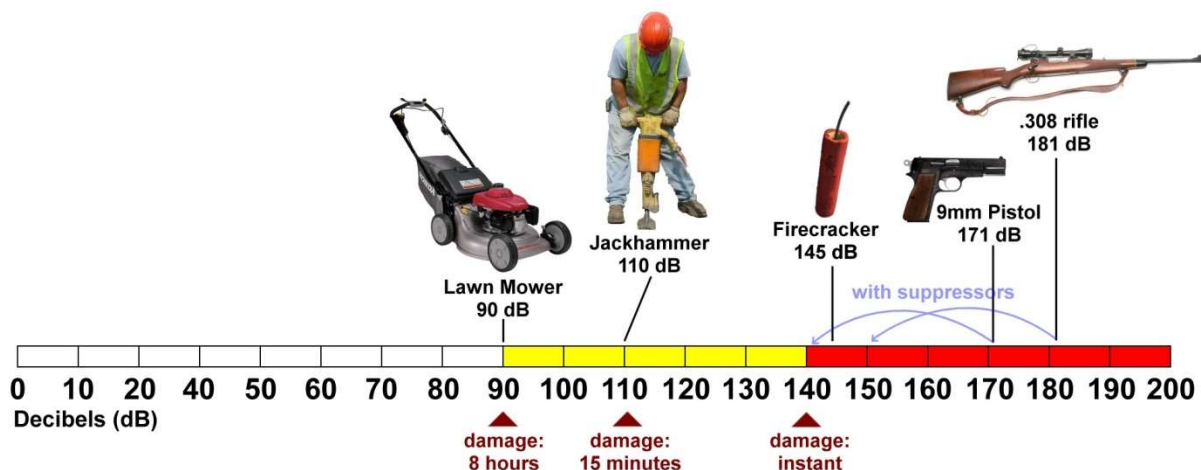
## Hearing protection

Hearing protection in the form of ear plugs or ear muffs, alone or in combination, can only reduce noise exposure by approximately 20-30 decibels. This limitation in noise reduction may still expose a firearms user to damaging levels of noise; 120 decibels is still louder than a car horn from three feet away. Thus, inside the canal and over the ear devices (i.e., ear plugs and ear muffs)—the only current generally available protection—are inadequate for impulse noise protection, and when used together they deafen the wearer to all external sound.

Research that demonstrates the superiority of suppressors over earplugs or earmuffs has been published by Matthew P. Branch, MD. In [Comparison of Muzzle Suppression and Ear-Level Hearing Protection in Firearm Use](#) (*Otolaryngology-Head and Neck Surgery*, 144(6) 950-953), he found that “All suppressors offered significantly greater noise reduction than ear-level protection, usually greater than 50% better. Noise reduction of all ear-level protectors is unable to reduce the impulse pressure below 140 dB for certain common firearms, an international standard for prevention of sensorineural hearing loss . . . ***Modern muzzle-level suppression is vastly superior to ear-level protection and the only available form of suppression capable of making certain sporting arms safe for hearing.***”<sup>10</sup> [*Emphasis added.*]

Firearms suppressors, which have been popularly called “silencers”, do not make a weapon silent. That is Hollywood fiction. Commercially available firearms suppressors can alone reduce muzzle blast noise by around 30 decibels. Using a suppressor on a firearm concurrently with proper ear protection can reduce

the amount of noise from shooting to safe levels safe for enthusiasts. [Graphic](#) from the Gun Owners Civil Rights Alliance in Minnesota: <sup>11</sup>



The Centers for Disease Control, in a September 2011 report titled [Noise and Lead Exposures at an Outdoor Firing Range—California](#), documents the importance of hearing protection in shooting. It determined that *noise levels above 160 decibels are routine at gun ranges* and how even repeated exposure at lower decibel levels can be as damaging as fewer exposures at higher levels. It recommended “double protection” (i.e., earplugs and earmuffs used together) as the best currently available protection. But it noted that *“The only potentially effective noise control method to reduce students’ or instructors’ noise exposure from gunfire is through the use of noise suppressors that can be attached to the end of the gun barrel. However, some states do not permit civilians to use suppressors on firearms.”*<sup>12</sup> [*Emphases added.*]

There is *no* effective treatment for hearing loss from high decibel acoustic blast noise. Maximal prevention is the only possible intervention. For shooters and bystanders, that begins with suppressors mounted on the firearms and may extend to supplemental use of earplugs and/or earmuffs.

But thanks to the 1934 National Firearms Act, gun suppressors are treated like machine guns. In [states](#) where they are allowed, they are still federally taxed and permitted, making their effective cost hundreds of dollars and requiring the applicant to wait at least 6 months before actually obtaining one.<sup>13</sup>

The contrast in strict U.S. regulation of suppressors to countries with stricter overall gun control like New Zealand and most of Europe where suppressors are entirely unregulated, effective and inexpensive is remarkable.

### Other concerns

Concerns have been raised that minimizing restrictions to acquiring suppressors will result in increasing their use during commission of crimes and in greater difficulty identifying shots fired. But gunshots cannot be “silenced” below about 120 decibels. That is still very loud. Even the anti-gun Violence Policy Center in a February 2016 [report](#) claiming to document the dangers of suppressed gunfire, acknowledges its other advantages: greater barrel stability and less muzzle flip and recoil resulting in greater accuracy; enabling verbal communication among shooters (who needn’t be deafened by the noise or by their total ear protection); and eliminating muzzle flash, preserving night vision.<sup>14</sup>

Fearing the spread of criminal use of suppressors to conceal shootings is phobic, not reality-based. There are over [900,000 registered suppressors](#) in America as of 2016.<sup>15</sup> In a 2007 [paper](#), Paul Clark estimates that there are no more than 200 state and federal prosecutions each year for illegal silencer use.<sup>16</sup> That's just a 0.02% rate.

Criminals prefer readily concealed firearms and are less concerned with the noise they produce. Homemade silencers can be made of other items repurposed very cheaply for single use, making the cost of buying a commercial suppressor even less attractive to criminals. And adding a commercial suppressor to a handgun typically doubles its length, making concealment much more difficult. See illustration below:



## Conclusion

In a January 2017 presentation just [published](#) online by *The Laryngoscope*, the authors concluded: “Substantial noise exposures with potentially serious long-term hearing health consequences frequently are occurring . . . with the use of firearms. Only a minority of those exposed consistently are using hearing protection. Healthcare providers should actively . . . encourage the use of hearing protection with those patients at risk.”<sup>17</sup>

***Doctors for Responsible Gun Ownership strongly supports making firearm suppressors readily available to the public*** as a critical health intervention to prevent Americans’ hearing loss. Reducing barriers to firearms suppressor ownership and decreasing the likelihood of gunshot blast noise induced hearing loss and tinnitus in tens of millions of U.S. firearms owners will have no material impact on criminal firearms use.

## References:

- 1     [H.R.367 - Hearing Protection Act of 2017](#)
- 2     [S.59 – Hearing Protection Act of 2017](#)
- 3     [OSHA Regulations \(Standards - 29 CFR\) - 1910.95\(a\)](#)
- 4     [NIDCD: Noise-Induced Hearing Loss](#)
- 5     [Gamma-actin is required for cytoskeletal maintenance but not development.](#) BelyantevaI, Perrin B *et al*, *Proc Natl Acad Sci USA*, 2009 Jun 16;106(24):9703-8.
- 6     [Effects of noise on hearing.](#) ClarkeW & BohneB, *JAMA*, 1999;281(17):1658-1659.
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- 8     [National Audiology Awareness Month: Helping Veterans with hearing loss.](#) *Vantage Point: Official Blog of the U.S. Department of Veterans Affairs*. October 5, 2016.
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- 13    [Map: Suppressor Legality & Ownership.](#) American Suppressor Association.
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- 16    [Criminal Use of Firearms Silencers.](#) ClarkP, *Western Criminology Review* 8(2), 44–57 (2007).
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