



Headquarters  
New Zealand Defence Force  
Defence House  
Private Bag 39997  
Wellington Mail Centre  
Lower Hutt 5045  
New Zealand

OIA-2024-5116

23 August 2024

[REDACTED]  
[REDACTED]@nzme.co.nz

Dear [REDACTED]

I refer to your email of 25 July 2024 requesting the following information:

*I've copied below a couple of stories to run recently on mild traumatic brain injury in the ADF.  
Could you please let me know what, if any, work NZDF has done in this area in the last decade. I'm aware of the research and journal articles after a research project with the NZSAS around 2010 or so. I wondered if there had been anything since, or anything imminent.*

Your request has been considered under the Official Information Act 1982 (OIA).

A substantial amount of research into concussive hazards has been conducted by the New Zealand Army, and has led to the publishing of updated orders in 2016. This has resulted in updated training protocols regarding blast overpressure exposure. The New Zealand Army has since reviewed these protocols and extended them to cover other weapons systems of high calibre, which are either shoulder fired (Anti Materiel Rifle or Javelin), indirect fire weapon (81mm Mortar) or manually employed (breaching charge or grenade).

In 2023, a working group was set up to review concussive hazards across the New Zealand Army. This working group seeks to identify the risks inherent to military operations and, among other things, makes recommendations to amend procedures and policy where necessary to eliminate or mitigate risks.

Enclosed is a copy of a current Defence Health Directive on the medical management of brain health hazards in military activity. This was issued together with a letter to personnel on brain health which is also enclosed. Further information regarding mild traumatic brain injury (mTBI) from blast exposure was provided in the response to you of 10 August 2023.

You have the right, under section 28(3) of the OIA, to ask an Ombudsman to review this response to your request. Information about how to make a complaint is available at [www.ombudsman.parliament.nz](http://www.ombudsman.parliament.nz) or freephone 0800 802 602.

Please note that responses to official information requests are proactively released where possible. This response to your request will be published shortly on the NZDF website, with your personal information removed.

Yours sincerely

**AJ WOODS**  
Air Commodore  
Chief of Staff HQNZDF

**Enclosures:**

1. Defence Health Directive: 23/003 – Medical Management of Brain Health Hazards in Military Activity: Version 01
2. mTBI Letter to Personnel



Defence Health Directorate

06 Sep 23

**DEFENCE HEALTH DIRECTIVE: 23/003**

**MEDICAL MANAGEMENT OF BRAIN HEALTH HAZARDS IN MILITARY ACTIVITY: VERSION 01**

**References**

- A. [DFO\(A\), Vol 7, Book 3](#), Chapter 04, Section 04, Annex D *Safety Guidelines – Blast Overpressure Exposure*.

**Authority**

1. This Health Directive is authorised by Colonel C M Tate, Surgeon General.

**Purpose**

2. The purpose of this Health Directive is to direct the medical management of brain health in military activity associated with military weapons system hazards.

**Scope**

3. This Health Directive applies to all New Zealand Defence Force (NZDF) personnel and to NZDF healthcare professionals (Defence Health and those under the technical control of the Surgeon General).

**Context and overview**

4. There are a number of military weapons system hazards that have been shown to potentially have a deleterious cognitive health effect on some people if exposure is not mitigated. Known brain health hazards include blast overpressure, whole body vibration/weapons recoil, noise and toxic muzzle gas. Exposure to these hazards can present symptoms similar to direct force concussion in some operators, particularly after repeated exposures to activities, such as firing high-calibre weapons and training with repeated low-level blasts such as that used in explosive methods of entry.
5. Regular calibre weapons systems (such as standard issue small arms) and explosives with significant stand-off, such as demolitions, claymores and grenade throws, do not trigger the same mechanism and, when conducted under standard training conditions, are not known to contribute to health hazards of this nature. However, any person presenting with cognitive symptoms with onset after specific military activities should be assessed for any link between symptom onset and activity hazards.

6. Frequent (cumulative) exposure to hazards can be expected to increase the risk of cognitive health effects. Safety guidelines and safety in training policy for military weapons systems are designed to minimise an individual's exposure to hazards in order to mitigate this risk. This includes both students and instructing staff, the latter being at risk of more frequent exposure (due to multiple serials during a training session and multiple training sessions annually).

#### **Mitigation of harmful exposure hazards**

7. Safety standards for current military weapons systems should mitigate harmful exposure hazards through the use of military weapons system mitigations, such as—
  - a. limiting the frequency of exposure;
  - b. increasing stand off from blast effects;
  - c. using effective personal protective equipment; and
  - d. educating operators.
8. It is expected that cognitive effects on operators will not be common if these effective mitigations are in place.

#### **Required restrictions for affected individuals**

9. Given that the primary organ effected by military weapons systems hazards is the brain, safety standards dictate that there should be no additional 'insults' or toxic exposures to the brain during a period of weapons training. The following activities are to be avoided 24 hours prior to and 48 hours after high-calibre weapons training—
  - a. contact sports;
  - b. consumption of alcohol or other substances that have a detrimental effect on cognitive ability; and
  - c. activities known to cause fatigue (eg sleep deprivation, intensive additional physical training sessions).
10. After a diagnosed concussion or traumatic brain injury (TBI) from any other activity (eg a sports injury), the affected individual is not to conduct weapons training with known cognitive hazards for a minimum of one week. They will then require medical clearance to continue training, as per the current 'return to play' sports concussion guidelines.
11. Cognitive stressors are often cumulative through life, and when individuals have had other brain insults, such as concussions from blunt force trauma with a period of persistent symptoms or vulnerabilities related to mood disorders, a lower threshold for restricting ongoing participation in military training or activities that may present further cognitive hazard should be considered.

#### **Monitoring for and reporting of health problems**

12. Defence Health are not aware of when an individual has been exposed to military weapons system hazards. As such, Single Service Safety Authorities, command/management of individuals, or individuals themselves (can also be in conjunction with the Directorate of Safety) are responsible for notifying Defence Health where an individual has been exposed to military weapons system hazards (ongoing or accidental exposures).

13. When informed, Defence Health elements are to conduct individual cognitive health monitoring of the relevant exposure to military weapons system hazards as set out in this Health Directive.

### **Medical Boards**

14. Personnel who regularly operate military weapons systems with high-calibre weapons, or participate in explosive breaching, are to notify NZDF health personnel of this trade occupation at their regular scheduled occupational medical board so that they can be routinely assessed for any health problems related to this activity.
15. Medical practitioners should ask all personnel about any potential cognitive hazards of their occupation during routine medical boards in order to accurately assess and manage the health of NZDF personnel in the context of their trade, occupation and exposures to hazards.

### **Assessment and management of affected individuals**

16. While the mechanism of weapons training stress on the brain is different to that of a blunt force concussion such as that seen in contact sports, the symptom reporting is similar, and hence assessment and management of weapons training-related brain injury should be aligned with current sports concussion guidelines. Notably, its symptoms are often more subtle, presenting at a level that does not reach a standard threshold for 'injury'. Evidence shows that symptoms resolve after a period of rest and a break from ongoing exposure to the weapons system. In personnel presenting with sub-clinical symptoms, ongoing monitoring should ensure that these symptoms resolve after rest and do not recur with ongoing training.
17. There is no single diagnostic test to prove that a cognitive injury has occurred, and a diagnosis of injury related to weapons training or military activities can be made only after careful assessment by a medical practitioner. Research is ongoing to find accurate objective measures of adverse clinical effects. Until such time as appropriate measures are identified, the key tools by which to assess and monitor an operator's health status will be subjective symptom questionnaires and clinical assessment in accordance with concussion guidelines.
18. Where Single Service Safety Authorities, Directorate of Safety, command/management of individuals, or individuals have identified a potential hazard associated with the use of a military weapons system, a symptom checklist, such as the example checklist in [Table 1](#) (originally from DFO (A) Vol 7) may be utilised. Table 1 is a *Weapons System Post Activity Self Questionnaire* that is to be completed by individuals when they are exposed to unmitigated or frequent training activities or if they develop symptoms within 24 hours of an exposure activity. Any reported symptoms will prompt a medic assessment, and those with persisting symptoms or concerns need to be referred to a medical practitioner for assessment. Medics should use the 'Mild Traumatic Brain Injury' clinical practice guideline (CPG) in the [Defence Medical Treatment Protocols \(DMTPs\)](#) as their assessment and management guidelines.
19. The general management of patients who present with cognitive symptoms following military activities should focus on careful assessment of cognition, exclusion of differential diagnoses (such as organic brain pathology, mood disorders, obstructive sleep apnoea or infectious causes), assessment and management of any persisting

cognitive effects after rest from exposure, promoting recovery and avoiding further harm.

20. Loss of consciousness, severe headache, obvious disorientation or confusion while participating in military training requires prompt removal from the training and rapid professional medical assessment and management in accordance with clinical guidelines.
21. Operators who have reported cognitive symptoms are not to return to military weapons system training until they are symptom free on exertion and medically cleared by a medical practitioner.
22. It is likely that some vulnerable individuals will experience symptoms at lower levels and rates of exposure. If an individual reports cognitive symptoms after two or more separate weapons training serials, they require a medical review and consideration of individual vulnerability and appropriateness of ongoing activity participation. Personnel with persistent deleterious cognitive effects that persist after 4 weeks of rest from exposure and/or whose symptoms are clearly either provoked or exacerbated by military activity will need to be assessed for appropriate grading and potential permanent restrictions on activities.

#### **Patient record**

23. Established cognitive health effects related to military weapons system activity are to be given the diagnostic code 'Concussion—military weapons system related' in Profile.

#### **Quality assurance**

24. An annual check is to be completed by the Defence Health Directorate on the above diagnostic code in order to look for occurrences of deleterious cognitive health effect related to military weapons system activity in the NZDF.

#### **Cancellation and disposal instructions**

25. The Content Owner for this Health Directive is the Surgeon General.
26. The withdrawal date for this Health Directive is 06 September 2024.

*SIGNED ON ORIGINAL*

**COL C M TATE**

Surgeon General  
Defence Health Directorate

**Table 1: Weapons System Post Activity Self Questionnaire**

Current Date \_\_\_\_\_ Current Time \_\_\_\_\_  
 Time of Training Serial \_\_\_\_\_ Date of Training Serial \_\_\_\_\_

Since your last exposure to weapons systems, are you experiencing any of the following symptoms?

Using the following scale, answer the questions below by circling the number that most closely represents your experience:

- 0 = not experienced at all
- 1 = no more of a problem than before training started
- 2 = a mild problem – present but I don't really notice, and it doesn't concern me
- 3 = a moderate problem – I can continue what I am doing, but I notice the problem\*
- 4 = a severe problem – constantly present and feels like it could affect my performance

<b>Headaches*</b>	0	1	2	3	4
<b>Feelings of dizziness*</b>	0	1	2	3	4
<b>Nausea and/or vomiting*</b>	0	1	2	3	4
Noise sensitivity					
Easily upset by loud noise	0	1	2	3	4
Sleep disturbance	0	1	2	3	4
Fatigue, tiring more easily	0	1	2	3	4
Being irritable or easily angered	0	1	2	3	4
Feeling depressed or tearful/sad	0	1	2	3	4
Feeling frustrated or impatient	0	1	2	3	4
Feeling anxious or tense	0	1	2	3	4
Forgetfulness, poor memory	0	1	2	3	4
<b>Poor concentration*</b>	0	1	2	3	4
<b>Taking longer to think*</b>	0	1	2	3	4
Blurred vision	0	1	2	3	4
Light Sensitivity					
Easily upset by bright lights	0	1	2	3	4
Double vision	0	1	2	3	4
Restlessness	0	1	2	3	4
Are you experiencing any other difficulties?					
1. _____	0	1	2	3	4
2. _____	0	1	2	3	4

- If a person scores 3 or more on any single question on the questionnaire, they are to be assessed by medical personnel.
- Operators who have reported more than two symptoms, at least one of which is headache, dizziness, nausea, poor concentration or taking longer to think (marked by bold text and an \* in the questionnaire), are not to return to weapons training until symptom free on exertion and medically cleared by a doctor.

### Why is brain health important?

Brain health impacts many areas of your physical and mental wellness. Your brain function is finely tuned to perform optimally, and sometimes even minor disruptions through injury or illness will have a profound effect on your quality of life.

Injuries or impacts to your brain can be challenging to recover from and will affect many areas of your life, and that of your whanau. Tasks important to being an effective service member, such as decision making, problem solving, impulse control, attention span and reaction time, can be negatively impacted by poor brain health.

Preventing injury to your brain and adopting habits that protect the health of your brain is a valuable approach, especially for any service people.

### What are hazards to brain health?

Traumatic injuries to the brain can happen to anyone. Unforeseen accidents can result in direct injury. Activities such as contact sports can also potentially directly injure the brain, either through repeated mild blows that you seemingly recover from, or through significant collision and head injuries.

Allied militaries have looked at the common causes of brain injury in service personnel. The most frequent causes are motor vehicle accidents, then falls and contact sports. In the New Zealand general population motor vehicle accidents, falls and assaults are common causes.

Twenty percent of Traumatic Brain Injury in NZ is from sport-related activity.

Head injury effects have been shown to be cumulative, i.e. the more head knocks you have in your life time, the higher the risk to your long term health. This is so, even when you think you have recovered well from each injury or insult.

Some military weapons symptoms have been shown to generate sufficient force that can generate a hazard to your brain in the same way a minor direct blow to the head might. Weapons that concentrate a large amount of force, either through pressure (such as that given off by explosives) or from repeated movement effect (such as recoil from high calibre weapons) can effectively disrupt your brain similar to a minor blow, shake or jolt.

### The cumulative effect of brain trauma and other hazards

In the training environment, these effects happen at a low level. A single exposure to a pressure or recoil effect is not likely to effect your brain. When this hazard is repeated too many times in a short time frame, without time to recover, the effect could be hazardous to your brain health.

Research is still ongoing to learn more about these military hazards. Weapons systems in the NZDF such as explosives and high calibre weapons have safety guidelines around them to significantly reduce cumulative exposures and to monitor effects on personnel. This ensures that the NZDF can prevent hazardous exposures before they effect the health of operators.



Some substances can also be toxic to your brain, the most common one being alcohol. Drugs can also damage and contribute to cumulative poor brain health.

Personnel exposed to several different hazards before adequate recovery risk a combined effect of those hazards on brain health. For example, if you have been exposed to weapons systems with significant overpressure effect, you play a contact sport and sustain a mild concussion, and combine this with alcohol within a short period, these factors together don't support good brain health in the long term. Safety procedures around weapons systems highlight this, but it is up to individuals to consider what work and social activities combined may contribute to health risk.

#### What symptoms should I be concerned about?

Memory, balance, concentration, headaches, hearing problems, sensitivity to light, fatigue, and irritability are all common symptoms of poor brain health.

However, many of these symptoms however overlap with other more common causes.

Similar symptoms occur in mood disorders (such as depression and anxiety), post viral infection complications (such as long COVID), metabolic problems, obstructive sleep apnoea, and medication side effects etc.

It is critical that if you identify troublesome symptoms that you seek health support to assist in finding the cause and assisting recovery for the issue.

As part of safety guidelines on weapons systems, self-monitoring for symptoms is a tool that allows operators to seek health support early if you have concerns about symptoms or your brain health.

#### What can you do to protect yourself?

- Take your brain health seriously. Try and prevent injuries or insults to your head and brain health. Consider that any brain injury, even a mild concussion, can have an ongoing impact, especially if you get subsequent injuries over your life time.
- Seek health support after every mild head injury. Pay attention to stand down times for contact sports and get clearance from a health professional if you want to return to play and to full military activity after a head injury.
- Minimise exposure to toxins that can effect your brain health such as alcohol and drugs.
- Make sure you are familiar with the hazards of any weapons systems or military activities you are exposed to. Comply with the safety policies and speak up if you have concerns.
- It is recommended to not expose yourself to brain health risk from several sources at the same time i.e. if you are doing training with a weapons system that has hazards to your brain, take a break from contact sports and alcohol during your training period.

#### What do you do if you are concerned about symptoms?

Both the NZDF and civilian health professions are very competent at dealing with symptoms and concerns around brain injury or brain health.

While exposure to military brain hazards may be unusual to civilian practitioners, the symptoms and assessments for brain injury are the same as those caused by more common causes, such as sports concussion.

If you have symptoms that are concerning you or your whānau, it is important that you seek a health professional's opinion. There are a range of conditions that can cause symptoms similar to brain injury and it would be important to identify exactly what is going on with your health so that the right treatment can be initiated.

If you are an instructor or leader for an activity or training serial, make sure you understand the hazards involved and have an effective risk management plan to mitigate those hazards.

Encourage your people to speak up with concerns and involve health providers early to assess anyone with concerning symptoms.

For more information

Familiarise yourself with applicable single service safety in training policies.

Contact your NZDF health provider via local Defence Health Centre or via 0800 268 437.

<https://www.accsportsmart.co.nz/concussion/>

<https://www.acc.co.nz/preventing-injury/traumatic-brain-injury-tbi/>