



RugbySmart: Challenges and Lessons from the Implementation of a Nationwide Sports Injury Prevention Partnership Programme

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1 Introduction

In New Zealand, rugby is the cause of the greatest number and cost of sports injuries for people aged 5–40 years. Since 2000, New Zealand Rugby and the Accident Compensation Corporation (ACC) have partnered to develop and deliver a nationwide rugby-specific injury prevention programme, ‘RugbySmart’, which is a platform for the delivery of injury prevention messages. RugbySmart has focussed on primary and secondary prevention—preventing injuries from occurring, and minimising the severity of those injuries that do occur [1].

2 Programme Structure, Elements and Process

RugbySmart draws upon published risk management principles as they apply to sports [2, 3]. The similarity of the process for the development and delivery of programme content for RugbySmart (Fig. 1) with the ‘sequence of prevention’ [4–6] (also called the ‘public health approach’ [7] to injury prevention) is no coincidence. Although complex causal paths for sports injuries mean that predicting injuries on an individual basis is currently unrealistic [8], regularities between proximal causes and injury outcomes in rugby are sufficient to warrant injury prevention interventions at a population level. From 2001 to 2016, the primary output of RugbySmart was the delivery of a compulsory session to coaches and referees. The educational component of RugbySmart has been based on:

- instructing coaches how to teach players to be as safe as possible in the contact elements of rugby, and, for referees, how to apply the laws to minimise player risk;
- how to prepare players for the physical demands of the sport; and
- how to recognise and manage injuries, including advice to seek treatment for soft tissue injuries and concussion [9].

The session content is developed at a national level by New Zealand Rugby in consultation with ACC. RugbySmart is delivered annually, and from the beginning a deliberate effort was made to incorporate feedback from the programme facilitators and participants into the programme for the following year. The developers of RugbySmart have worked hard to identify, understand and overcome beliefs and attitudes that may act as barriers to the uptake of injury prevention messages among the rugby community. Formal surveys of the knowledge, attitudes and behaviours of RugbySmart attendees have been conducted every second year over the life of the programme. Participant responses have led to changes in programme design or delivery [10]. For example, following discussions with participants in the early 2000s, an attempt was made to highlight the link between injury prevention and performance. Rather than a focus on safety, which was connected by some people with wanting to make players ‘soft’, there was an emphasis on improving performance—‘injured players can’t perform to their best levels’. We attempted to shift thinking about continuing to play when injured, with messages conveying that, rather than being heroic, playing injured was selfish, because playing injured decreased the team’s chances of success and impaired the ability of the player to perform at their best. To counter what was thought to be a common belief that injuries were the result of bad luck (‘just accidents’), we included graphic footage of how fractures to the cervical spine could occur, and made it clear that such injuries followed from predictable, and thus preventable, mechanisms.

It has proved difficult to balance the requirement to communicate what are viewed as the essential elements of the

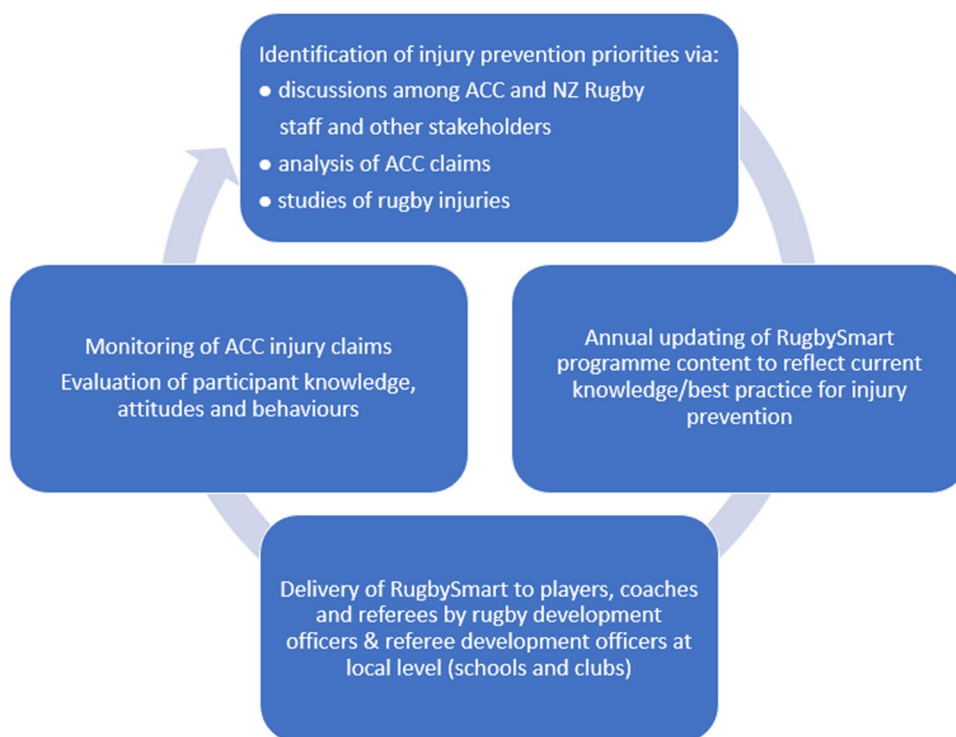
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Fig. 1 The cyclic process for updating and delivering RugbySmart. ACC Accident Compensation Corporation



programme with a desire to keep the content fresh and engaging. Although there is a reasonably high turnover of coaches from year to year, some have been exposed to the content of the programme for close to 2 decades. A variety of methods for presenting injury prevention messages have been used, some repeatedly, since 2001. These have included video and web-based resources, such as:

- expert panel discussions;
- single/dual presenter-led sessions;
- anatomical/biomechanical simulations of injury mechanisms;
- discussion by seriously injured players about the impact of injuries on their lives;
- alternation between top-level coaches (e.g. All Blacks/Super Rugby coaches) and community-level coaches providing instructions to players on technique in contact and conditioning;
- fictional narratives to demonstrate commonly held beliefs and appropriate steps to recognise and manage injuries.

Fictional narratives have been promoted as a useful means of communicating scientific findings to lay audiences [11] and for their ability to persuade people to change health-related behaviours [12]. An example of the use of a fictional narrative in RugbySmart was showing a concussed player working through issues regarding their desire to return to play as soon as possible versus waiting until symptoms had cleared. Such narratives can also highlight, and hopefully

help correct, common misconceptions regarding injury severity and management. The use of plain language has received greater emphasis as the programme has progressed. Expert input regarding current best practices (e.g. from top-level coaches, referees and medical personnel) is included each year, and information regarding injury risks and prevention strategies derived from scientific research is also incorporated. There is recognition among RugbySmart's developers that sometimes compromises must be made to balance the desire to keep the material as up-to-date with scientific knowledge as possible with providing clear and consistent messages upon which audiences can act.

3 Expansion of RugbySmart

As well as retaining the coach and referee education component, from 2017, the scope of RugbySmart was expanded to include the following:

- Player Education: an incentivised online education and player safety course modelled from coach and referee education.
- Health Provider Engagement: a community programme that raises awareness and education by providing tools and decision-making aids to health providers to help them manage concussion and other sport-related injuries more effectively.

- First Aid In Rugby (FAIR): a rugby-specific first aid course that teaches basic skills for pitch-side management of soft tissue and serious injuries.
- Respect and Responsibility: using rugby as a platform for positive social change and focusing on high-risk areas such as family violence and sexual assault.
- Rugby Specific Warm-Up: a rugby-specific resource incorporating aspects of the FIFA11+ injury prevention programme [13, 14] and the World Rugby 'Activate' programme [15].

Further developments will include development of resources for specific audiences (e.g. female, Māori and Pasifika players, coaches and referees) and the use of RugbySmart as a means of delivering public health interventions to the wider rugby community.

4 Evaluation of Programme Effectiveness

Following the introduction of RugbySmart, there was a substantial reduction in the number of permanently disabling scrum-related spinal injuries in New Zealand, as well as a reduction in less severe injuries to body sites that were a focus of the programme [10, 16]. We recognise, however, that many factors influence injury claim rates, and a change in claim rates can result from a true change in risk, changes in player exposure, and changes in player and health provider behaviour (e.g. seeking treatment for injuries, improved service provision), either singly or in combination.

A New Zealand Rugby survey of coaches ($n=417$) from across the country in 2017 found that 84% of respondents either strongly (43%) or somewhat (41%) agreed with the statement that “the content of RugbySmart was appropriate and relevant”; 9% were neutral and 7% disagreed. In the same survey, 45% strongly agreed that “RugbySmart was effectively delivered”, 39% somewhat agreed, 9% were neutral, 6% disagreed and 1% strongly disagreed [17].

Using the method to evaluate return on investment (ROI) developed by Gianotti and Hume [18] the ROI to ACC for RugbySmart as of 2019 was 3.94 New Zealand dollars (\$NZ) for every dollar invested, compared to a return of \$NZ1.67 per dollar invested across all of ACC's injury prevention programmes excluding rugby [19].

5 Understanding Perspectives on Programme Success

Different stakeholders may have different views on what 'success' means. For example, a substantial reduction in the number of rugby players would result in lower claim numbers and costs to ACC. This, however, would run counter to the goal of New Zealand Rugby of increasing the popularity

of, and participation in, rugby. Understanding where organisations are pursuing different goals and where their interests overlap is an important element to ensure ongoing success of programmes that involve partnerships between organisations. Ongoing communication about such issues, especially where the organisations' priorities diverge, is essential.

Some of the measures of the success of RugbySmart, and the organisations or groups for whom those measures apply, are listed as follows:

- reduction in absolute rugby-related claim numbers and claim costs (ACC);
- reduction in relative claim rates per (1000) player-seasons (ACC and New Zealand Rugby);
- positive ROI (ACC and New Zealand Rugby);
- reductions in rates of injuries that result in long-term or permanent disablement (e.g. spinal cord injuries, severe brain injuries), (all participants);
- more players fit and available to play (New Zealand Rugby, clubs, teams, coaches);
- being 'uninjured' and thus able to perform to the best of one's ability (players).

6 Lessons and Recommendations

Based on our experiences, we suggest that organisations considering developing and implementing sports injury prevention programmes consider the following points:

- Identify priorities: what are the most important injury issues upon which to focus? How do these differ by age, gender and level of play? Are they changing over time?
- Develop content by combining research evidence with domain knowledge from experts (i.e. coaches; coach educators).
- Seek a balance between centralisation and devolvement. Some things, e.g. development of resources, may be more efficiently done at national level, whereas people at local level understand the specific context in which they need to deliver the programme, both with respect to opportunities and challenges.
- Listen to facilitator and participant feedback to identify what is and isn't working, and update content and delivery methods accordingly.
- What is your communication strategy? What channels will you use? Identify and use influencers—different influencers with different messages for different groups.
- Understand the value of face-to-face sessions and costs and benefits of making sessions compulsory.
- Speak the language of the participants—both literally and figuratively (i.e. coach language not scientific jargon).

- Conduct research on the effectiveness of the programme, and use the information obtained to modify the programme.
- Success means different things to different stakeholders. Ensure communication between stakeholders and agreement on measures of success to ensure that people aren't working at cross-purposes.
- Keep an eye on developments in other regions [20] and other sports and use a 'copy–edit–paste' approach. Copy useful ideas from others, edit them to fit the local conditions and paste them into the overall programme.

7 Conclusions

New Zealand Rugby and ACC work in partnership to take an approach to injury prevention that is consistent with the 'sequence of prevention'. Injury prevention priorities are identified based partly on ACC claims and consideration is given to what is known about rugby injury epidemiology from other studies. Research evidence is combined with input from RugbySmart's developers and deliverers to tailor the programme to suit local contexts. RugbySmart is one of the longest-running compulsory, annually delivered injury prevention programmes in any sport that is delivered on a nationwide basis. RugbySmart is generally favourably viewed by coaches, has demonstrated positive ROI [21] and reductions in injuries targeted by the programme have been observed [10, 16]. RugbySmart was expanded significantly in 2017 to include direct targeting of messages to players, along with those provided to coaches and referees.

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Compliance with Ethical Standards

Conflict of interest Ken Quarrie, Ian Murphy, Peter Harold, Danielle Salmon and Joe Harawira were employed by New Zealand Rugby throughout the period of the preparation of this article. Their salaries were not contingent upon their roles in preparing the article. Simon Gianotti was employed by ACC throughout the period of the preparation of this article. His salary was not contingent upon his role in preparing the article.

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