

Good firearms law needs multiple defensive layers: The Swiss cheese model

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Summary

The Ministry of Justice has released a discussion document for the rewrite of the Arms Act 1983. The discussion document sets out a series of questions on almost every element of the Arms Act but makes no concrete proposals for change. It also fails to provide an overall assessment of the effectiveness of individual and multiple combined measures designed to limit the public health harms from firearms.

The Swiss cheese model provides a useful framework to consider firearms policy. Australia implemented new firearms laws in 1996, using multiple defensive layers, and has been remarkably successful in preventing mass shootings since then. There are synergies between individual firearms policies and they need to be considered collectively. Aotearoa New Zealand needs to maintain and ideally enhance its current approach, modelled after the successful Australian laws.

The [current Review of the Arms Act 1983](#) is an opportunity to consider how firearms safety can be improved in Aotearoa New Zealand (NZ). Here we consider the benefits to the Act of identifying an overall approach to improving firearm safety as a basis for linking the different parts of the Act in a synergistic way.

Benefits of the Swiss cheese model for integrating efforts to improve firearm safety

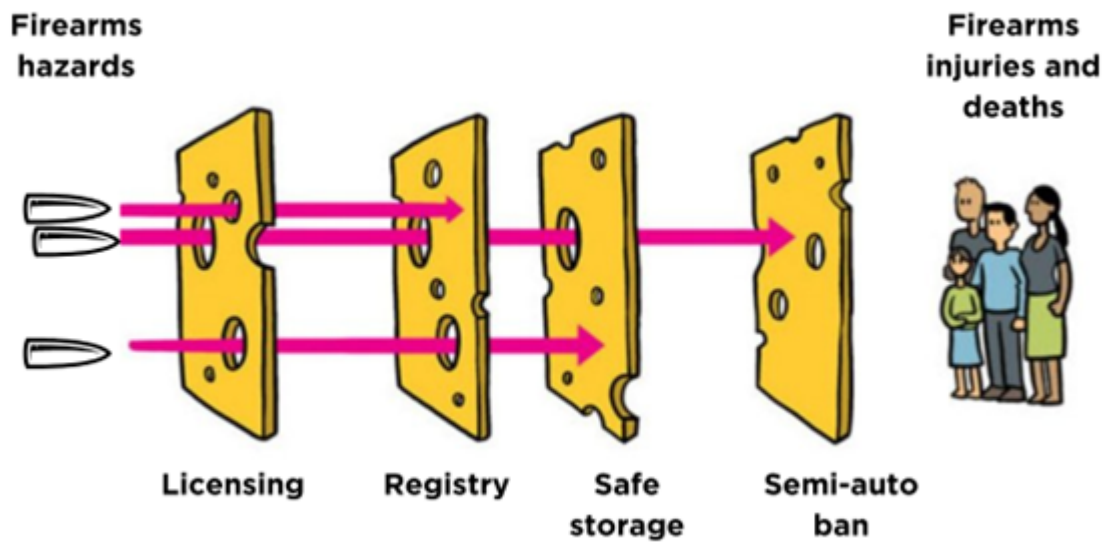
The “Swiss cheese” model for preventing system failures is a useful tool for considering firearms policy. The Swiss cheese model suggests that instead of focussing on the errors of individuals, we should take a system approach that considers the conditions under which individuals live and work. Systems have defensive layers that protect against accidents. Ideally these defensive layers are perfect, but in reality each defensive layer has holes (imperfections) like a slice of Swiss cheese. Accidents happen when the holes in all the layers line up.¹ The Swiss cheese model is used for air traffic safety,² framed the report of the Royal Commission into the Pike River Mine Tragedy³ and informed the COVID response.⁴ It can also be used to inform firearms policy.

There are a number of individual policies in NZ that work collectively to reduce deaths caused by firearms. These policies include the licensing of individual gun owners, registration of firearms, safe storage requirements, a ban on semi-automatic firearms, and restrictions on the availability of ammunition. These policies work in different ways and have different outcomes. For example, safe storage requirements reduce firearms fatalities in children⁵ and reduce firearms suicides.⁶ Licensing requirements and a ban on semi-automatic firearms are very important for preventing mass shootings.⁷ Registration reduces the availability of illicit firearms.⁸

Recent research comparing American states shows that there is a clear synergy between firearms safety policies: individual policies may show only small or uncertain effects, but the most restrictive set of firearm policies was associated with a 20% lower firearm mortality than the most permissive set.⁹ This synergy can be visualised by considering the individual policies as layers of Swiss cheese. In the figure below, the licensing system, the registration of firearms, safe storage requirements and the prohibition on specific semi-

automatic firearms all work together to reduce firearms injuries and deaths.

Figure 1: A visual illustration of an application of the Swiss cheese model to improve firearms safety.



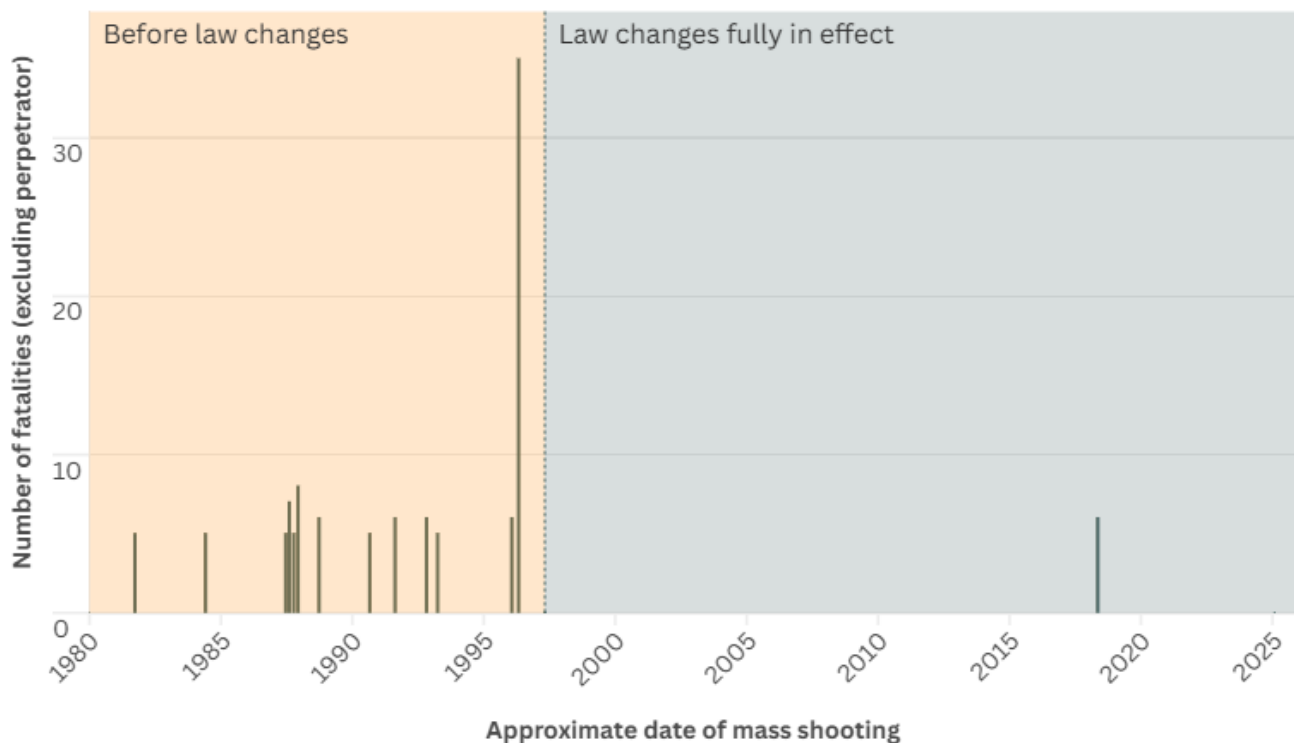
Adapted from @Siouxsiew @Xtotl thespinoff.co.nz, from James Reason, Ian Mackay, Sketchplanations CC-BY-SA 4.0.¹⁰

Positive evidence from tougher Australian firearm laws in preventing mass shootings

Australian states reformed their firearms laws in 1996 in the wake of the Port Arthur massacre. They introduced a comprehensive set of policies, including more stringent licensing conditions, a ban and buy-back of semi-automatic rifles, and the introduction of universal firearms registration.¹¹ Australian firearms laws have been extremely successful in almost eliminating mass shootings in Australia. This benefit is demonstrated in the following infographic.¹² Researchers estimate that about 16 mass shootings were prevented by their 1996 law changes.¹³

Figure 2: Fatalities in firearms related homicides in Australia, 1 Jan 1980 - 31 Jan 2025

Events in which at least 5 persons other than perpetrator died, 1 Jan 1980 - 31 Jan 2025



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The Australian laws provided a model for Aotearoa New Zealand's legislative reforms in the wake of the 2019 mosque terror attack. However, the Aotearoa New Zealand legislation is not as stringent as some elements of the Australian law in limiting access to firearms, for example, unlike New Zealand, the Australian law requires semi-automatic firearms held by collectors to be permanently disabled.¹⁴

Narrowly focussing on licensing is counterproductive

Opponents of NZ's current approach to firearms law have placed the blame for the Christchurch terror attack on the failings of Police in licensing the terrorist. These opponents did not support the semi-automatic ban and have argued that it would not be needed if there were no failures in the licensing system.¹⁵

No licensing system on its own can prevent mass shootings. Licensing screens large numbers of people to try and prevent relatively rare events (such as homicides and suicides). It is not possible to predict beforehand who exactly will commit crimes or suicide as only those with obvious red flags can be screened out.

The licensing system assesses individuals at a point in time (generally every ten years). There are currently slightly less than 250,000 individuals with a firearms licence,¹⁶ which means that Police are processing roughly 25,000 applications every year. Even if the Police are 99.9% correct in their decisions (a very low error rate) then about 25 licence holders would have incorrectly been given a licence every year. It only takes a small number of individuals to divert firearms to criminal gangs, or to commit violent crimes themselves. Even with a very low error rate, the licensing system will always let through a small number

of people who should not be licensed, with serious consequences.

The perpetrator of the Aramoana massacre held a valid licence.¹⁷ The would-be perpetrator of a school shooting in 2017/18 had a valid licence and access to firearms.¹⁸ The licensing system on its own is not enough to protect New Zealanders from a future mass shooting, or other criminal misuse of firearms: it is just one layer of Swiss cheese. Stringent controls on the types of firearms commonly used in mass shootings are also needed: a second layer of Swiss cheese.

Implications for the current review of the Arms Act

The Ministry of Justice has just released a discussion document for the Arms Act rewrite.¹⁹ The discussion document sets out a series of questions on almost every protection in the Arms Act and seeks views on those protections. It does not however make any concrete proposals for change.

The discussion document fails to acknowledge the synergies between individual protections in the Arms Act. Instead, the document has minutely focussed on the individual slices of Swiss cheese without accounting for the effects of layering up multiple pieces of holey cheese.

The critical protections in the Arms Act 1983 which need to be retained and ideally enhanced are:

1. Licensing of firearm owners
2. The prohibition on semi-automatic firearms
3. Registration of all firearms.

These protections also need to be underpinned by effective and appropriately resourced administration of the firearms system. An under-resourced system can lead to catastrophic failures.

Make a submission

- The Ministry of justice is undertaking [public consultation on the Arms Act rewrite](#). Submissions close on 28 February.
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What this Briefing adds

- The Swiss cheese model of system failure is a useful approach for considering firearms policy. It emphasises the importance of considering the synergies between individual firearms safety policies
- Australia has more restricted firearms laws than NZ which have been extremely successful in almost eliminating mass shootings there

Implications for policy and practice

- The review of the Arms Act should aim to preserve or enhance critical protections of Aotearoa New Zealand's firearms law that synergistically support public safety, including:
 1. Licensing of firearm owners
 2. The prohibition on semi-automatic firearms
 3. Registration of all firearms.
- These measures need to be underpinned by effective and appropriately resourced administration of the firearms system.

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Competing interests:

Philippa Yasbek is a co-founder of Gun Control NZ, a group advocating for strong gun laws in New Zealand. She is a member of the Advisory Committee for Global Action on Gun Violence. Her work for these groups is not remunerated. Philippa has appeared as an expert witness in the Christchurch Masjidain Attack Inquiry by the Coroner and is a member of the Ministerial Arms Advisory Group. These positions are remunerated.

Dr Telfar-Barnard has no competing interests.

References

1. Reason J. Human error: models and management. BMJ. 2000
<https://doi.org/10.1136/bmj.320.7237.768>
2. International Civil Aviation Organisation. Safety Management Manual (SMM). Third Edition-2012
https://www.icao.int/sam/documents/rst-smssp-13/smm_3rd_ed_advance.pdf
3. Royal Commission on the Pike River Coal Mine Tragedy. 2012; Volume 2, pp29-30. Available from:
[https://pikeriver.royalcommission.govt.nz/vwluResources/Final-Report-Volume-Two/\\$file/ReportVol2-whole.pdf](https://pikeriver.royalcommission.govt.nz/vwluResources/Final-Report-Volume-Two/$file/ReportVol2-whole.pdf)

4. Office of the Minister for COVID-19 Response. Cabinet Paper: COVID-19 Resurgence: Improving Public Health Measures at Alert Level 1. 2020 Nov 16.
<https://www.dPMC.govt.nz/sites/default/files/2023-01/Paper-CP1-16112021-COVID-19-Resurgence-Improving-Public-Health-Measures-at-Alert-Level-1.pdf>
5. Grossman DC, Reay DT, Baker SA. Self-inflicted and unintentional firearm injuries among children and adolescents: the source of the firearm. Arch Pediatr Adolesc Med. 1999. <https://doi.org/10.1001/archpedi.153.8.875>
6. Violano P, Bonne S, Duncan T, et al. Prevention of firearm injuries with gun safety devices and safe storage: An Eastern Association for the Surgery of Trauma Systematic Review. Journal of Trauma and Acute Care Surgery. 2018 Jun
<https://doi.org/10.1097/ta.0000000000001879>
7. Chapman S, Stewart M, Alpers P, Jones M. Fatal firearm incidents before and after Australia's 1996 national firearms agreement banning semiautomatic rifles. Annals of internal medicine. 2018 <https://doi.org/10.7326/m18-0503>
8. European Commission: Directorate-General for Enterprise and Industry. Evaluation of the Firearms Directive : final report. Publications Office; 2014.
<https://doi.org/10.2769/89829>
9. Schell TL, Smart R, Cefalu M, Griffin BA, Morral AR. State policies regulating firearms and changes in firearm mortality. JAMA network. 2024.
<https://doi.org/10.1001/jamanetworkopen.2024.22948>
10. The illustration is based on an image with the following credit: @Siouxiew @Xtotl thespinoff.co.nz Adapted from James Reason, Ian Mackay, Sketchplanations CC-BY-SA 4.0. Original image available from:
<https://www.auckland.ac.nz/en/news/2020/10/22/covid-19-and-the-swiss-cheese-system.html>
11. Chapman S. Over our dead bodies: Port Arthur and Australia's fight for gun control. Sydney University Press; 2013.
<https://open.sydneyuniversitypress.com.au/files/9781743320310.pdf>
12. Ellis P. Poisson point processes, mass shootings and clumping. Free Range Statistics. 2019. <http://freerangestats.info/blog/2019/09/07/mass-shootings-oz>
13. Chapman S, Stewart M, Alpers P, Jones M. Fatal firearm incidents before and after Australia's 1996 national firearms agreement banning semiautomatic rifles. Annals of internal medicine. 2018. <https://doi.org/10.7326/m18-0503>
14. Council of Australian Governments. National Firearms Agreement. 2017 Feb [cited 2025 Feb 10]. Available from:
<https://www.ag.gov.au/sites/default/files/2022-09/crime-national-firearms-agreement.pdf> [This paper uses the shorthand "Australian law" to refer to the National Firearms Agreement. The National Firearms Agreement is an agreement between the Australian Commonwealth and State governments on the minimum requirements for firearms laws implemented by the States (some laws related to firearms are Commonwealth laws). Not all States are in perfect conformance with the Agreement and some have introduced more stringent laws that go beyond the requirements of the Agreement. The complexities of the arrangement are beyond the scope of this note.]
15. Council of Licensed Firearm Owners. Police Hid Truth About Terrorist Licensing, Inciting Needless Law Changes and Gun Buyback. Media Release. 2024.
<https://www.colfo.org/post/police-hid-truth-about-terrorist-licensing-inciting-needless-law-changes-and-gun-buyback>
16. Te Tari Pūreke. Licensing and Registry Snapshot. 2024.
<https://www.firearmssafetyauthority.govt.nz/sites/default/files/2024-02/firearms-public-dashboard-january2024.pdf>
17. Thorp T. Review of Firearms Control in New Zealand: Report of an Independent

Inquiry, commissioned by the Minister of Police. GP Print, Wellington. 1999.

<https://www.police.govt.nz/resources/1997/review-of-firearms-control/review-of-firearms-control-in-new-zealand.pdf>

18. Savage J. 'Terrorist attack': How police thwarted heavily armed teen's plan to shoot teachers, classmates in South Island school. NZ Herald. 2020.

<https://www.nzherald.co.nz/nz/terrorist-attack-how-police-thwarted-heavily-armed-teens-plan-to-shoot-teachers-classmates-in-south-island-school/UIBDQEDPD5OCWPJLYN34DSI53U/>

19. Ministry of Justice. Arms Act rewrite: Discussion Document. 2025.

<https://consultations.justice.govt.nz/policy/public-consultation-on-the-arms-act/>



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