

**Medical Director's Statement on
Minimising Head Injury Risk
to SLSNZ Lifeguards
05/07/2017**

The Medical Director's recommendation is that surf helmets should be mandatory for wear by SLSNZ members during

- all training or patrolling in motorised surfcraft such as IRBs or RWCs regardless of sea condition and
- all rock rescues or training performed where waves are breaking upon rocks or swell is surging between rocks.

Due to

- 1) The need for SLSNZ to minimise foreseeable health and safety risks to members through reasonable interventions
- 2) The regular occurrence of significant injury among motorised surfcraft users
- 3) The risk of serious brain injury or fatal drownings due to head injury from impact with surfcraft or rocks
- 4) The long-term health implications of serious non-fatal head injuries
- 5) The evidence for a significant, proven reduction in head and brain injuries including death, through the use of sport helmets

Discussion:

Thousands of SLSNZ members have access to surfcraft including IRBs and RWCs used under the auspices of SLSNZ and its member surf clubs. The potential exists for lacerations, concussions, skull fractures, severe brain injuries and deaths to occur during the operation of these surfcraft, especially with the use of motor-powered craft including Inflatable Rescue Boats (IRBs) and Rescue Water Craft (RWCs), and the use of non-motorised craft in high-risk conditions.

Beyond the theoretical risks, there are actual and significant injuries occurring on a recurring basis, some of which are discussed below. As an institution, SLSNZ has an ethical and legal obligation to minimise the risk of injuries to members when practicable.

It should be noted that under the Health and Safety Act, SLSNZ is a 'Person Conducting a Business or Undertaking (PCBU) and that its volunteer lifeguards are considered 'volunteer workers', and that under the broad reaches of the new Health and Safety legislation, there are even duties to other individuals, such as customers and visitors. The scope of the law is significant, and suggests that if one knows a harm is plausible, one has to take reasonable steps to mitigate it, and not just for salaried employees.

Per the 2016 Act, "PCBUs will owe a duty to ensure, so far as reasonably practicable, the health and safety of volunteer workers (as if they were any other worker)...PCBUs will have

a duty to others (such as customers or visitors) to ensure that their health and safety is not put at risk from the PCBU's work, so far as is reasonably practicable.”

“Under the Act, a Person Conducting a Business or Undertaking (PCBU) has the primary duty to ensure the health and safety of its workers and others, so far as is reasonably practicable... A volunteer organisation which has one or more employees is a PCBU and will have the same duties as a PCBU to ensure, so far as reasonably practicable, the health and safety of its workers and others. There are some exclusions to this, depending on whether the PCBU has casual volunteers or volunteer workers... Volunteer workers are people who regularly work for a PCBU with its knowledge and consent on an ongoing basis and are integral to the PCBU's operations. PCBUs will owe a duty to ensure, so far as reasonably practicable, the health and safety of volunteer workers (as if they were any other worker). This ensures that these volunteers are afforded the protection of having the appropriate training, instruction or supervision needed to undertake their work safely – just like any other worker. PCBUs will have a duty to others (such as customers or visitors) to ensure that their health and safety is not put at risk from the PCBU's work, so far as is reasonably practicable.... People volunteering for the following activities will not be volunteer workers under the new law: Participation in a fundraising activity. Assistance with sports or recreation for an educational institute, sports or recreation club. Assistance with activities for an educational institution outside the premises of the educational institution. Providing care for another person in the volunteer's home.¹

The rest of this statement will assume that SLSNZ, and member clubs, have a duty to minimise foreseeable harm to members using its motorised surfcraft and when its members are swimming around rocks and rocky headlands.

SLSNZ IRB Injuries, Training and Patrol/National Sporting Events, 2013-17:

Limitations: This is a selection of injuries that were initially deemed serious (requiring ambulance/hospital care) and were entered into the PAM database with the descriptor “IRB”. Note that not all member injuries are entered into PAM, especially surf sport injuries. The injuries listed are initial impressions rather than final diagnoses. Minor injuries that later required hospital or specialist care were not routinely recorded. Although most of the injuries are orthopaedic, they are listed to demonstrate the frequency of injury due to high-energy impacts sustained by IRB occupants.

Fibular (leg) fracture

Humerus (arm) fracture

Cerebral concussion (head hit pontoon)

Ankle sprain

Shoulder dislocation

Cerebral concussion (hull landed on head)

Facial contusion (head hit bow rope handle attachment)

Shoulder contusion (flipped IRB)

Hand fractures (flipped IRB)

Hand injury and facial contusion (flipped IRB)

Ankle sprain

Head contusion

Wrist fracture

Spine contusion

Elbow contusion (thrown against transom)

Concussion (with eye nerve ‘damage’)

Leg fracture

¹ <http://www.mbie.govt.nz/info-services/employment-skills/workplace-health-and-safety-reform/document-and-image-library/summary-doc-volunteers-3rd-reading.pdf>

Foot fracture
Foot fracture requiring surgery
Neck muscle sprain ('torn')
Eye contusion and concussion

Looking at a dataset of IRB injuries from SLSNZ over the past four years, it is apparent that injuries from being thrown around the boat, in training and in races, occur on a recurring basis each year. The IRB-related head injuries in this limited sample comprised head contusions, facial contusions, and concussions. I found no SLSNZ surfcraft-related deaths in NZ in the period studied.

A search of online news sites found three head injury deaths believed to be sustained from surfcraft head impacts in Australia in 1996, 2010, and 2012. All victims were helmetless, and were thought upon coroner review to have drowned after head impacts with surfcraft. In 1996 Robert Gatenby was killed after being struck in the head by a surfboat in large surf. He was without helmet or PFD. In 2010 an unhelmeted Saxon Bird was struck in the head by another competitor's surf ski in large surf and drowned. And in 2012 Matthew Barclay died after an unhelmeted head strike with a board in large surf.

The overall risk of death or serious injury during surf lifesaving is very low, but the outcome is devastating, can last a lifetime, and touches an entire community. Regarding non-fatal injuries, we have some surf-specific data² that highlights IRBs and surfboats as particularly high-risk, as well as a prospective study on surfers that is informative. It shows their risk of injury more than **doubles** in overhead or larger waves. And it more than **doubles again** over rock or reef bottoms.

Nathanson A. et al., **Competitive surfing injuries: a prospective study of surfing-related injuries among contest surfers**. Am J Sports Med. 2007 Jan;35(1):113-7.

There were 116 injuries documented, 89 of which occurred during competition. There were 15,675 athlete exposures, yielding an injury rate of 5.7 per 1000 athlete exposures, or 13 per 1000 hours of competitive surfing. There were 6.6 significant injuries per 1000 hours of competitive surfing. Risk of injury was 2.4 (95% confidence interval, 1.5-3.9) times greater when surfing in waves overhead or bigger relative to smaller waves and 2.6 (95% confidence interval, 1.3-5.2) times greater when surfing over a rock or reef bottom relative to a sandy bottom.

Discussion of scientific evidence regarding sports helmet use:

Sports helmets significantly reduce the incidence of severe brain injuries, skull fractures, scalp lacerations, and death due to head injury.³ This is generally accepted, and is well supported by evidence, systematic reviews and consensus statements. (See footnotes.)

In one large and recent study of bicyclists, helmets reduced the risk of severe brain injury by 51%, the risk of death by 44%, and the risk of facial fractures by 31%.⁴ For the sake of

² Rebecca Mitchell et al., Journal of Science and Medicine in Sport, **The epidemiology of competition and training-based surf sport-related injury in Australia**, 2003–2011

³ Joseph, Bellal et al., **Bicycle helmets work when it matters the most**. The American Journal of Surgery, Volume 213, Issue 2, 413-417.

⁴ Jake Olivier, Prudence Creighton. **Bicycle injuries and helmet use: a systematic review and meta-analysis**. Int J Epidemiol (2017) 46 (1): 278-292.

comparison, seat belts in cars are also approximately 40-50% effective in reducing occupant fatalities.

Other studies and reviews from cycling, skiing, and snowboarding show similar reductions in head injuries, serious brain injuries, and deaths with helmet use.⁵ Wearing a helmet prevented roughly half of serious brain and head injuries across several sports.^{6,7,8,9}

The largest and most recent analysis of bicycle helmets and injury concluded that bicycle helmets prevent both minor and major head injuries, from concussions right up to deaths.³ This 2017 article in the *International Journal of Epidemiology* analysed 64,000 cyclist injuries published in 40 prior studies, and found a 33-69% reduction in head/facial/brain injuries. It's not surf-specific, of course, but the results are significant nonetheless. (If readers would like a full-text copy of this study, contact me.)

Bicycle injuries and helmet use: a systematic review and meta-analysis

Jake Olivier, Prudence Creighton. *Int J Epidemiol* (2017) 46 (1): 278-292.

Results: A total of 43 studies met inclusion criteria and 40 studies were included in the meta-analysis with data from over 64 000 injured cyclists. For cyclists involved in a crash or fall, helmet use was associated with odds reductions for head (OR = 0.49, 95% confidence interval (CI): 0.42–0.57), serious head (OR = 0.31, 95% CI: 0.25–0.37), face (OR = 0.67, 95% CI: 0.56–0.81) and fatal head injury (OR = 0.35, 95% CI: 0.14–0.88). No clear evidence of an association between helmet use and neck injury was found (OR = 0.96, 95% CI: 0.74–1.25). There was no evidence of time trends or publication bias.

Conclusions: Bicycle helmet use was associated with reduced odds of head injury, serious head injury, facial injury and fatal head injury. The reduction was greater for serious or fatal head injury. Neck injury was rare and not associated with helmet use. These results support the use of strategies to increase the uptake of bicycle helmets as part of a comprehensive cycling safety plan.

There is no longer any significant debate about whether helmets prevent significant brain injuries, skull fractures, lacerations. They do. But there is still significant debate about whether sports helmets can prevent lower-energy or rotational injuries such as concussions, such as occur frequently in sports such as boxing.

Concussions occur when the brain gets shaken within the skull. They can range in severity from mild headache to prolonged unconsciousness. The brain is fragile, more or less the consistency of tofu or gelatine, and it's easily injured, even by shaking. Preventing minor concussions in boxers or NFL football players is essential so that players can have

⁵ Cusimano et al., **The effectiveness of helmet wear in skiers and snowboarders: a systematic review.** *Br J Sports Med.* 2010 Sep;44(11):781-6. doi: 10.1136/bjsm.2009.070573. Epub 2010 May 29.

⁶ **Helmet Use and Risk of Head Injuries in Alpine Skiers and Snowboarders,** Sulheim et al., *JAMA.* 2006;295(8):919-924. doi:10.1001/jama.295.8.919

⁷ Thompson DC, Rivara F, Thompson R. **Helmets for preventing head and facial injuries in bicyclists.** *Cochrane Database of Systematic Reviews* 1999, Issue 4. Art. No.: CD001855. DOI: 10.1002/14651858.CD001855.

⁸ Haider, Adil H et al. **An Evidence Based Review: Efficacy of Safety Helmets in Reduction of Head Injuries in Recreational Skiers and Snowboarders.** *The journal of trauma and acute care surgery* 73.5 (2012): 1340–1347. PMC. Web. 20 May 2017.

⁹ Latha Ganti, Aakash N. Bodhit, Yasamin Daneshvar, et al., **Impact of Helmet Use in Traumatic Brain Injuries Associated with Recreational Vehicles.** *Advances in Preventive Medicine*, vol. 2013, Article ID 450195, 6 pages, 2013. doi:10.1155/2013/450195

productive careers without developing chronic brain damage, known as chronic traumatic encephalopathy, due to repeated minor head trauma.

Some studies show helmets prevent minor head injuries like concussions (as in the study mentioned above). Many other studies have shown they don't prevent concussions. But the essential point is that helmets do a good job at preventing head injuries overall, including severe head injuries, and head-injury related deaths.

Helmets prevent exactly the kinds of injuries SLSNZ members need to worry most about: not repeated mild blows to the brain, like a boxer might sustain, but rather a single, sudden, accidental impact with a crew member's skull, a motor, prop guard, or the transom, causing skull fractures, scalp lacerations, and bleeding or bruising within the brain.

The risk of a survivable head injury resulting in a drowning makes prevention of all head injuries even more important in the surf setting than in other sports.

'Safety Culture':

But the argument for helmets in IRBs cannot be based on evidence alone. There are exceptions and limitations to every study. And there are the issues of public perception and personal opinion. Risk-taking has an appeal, especially to young people and to males, which mere evidence often cannot sway.

An example of this is that literally decades after seat belts have been shown, without any doubt, to reduce the risk of death in car accidents by roughly 40%, there is still an active and vocal minority of people who advocate for repeal of mandatory seat belt laws.

More distressing are those people who "vote" through their actions. Despite seat belt use being mandatory in NZ, around 7% of people still don't buckle up. They are over-represented in the fatalities. About one-third of people killed in car crashes in New Zealand weren't wearing their seatbelt. The data suggests almost half of them would still be alive today if they had buckled up.

Internationally, a changing safety culture has resulted in a growing number of official sports bodies requiring mandatory helmet use including some cycling¹⁰, equestrian¹¹, and surf life saving groups¹². These changes to policy frequently come after well-publicised incidents of death or disability involving a highly accomplished athlete, serving as a stark reminder that no one is immune from unexpected accidents, even Olympians and Surf Ironmen.

Cycling (UCI) brought in an initially unpopular mandatory helmet rule after the 2003 death of pro cyclist Andrei Kivilev. Equestrian sports (FIE) mandated modest helmet rules after Olympian Courtney King-Dye became permanently brain-injured in a fall after her horse tripped during a simple training exercise. Recent SLS Australia helmet rules were in part a

¹⁰ http://www.velonews.com/2003/04/news/uci-will-make-helmets-mandatory_3699

¹¹ <http://www.nzequestrian.org.nz/endurance/news/2016/july/esnz-leads-the-way-with-safety/> and <https://inside.fei.org/news/fei-launches-global-safety-helmet-campaign>

¹² <https://sls.com.au/.../slsa-personal-protective-equipment-ppe-project-surfsports-may2015...>

response to the deaths of three surf sports competitors from 1996 to 2012, including Saxon Bird, an experienced surf ironman competitor.

SLSNZ is charged with maintaining public safety. One way to build a strong “safety culture” is to implement safety measures before a serious accident occurs, rather than in response to one. One of my concerns is that our present protocols allow helmet and PFD use to be left up to an individual’s decision even in high-risk motorised surfcraft, and high-risk conditions. A bad decision by an individual ‘sweep’ to not require helmets or PFDs can result in a preventable brain injury or death. There comes a time where a decision has to be made by an organisation regarding how much risk and responsibility it is willing to shift onto individual members.

Therefore it is my recommendation is that surf helmets should be mandatory for wear by SLSNZ members during

- **all training or patrolling in motorised surfcraft such as IRBs or RWCs regardless of sea condition and**
- **all rock rescues or training performed where waves are breaking upon rocks or swell is surging between rocks.**

Mandatory vs Voluntary Safety Rules

Yet we have to acknowledge that people don’t want to be hemmed in by rules. It’s hard to think of any important safety interventions that didn’t face initial opposition, even ones that were undoubtedly effective at saving lives and/or preventing harm. There has been public backlash to the introduction of mandatory seat belt laws (curtails personal freedom), mandatory airbags (increases car prices), and even mandatory helmet laws for motorcyclists (impairs hearing and vision, and curtails personal freedom).

As a thought experiment, try this. Imagine you owned an IRB, and your 19 year-old neighbour asked if he could borrow it to use in the surf. You might say yes, but first you’d want to teach him well, and then provide a period of supervision. One day, when he was trained and safe, you might let him off on his own.

Now imagine that you would be held personally financially liable for the entire lifetime costs of his brain injury if he hurt himself while using your IRB. If you let him borrow your IRB at all, you’d probably *insist* that he wore a helmet. Every time. By protecting his head, you’d be protecting your own financial interests. You wouldn’t need to see the evidence for helmets decreasing brain injuries. No helmet, no ride. No exceptions.

But in New Zealand we have the luxury of ACC covering the immediate and long-term costs of brain injuries, lacerations, and skull fractures. Taxpayers are picking up the tab. The lifetime cost of treating and caring for a **single** severe traumatic brain injured patient approaches one million dollars, but none of us ever actually sees the bill.

We also have the luxury of being able to forget. We can forget about the lifeguard or surf sport competitor that was injured years ago. They will probably disappear from our view when they leave lifeguarding or discontinue surf sports. We don’t track them on our incident forms. But brain injuries are chronic, and the damage can be lifelong. How many of them per year or per decade are an “acceptable” loss?

Until recently, we had the luxury of relaxed health and safety laws. That is changing. The question now becomes: What is the level of foreseeable, preventable harm for which we are willing to accept responsibility? And if we refuse to minimise known harms by making reasonable interventions, are we as an institution ready to accept the consequences of those decisions?

If we have the ability to reduce foreseeable risks through reasonable interventions, we ought to. If a person wants to be self-destructive, that is one thing, but for us to condone it, or worse facilitate it, by providing the machines and the venue, that's quite another.

When we encourage our members to blast through incoming surf break in an SLSNZ-branded IRB at top speed, we have to accept that when an injury happens, we are not merely spectators.

And by the same token, when we are on patrol, doing everything as safely and appropriately as possible, accidents will still happen. Random bad luck, freak occurrences, and simple mistakes do occur. But even though the accident may be unavoidable, the head injury doesn't have to be.

Thanks for your time and consideration,

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