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**Paediatric Traumatic Brain Injury in New Zealand:  
Caregiver Knowledge and Media Representations**

A thesis

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## **Abstract**

Traumatic brain injury (TBI) is a major cause of death and disability in the paediatric population. Even mild TBI may lead to on-going cognitive, behavioural and physical problems. Children are reliant on their caregivers to seek treatment for them, which depends on caregiver knowledge of TBI. The aims of this study were: (a) to investigate the knowledge of New Zealand caregivers about TBI; and (b) to examine the potential contribution of New Zealand newspapers to public knowledge about TBI.

Caregivers (205) of primary and intermediate schoolchildren completed a pen-and-paper or online survey containing questions examining their knowledge of TBI terminology, symptoms and facts about concussion/mTBI. A high proportion (61%) of caregivers did not think that a concussion was the same thing as a brain injury. Loss of consciousness (LOC) was the most endorsed symptom of TBI, and 31% of caregivers did not know that a TBI could occur without LOC. Behavioural symptoms of TBI were less well known than physical and cognitive symptoms, and caregivers varied widely in their knowledge of facts about mild TBI/concussion. These results suggest more education is needed. Demographic and predictor variables explained little of the variance in knowledge, suggesting that a general approach to education would be more useful than an approach targeted to specific demographic groups.

To evaluate the contribution of the popular press to TBI knowledge, the presence of information about TBI terminology, symptoms and concussion facts in newspaper articles published between January and June in 2009 and 2014 was investigated via quantitative content analysis. The context in which the information was presented was investigated both quantitatively and by qualitative

thematic analysis. The use of different terminology for TBI was strongly associated with the section of the newspaper. Articles rarely used ‘brain injury’: ‘head injury’ and ‘concussion’ were the main terms used. ‘Head injury’ was strongly associated with the News section of the newspaper, whereas ‘concussion’ was mainly used in the Sports section. There was very little information on symptoms and concussion facts in newspaper articles. Loss of consciousness was the most commonly mentioned symptom, which is of concern given that a TBI can occur without loss of consciousness. Most of the limited information that was present about concussion was correct. There was more information about concussion in 2014 than in 2009, but there was no increase in symptom information with time. Qualitative analysis revealed that information was present in a context which was supportive of good management of TBI in the sporting context, and which was unsupportive of returning to play too soon after injury. As newspapers represent an important ‘pre-exposure’ source of information about TBI, researchers should work with journalists to improve the level and accuracy of coverage of TBI information in newspapers.

In conclusion, further education of caregivers of primary and intermediate school children is needed to ensure they can recognise and appropriately manage TBI in their children. Improving the information present in New Zealand newspapers, which is lacking, would be one way to improve this knowledge.

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## **Chapter One: General Introduction**

Traumatic brain injury (TBI) has been defined by the World Health Organisation (WHO) as ‘an acute brain injury resulting from mechanical energy to the head from external physical force’ (Carroll et al., 2004, p. 115). External forces may arise from an object hitting the head, or from the head hitting an object or surface. Additionally, injury to the brain may occur without a direct blow to the head, via a transfer of force which causes the brain to move within the skull.

The severity of a TBI occurs across a wide spectrum. A range of systems have been used to characterise the severity of TBIs as mild, moderate or severe (Andriessen et al., 2011; Malec et al., 2007; Van Baalen et al., 2003). These are usually based on some combination of the duration of post-traumatic amnesia and the Glasgow Coma Scale (GCS) rating (Teasdale & Jennett, 1974). Mild TBIs may be subdivided further, with one schema proposed by Servadei, Teasdale, and Merry (2001) dividing mild injuries into low, medium or high risk categories, depending on the clinical findings, neurological issues and pre-injury risk factors.

TBI is an important cause of disability and death, and is more common in young children and the elderly (Feigin et al., 2013). In the paediatric population, estimates of incidence vary widely due to differences in methodologies (Barker-Collo & Feigin, 2008). Estimates made before 1995 ranged from just over 100 to nearly 300 per 100,000 children per year in international studies (Kraus, 1995). More recently, studies based on hospital admission or discharge records have estimated annual numbers at 70 per 100,000 for children under 17 in the United States (US) (Schneier, Shields, Hostetler, Xiang, & Smith, 2006); 130 per 100,000 for children under 16 in Northern Finland (Winqvist, Lehtilahti, Jokelainen,

Luukinen, & Hillbom, 2007); 369 per 100,000 for children under 15 in Estonia (Ventsel et al., 2008); and 145 per 100,000 for children under 15 in Oslo, Norway.

Meehan and Mannix (2010) investigated the incidence of concussion, as distinct from mild TBI, and estimated that annually 144,000 young people aged under 20 who attend emergency departments in the US receive this diagnosis. These authors unfortunately do not provide a rate standardised by population which would allow comparison with other studies looking at the whole range of TBI. Hawley et al. (2013), using the National Institute for Health and Care Excellence definitions for head injury, found an incidence of 3419 minor head injuries per 100,000 population in 0-14 year olds using emergency department records. This figure is considerably higher than other estimates, probably due to the more inclusive definition used, which captured any trauma to the head.

In New Zealand (NZ), the hospital-based incidence of TBI has been estimated at 20 per 100,000 for 5-9 yrs and 25 per 100,000 for 10-14 year olds (Barker-Collo, Wilde, & Feigin, 2008). However, using a prospective birth cohort method including all severities of head injury, McKinlay et al. (2008) found a NZ incidence of 1100-1185 per 100,000 person years for 0-14 year olds. Only 30% of these children were admitted to hospital, suggesting that hospital-based incidence studies severely underestimate numbers of TBI in the population. McKinlay et al.'s (2008) findings are consistent with more recent findings in the Brain Injury Outcomes New Zealand In the Community (BIONIC) population-based study of TBI in NZ, which found annual incidences of 1300 per 100,000 in children aged 0-4, and 818 per 100,000 in children aged 5-14 years across all severities, or approximately 40,000 children per year in NZ (Feigin et al., 2013). Despite the

differences in estimates, it is evident that TBI affects a large number of children and contributes to the costs of healthcare in all countries.

The occurrence of a TBI in childhood has differing implications from one acquired during adulthood. Children's brains are still developing, so a brain insult can not only reduce the current level of functioning, but may also lead to problems with the acquisition of new skills and with building on existing skills that would normally be expected to develop as the child grows up (McCrorry, Collie, Anderson, & Davis, 2004). In addition, recovery for a child does not simply mean a return to their pre-injury status as it does in adults. Since their uninjured peers will have continued to develop over time, achieving equivalent functionality to age-matched peers means that they have to "hit a moving target" (Giza, Kolb, Harris, Asarnow, & Prins, 2009, p. 255).

Previously it was thought that greater brain plasticity in children would allow other areas of the brain to take over and compensate for damaged areas, and that a younger age at injury led to better outcomes. More recent studies suggest that this is not necessarily the case (Giza, Mink, & Madikians, 2007). It has also been noted that there may be a possibility of children "growing into the lesion" (Giza & Prins, 2006, p. 367). This means that deficits may not be noticed at the time of injury if a particular function is not normally well developed at that stage, but may become apparent later in life when that function would be expected to develop (Giza & Prins, 2006).

The long-term impact of TBI on the developmental trajectory of children can be seen in studies of outcomes measured many years after the injury. TBI in children can lead to deficits in a number of areas including cognitive, behavioural, and psychosocial functioning. These are better documented for those suffering

moderate or severe TBI. Problems have been found ten years after injury in cognitive functions such as performance IQ, verbal comprehension and processing speed (V. Anderson, Catroppa, Godfrey, & Rosenfeld, 2012), and in tests of and parental ratings of attention (Catroppa, Anderson, Godfrey, & Rosenfeld, 2011). Problems in the social sphere have been noted in children with severe TBI as compared to children with orthopaedic injuries (OI) up to four years after the injury (Janusz, Yeates, Taylor, & Kirkwood, 2002; Yeates et al., 2013; Yeates et al., 2004). In the behavioural domain, Cole et al. (2008) found a significant increase in aggression one year after severe TBI. Fay et al. (2009) found that children with severe TBI received significantly worse parental ratings of behaviour on the Child Behavior Checklist (CBCL) than children with OI at 4 years after injury, and that their behaviour ratings were more likely to have deteriorated over time.

Psychosocial functioning may also be affected in the long-term after TBI. Green, Godfrey, Soo, Anderson, and Catroppa (2013) found that severe TBI before five years of age was associated with poorer participation in school and leisure activities, and poorer everyday living skills at 13-16 years after injury. The overall sample of children with TBI was also rated by parents as having poorer quality of life than control children (Green et al., 2013). Problems in adulthood (19-30 years) with education, employment and quality of life were more likely to be found in those who experienced severe TBI during childhood than in the general population (V. Anderson, Brown, Newitt, & Hoile, 2011).

Evidence is also emerging that even mild TBI may cause long term problems, although this is inconsistent. In a review of mild TBI in childhood, McKinlay (2010) found studies reporting both adverse and null effects on

cognitive, psychiatric and behavioural domains. Examples of adverse affects include a greater risk of symptoms of attention deficit/hyperactivity disorder; oppositional defiant disorder; conduct disorder; substance abuse; and mood disorder in adolescence after a pre-school mild TBI (McKinlay, Grace, Horwood, Fergusson, & MacFarlane, 2009). Others have found a greater reporting of behavioural and school problems by parents of children with mild TBI compared with control children (Hawley, 2003). Another study found lower academic achievement and intellectual functioning, and a higher prevalence of learning disorders, in children with mild TBI compared with a cohort of uninjured children matched for age and gender (Case, 2014).

A systematic review published in 2014 concluded that there was some evidence that mild TBI was associated with adverse psychiatric outcomes but that more research was necessary in this area (Keightley et al., 2014). A broader review by the same group concluded that post-concussive symptoms such as sleep disturbance, somatic and cognitive problems are not necessarily specific to mild TBI and usually resolve completely with time, but that a subgroup of children with visible pathology on neuro-imaging may have persisting problems (Hung et al., 2014). Both these reviews included only a small number of articles published since 2001 in their review, rejecting many others based on methodological criteria (Cancelliere et al., 2012). Overall, the existing research suggests that at least a sub-group of children with mild TBI experience some long term difficulties.

Because of these potential problems, it is important that children who experience a TBI are adequately assessed, and supported by medical and educational professionals where relevant. Children, however, are a vulnerable population, and are generally dependent on the adults in their lives to ensure they

receive medical attention when necessary. A variety of factors may influence caregivers' help-seeking on behalf of their children; one of these is knowledge about the condition.

Many of the theoretical models of help-seeking health behaviour incorporate knowledge as one factor or step in health actions or behaviour changes. For example, the model of parental help-seeking proposed by Srebnik, Cauce and Bayder (1996) includes knowledge in all three stages of their help-seeking process: problem recognition; decision to seek help; and support and service utilization. In the Health Belief Model, knowledge is considered to be a modifying factor that can influence perceptions about illness or about the benefits of health behaviours such as help-seeking (Champion & Skinner, 2008). The Transtheoretical Model also incorporates knowledge as an important part of the consciousness-raising process which raises awareness about a health condition or behaviour (Prochaska, Redding, & Evers, 2008).

The existing literature suggests that the lay public's knowledge about traumatic brain injury is poor (*e.g.* Gouvier, Prestholdt, & Warner, 1988; McKinlay, Bishop, & McLellan, 2011). Therefore one of the aims of the current study was to investigate the knowledge of NZ parents about TBI in children. The literature about this issue and specific research questions for the current study are described in the introduction to Chapter 2: Survey of Caregiver Knowledge.

Knowledge about health issues can come from a variety of sources, including the media, both 'new' and 'old'; health professionals; friends and family; and personal experience. A Cochrane systematic review of the effects of mass media interventions on the utilization of health services concluded that both planned mass media campaigns and unplanned health event coverage have effects

in the expected direction on the public's use of health services or on other health behaviours (Grilli, Ramsay, & Minozzi, 2002). Media seem to be a relatively important source of people's knowledge about TBI (R. C. G. Chapman & Hudson, 2010; Gouvier et al., 1988; Rosenbaum & Arnett, 2008). However, few studies report on the quality of information on TBI available in the media.

Therefore, a second aim of the current study was to investigate the potential contribution to public knowledge about TBI by NZ newspapers. The current knowledge about media coverage of TBI and specific research questions are described in the introduction to Chapter 3: Media Analysis.

## **Chapter Two: Survey of Caregiver Knowledge**

In support of the theories on health behaviour and help-seeking discussed in Chapter One, there is empirical evidence that knowledge about health issues can affect help-seeking, both in adults seeking help for themselves and in parents seeking help for their children. For example, greater knowledge of Alzheimer's disease symptoms was positively correlated with intention to seek help in adults (Werner, 2003). Further, Pavuluri, Luk, and McGee (1996) found that recognition of psychopathology, which requires knowledge of symptoms, was an important first step in parental help-seeking behaviour for behaviour problems in pre-school children.

Factors affecting caregivers' intentions to seek assistance for their children when they receive a TBI have not been well-studied to date. However, knowledge has been shown to be a factor affecting whether adolescents seek medical attention for their TBI, with 36% of those who didn't report their TBI giving 'didn't know it was a concussion' as a reason for their failure to report (McCrea, Hammeke, Olsen, Leo, & Guskiewicz, 2004).

One area of parental knowledge which may contribute to outcomes for children suffering from a TBI is the terminology used to describe it. Mild TBI, minor TBI, minor head injury and concussion are all used in medical records to describe mild TBI, and there is some evidence that the concussion label is sometimes applied even when the TBI is moderate or severe (DeMatteo et al., 2010). Concussion is also a term which is commonly used in lay parlance, but there are many inconsistencies in definition of this term. Moser et al. (2007) discuss the fact that in sports, mild TBI is commonly referred to as concussion.

They go on to state that the ‘majority of concussions in athletes fall at the mild end of the mild traumatic brain injury severity continuum’ (Moser et al., 2007, p. 911), implying that concussions comprise only a small part of the mild TBI continuum. By contrast, the National Academy of Neuropsychology education paper on diagnosing mild TBI specifically states that the terms concussion and mild TBI are used synonymously in the paper (Ruff et al., 2009), thereby implying that the term ‘concussion’ applies to the whole of the mild TBI severity continuum. As a third option, the 2008 Consensus Statement of Concussion in Sport (McCrory et al., 2009, p. 43) specifically states that “the terms [*concussion and mild traumatic brain injury*] refer to different injury constructs and should not be used interchangeably”, suggesting that in this schema, concussion is not on the mild TBI continuum at all.

This confusion is shared by the general public. McKinlay et al. (2011) found that 59% of people in their NZ sample who said they had experienced a concussion did not also agree that they had experienced a brain injury. Gordon, Dooley, Fitzpatrick, Wren, and Wood (2010) found that 49% of parents of Canadian children attending a regional Emergency Department believed that ‘concussion’ and ‘mild TBI’ were non-equivalent, with mild TBI being considered ‘worse’ than concussion by a clear majority.

This is not merely an academic argument over definitions. Research suggests that when the term ‘concussion’ is used it is perceived by lay people as less serious than when the term ‘mild TBI’ is used (Gordon et al., 2010). Raugust and Latter (2013) found that parents recommended shorter time periods before return to playing sport for a hypothetical child given a diagnosis of ‘concussion’ compared with one given a diagnosis of ‘mild TBI’ or of ‘concussion, which is a

form of mild TBI'. In a study of children hospitalised for TBI, the 'concussion' label was found to be associated with earlier discharge from hospital and earlier return to school than when the diagnosis was given as 'TBI' (DeMatteo et al., 2010).

The term 'concussion' was also associated with lower expectations of learning difficulties and depression after injury by university athletes (Weber & Edwards, 2010), and with lower expectations of PTSD symptoms and lower negative illness perception by a sample of university staff and students using a motor vehicle accident vignette (K. Sullivan, Edmed, & Kempe, 2014), than was the term 'mild TBI'. However, in another study, the same authors found no influence of diagnostic terminology on injury perception by university students using a sports injury vignette (Edmed & Sullivan, 2014). Apart from the study by McKinlay et al. (2011) described above, which did not differentiate between caregivers and other adults, there is no information specifically about the understanding of NZ caregivers of TBI terminology, so it is of interest to investigate this further.

Another area which is of interest due to its potential contribution to help-seeking is caregiver knowledge of the symptoms of TBI. Several studies suggest that the lay public's (Aubrey, Dobbs, & Rule, 1989; Block et al., 2014; Lees-Haley & Dunn, 1994; Mackenzie & McMillan, 2005; Mulhern & McMillan, 2006), and even health professionals' (Bazarian, Veenema, Brayer, & Lee, 2001; Boggild & Tator, 2012; Mackenzie & McMillan, 2005) knowledge of TBI symptoms is poor.

The few studies specifically investigating the knowledge of parents show similar results. In a US study of parents of children involved in sport, four out of

five parents had heard of concussion, but only one quarter of those could accurately describe what a concussion was in a free recall open-ended question (Bloodgood et al., 2013). However, this low number may have been due to the nature of the question, as conversely in a Canadian study of parents of 12-14 year old ice hockey players, parents were able to correctly identify on average 21.25 out of 25 signs and symptoms of concussion from a list (Coghlin, Myles, & Howitt, 2009). Mothers were better than fathers at correctly identifying symptoms and knowing that distracter symptoms were incorrect (Coghlin et al., 2009). In another study, nearly 70% of parents of children in the US Midwest who had experienced a mild TBI reported their children to have no symptoms two to five days after the injury. However when they were asked about each symptom individually, 46.6% of them said that they had observed at least one symptom in their child. This suggests many parents do not relate post-concussive symptoms back to their child's TBI (Stevens, Penprase, Kepros, & Dunneback, 2010).

In the only NZ research focussing on caregivers' symptom knowledge, the parents of teenage male rugby players did not do well at recalling symptoms: the most commonly recalled symptom (headache) was mentioned by fewer than half the respondents, despite the fact that 83% said that they would recognise a concussion in their child (S. J. Sullivan et al., 2009). Although rugby injuries are an important cause of TBI in NZ, TBIs may also occur by other mechanisms, so it is important to understand the level of knowledge of parents more generally. Therefore the current study aimed to investigate symptom knowledge in parents of children of primary and intermediate school age without restriction to a particular sporting code.

In addition to specific symptom knowledge, other misconceptions about health conditions can create barriers to help-seeking. For example, the misconception that anxiety symptoms would get better by themselves reduced help-seeking in parents of children with anxiety problems (Pavuluri et al., 1996), and misconceptions about stimulant drug treatment for ADHD were associated with reduced acceptability of pharmacological treatment (Sciutto, 2015).

Misconceptions about brain injury or concussion have been studied by a number of groups by presenting a series of statements and asking participants to rate how true or false they believed the statements to be. Much of this work has been based on the original paper by Gouvier, Prestholdt and Warner (1988) which showed that 25% of their US convenience sample had misconceptions about the effects of brain injury and 44% had misconceptions about unconsciousness. Subsequent studies with very similar methodology in several geographic areas of the US, in Canada and in Britain have found similar levels of misconceptions (R. C. G. Chapman & Hudson, 2010; Guilmette & Paglia, 2004; Hux, Schram, & Goeken, 2006; Willer, Johnson, Rempel, & Linn, 1993).

McKinlay et al. (2011) used a similar methodology, using statements about concussion, to investigate knowledge of the general public in NZ about concussion and its management. They found that their sample incorrectly evaluated the accuracy of two out of ten statements about concussion, and were uncertain about another two statements. For example, their participants incorrectly agreed that “someone with a concussion should be kept awake”, and were uncertain about whether “young children will recover better from concussion than adults”, but were confident that “sometimes symptoms can take hours to show

up”. Participants were also confident that the statement “it is safe to return to playing sport as soon as the confusion clears” was not correct.

McKinlay et al. (2011) noted the need for more NZ research specifically focussing on the knowledge of caregivers, because of the vulnerability of the paediatric population both in terms of injury susceptibility and because of their need for adult intervention to obtain medical assessment and treatment. A better understanding of the knowledge and misconceptions held by parents would allow better targeting of information to caregivers.

Due to the limited research on the knowledge of NZ caregivers about TBI, the specific research questions addressed in the current study were:

1. To what extent do NZ caregivers of primary or intermediate school children consider concussion to be a brain injury?
2. What are the best known symptoms of TBI among caregivers?
3. How does caregivers’ knowledge about concussion compare with that of the general public reported by McKinlay et al. (2011)?
4. How do demographic and other variables affect caregiver knowledge about TBI?
5. Where do caregivers obtain their knowledge of TBI?

## **Method**

**Participants.** Participants were caregivers of children who were primary or intermediate school pupils. In NZ, this group encompasses children in Years 0-8, aged between five and thirteen years. The inclusion criteria for caregivers were that they cared for at least one child in the target age group, and that they spoke sufficient English to understand and answer the study questionnaire. A total of

182 people were approached in person and asked to complete a paper questionnaire. Of these, 34 (20%) declined to take part and 22 (12%) were not eligible because they did not care for children in the target group, leaving a final sample of 126 people. A total of 95 people began answering an online version of the questionnaire. Nine people (9.4%) discontinued answering at the eligibility question. Data from seven online participants (7.3%) were not included in the final analysis, one because their children's ages were outside the target range, and six because all demographic information was missing. This left a final sample of 79 people who completed the online questionnaire. The characteristics of the final sample are described in detail in Table 1.

Table 1

*Sample characteristics*

Variable	Total Sample
Number of participants, <i>n</i> (%)	205 (100)
Female, <i>n</i> (%)	128 (62.4)
Age (years), <i>M</i> ( <i>SD</i> )*	41.8 (7.4)
Prioritised ethnicity	
NZ Māori, <i>n</i> (%)	28 (13.7)
Pasifika, <i>n</i> (%)	4 (2.0)
Other, <i>n</i> (%)	173 (84.4)
Education Level	
Primary, <i>n</i> (%)	2 (1.0)
Secondary, <i>n</i> (%)	36 (17.6)
Polytechnic/Trade School, <i>n</i> (%)	44 (21.5)
University, <i>n</i> (%)	123 (60.0)

*Note.* \**n* = 202 as not all participants answered this question; ‘Other’ Ethnicity includes NZ European, Other European, Asian, Indian.

The final sample consisted of more female than male participants. The proportion of participants of various ethnicities approximates the proportions in the NZ population (Statistics New Zealand, 2014). The majority (99%) of participants had received at least a secondary education, with 81.5% having some form of tertiary education.

**Materials and Measures.** A questionnaire (see Appendix 1) was developed specifically for the study, based on previous research on public knowledge of head injury. Both a paper version and an online version developed

using the Qualtrics survey software (<http://www.qualtrics.com/>) were used. Any differences between the two are noted in the description of the measures below.

**Terminology.** To measure knowledge of TBI terminology, the questions used by McKinlay, Bishop and McClellan (2011) were replicated, with the addition of questions about children. One section of the questionnaire asked about a participant's experience of 'brain injury' either in themselves, other adults, and children. A later section, separated by intervening questions, asked the same questions as the first, but used the terminology 'concussion' rather than brain injury.

The main variables of interest were the percentage of participants who had a mismatch between their answer to the question containing the 'concussion' terminology and the parallel question containing the 'brain injury' terminology (answering Yes to concussion and No to brain injury), for each of own experience, knowing an adult, or knowing a child. A mismatch was assumed to reflect the fact that they thought concussion and brain injury were different. Two additional dichotomous variables were calculated reflecting whether the participant had any experience with either concussion or brain injury. These were coded as 'yes' if the participant answered 'yes' to one or more of the concussion or brain injury questions respectively.

**Symptom knowledge.** To measure participants' knowledge of TBI symptoms, they were asked to read a short vignette about a child who had hit their head and then tick symptoms which would suggest to them that the child had a brain injury. Symptoms were presented in a checklist format with a space for the participant to enter any additional symptoms. The list contained symptoms that were used to include children in the BIONIC study (Theadom et al., 2012), plus

an additional eight distracter symptoms (*e.g.* diarrhoea, see Figure 5 and Appendix 1 for full list). Participants were then presented with a second list of symptoms, and asked which of them the child in the initial vignette might have three months after the accident. This second list contained symptoms from the Rivermead Post-Concussion Syndrome questionnaire (King, Crawford, Wenden, Moss, & Wade, 1995), plus an additional nine distracter symptoms (*e.g.* muscle cramps, see Figure 5 and Appendix 1 for full list). Symptoms in both sections were classified for analysis as physical, cognitive or behavioural as shown in Table 2.

Table 2

*Categories of Traumatic Brain Injury Symptoms*

		Symptom Type		
		Physical	Cognitive	Behavioural
Acute	Loss of consciousness		Dazed/confused	Persistent crying
	Seeing stars		Memory loss	Irritability
	Vomiting			Whinging
	Loss of appetite			Out of sorts
	Lethargic			
	Headache			
	Seizures			
Chronic	Double vision		Taking longer to think	Depression or tearfulness
	Nausea		Forgetfulness, poor memory	Restlessness
	Headache		Poor concentration	Frustration or impatience
	Sleep disturbance			Easily irritated
	Dizziness			
	Fatigue			
	Noise sensitivity			
	Blurred vision			
	Light sensitivity			

The number and percentage of participants endorsing each symptom was calculated to determine which symptoms were best known. To assess the extent of knowledge of different symptom types, the total number of real and distracter symptoms; total acute and chronic symptoms; total acute physical, cognitive and

behavioural; and total chronic physical, cognitive and behavioural symptoms endorsed were calculated. These variables were converted to percentages of the total symptoms of the relevant type that were present on the checklist, to allow comparison between symptom types.

***Concussion knowledge.*** The measure used to investigate participant knowledge about concussion was a series of 10 statements about concussion. This section replicated the concussion statements used by McKinlay et al. (2011), who derived them from common factual errors found on websites retrieved using the Google search term ‘concussion’. Participants were asked to rate how accurate they believed the statements were.

In the paper version of the questionnaire they were asked to place a mark on a graphic rating scale comprising a plain, 100mm horizontal line marked ‘True’ at one end and ‘False’ at the other. An example, with the line already marked, was given before the statements about concussion. The distance of the mark from the ‘True’ end was measured with a ruler. In the online version, participants were asked to move a slider along a plain bar marked ‘True’ at one end and ‘False’ at the other. The opening position for the slider was at the ‘True’ end of the bar. An example, with the slider moved along the bar, was shown before the statements about concussion. The questionnaire software converted this position to a number between one and 100.

To determine how accurate participants believed the statements were, the distance of the mark/slider from the True end of the line was transformed such that the midpoint of the line was represented by zero, the False end as -50, and the True end as +50. The total number of statements answered correctly by each participant was also calculated. A correct answer was defined as a rating which

fell within 20 mm/points of the end of the line that was the correct answer to the statement.

*Demographic and predictor variables.* The last section of the questionnaire asked for information on demographic variables and potential predictors of TBI knowledge including age; gender; ethnicity; level of education; occupation; experience of formal first aid training; age and genders of their child(ren); sports which their child(ren) played; and the source of their knowledge about head injury.

*Ethnicity.* Participants could choose as many ethnicities as they wished from a list or could write in an additional ethnicity in the ‘Other’ field. Ethnicity was classified for the purposes of analysis by the ‘prioritised’ Level 0 codes method according to the following hierarchy: (1) regardless of any other ethnicities endorsed, any person who endorsed ‘Māori’ was classified as Māori; (2) any remaining person who endorsed ‘Pasifika’ was classified as Pasifika, regardless of any other ethnicity; (3) any remaining person was classified as Other (Ministry of Health, 2004).

*Education.* Participants ticked their highest level of education. This was converted to a dichotomous variable reflecting experience of post-secondary education.

*Occupation.* This was a free-text field. The occupation text variable was re-coded into a dichotomous variable reflecting whether the occupation was a health profession or not. Health professional included any occupation covered by the Health Practitioners Competence Assurance Act, New Zealand Statutes (2003), such as nurses, doctors, physiotherapists, occupational therapists, psychologists etc.

*Children's ages.* Participants were asked to write each of their children's age and gender in a free-text field. The text variable was re-coded in two ways – into a continuous variable for age of the oldest child, and into a dichotomous variable reflecting whether the participant had children only in the target age group or older children as well as those in the target age group.

*Sports played by children.* This was a free-text field where participants could list as many sports as they wished. The text variable for the sport(s) played was recoded using the sports classifications listed in Rice (2008) which divides sporting codes into contact, low contact and no contact. The total number of sources of information was calculated for each participant.

*Sources of knowledge.* A checklist of potential sources was provided. Participants could tick as many sources as they liked, and there was space to enter additional sources. The percentage of participants endorsing each source was calculated.

**Procedure.** All procedures were approved by the University of Waikato School of Psychology Ethics Committee (Reference: 14:34). Both in-person and online recruitment strategies were used, to maximise sample numbers.

*In person recruitment.* Participants were recruited from a variety of locations which would ensure high concentrations of participants in the targeted group, including schools, sporting venues and a dance school. Permission was sought from principals and sporting/dance school representatives before attending the venues. Sports venues included touch rugby, softball, cricket, flippaball (junior water polo) and a swimming meet.

Participants were approached and asked if they had time to fill in a short questionnaire on head injury knowledge in parents and caregivers. If they agreed,

it was confirmed that they cared for a child in the target age group and then they were given a copy of the questionnaire and a pen. They were asked to read the information sheet (See Appendix 1) and then any questions they had were answered. Participants then completed the questionnaire if they agreed to take part. The information sheet informed them that by submitting the questionnaire they were deemed to have provided consent for their data to be used. Further explanation was given if necessary about the information sheet or the questionnaire as they completed it. Questionnaires took about five minutes for participants to complete. The final page provided the opportunity for participants to request a summary of the study findings. When they had finished, the researcher collected the questionnaire, thanked them, and answered any further questions they had. The information sheet contained a list of sources of further information about head injury and participants were given this to take away with them.

***Recruitment to complete online questionnaire.*** Notices were placed in school newsletters with a brief description of the research and a link to the online questionnaire. The link was also distributed via university staff and student electronic newsletters, and via personal and professional networks of the researcher.

On following the link provided, the participants first saw the information sheet which explained the research and informed them that by submitting the questionnaire they would be deemed to have provided consent for their data to be used. The online version took approximately five minutes to complete. This version contained two preliminary screening questions. If the potential participant reported being under 16 years or not the caregiver of a child at primary or

intermediate school they were informed that they were not eligible to take part and given the opportunity to provide their contact details if they were interested in being contacted regarding further research about head injury. The last page thanked participants for their participation and provided a list of sources of further information about head injury. Participants were offered the opportunity to request a summary of the study findings.

Both versions of the questionnaire used skip logic so participants did not answer questions that did not apply to them. Data from the paper questionnaires was entered by the researcher into a parallel Qualtrics online questionnaire, to ensure all data was in the same format. Data was downloaded from Qualtrics as an Excel file for data cleaning, and analysed using SPSS.

*Analysis.* Chi-squared analysis was used to determine whether there were any significant associations between categorical demographic and predictor variables and participants' understanding of terminology. Fisher's Exact Test was used to correct the test statistic where the calculated expected values in cells were less than five. Because participant age was a continuous variable, point-biserial correlation was used to determine whether there was a significant relationship between participant age and understanding of terminology.

Chi-squared analysis was used to test whether there was a significant difference in endorsement of individual symptoms by male and female participants. A two-way repeated measures analysis of variance (ANOVA) was used to test whether symptoms of different chronicity and type were endorsed at different rates. Greenhouse-Geisser corrections of degrees of freedom were used where the assumption of sphericity was violated.

Multiple regression was used to determine whether any of the demographic and predictor variables predicted knowledge of (1) symptoms and (2) concussion misconceptions. Because no prior assumptions were made about which variables would predict the most variance, variables were entered into the regression as a single block. Variables were selected according to hypothesised likely effects (first aid training; occupation; education; and experience of brain injury or concussion) or to investigate factors that could help inform targeting of education efforts (gender, age, and ethnicity). Dummy variables were created for ethnicity which compared participants of Pasifika and Other ethnicity with participants of Maori ethnicity.

## **Results**

**Predictor variables.** The characteristics of the overall sample with respect to the potential predictors of knowledge are shown in Table 3.

Table 3

*Characteristics of Participants by Predictor Variable*

Variable	
In a health profession occupation, n (%)	16 (7.8)
Had formal first aid training, n (%) <sup>a</sup>	139 (68.1)
Had child(ren) in target age group only, n (%) <sup>b</sup>	131 (65.5)
Age of oldest child (years), M (SD) <sup>b</sup>	12.6 (5.1)
Type of sports played by children	
Contact, n (%)	153 (74.6)
Limited Contact, n (%)	32 (15.6)
Non-contact, n (%)	7 (3.4)
None, n (%)	13 (6.3)

*Note.* <sup>a</sup> n=204 as not all participants answered; <sup>b</sup> n=200 as not all

participants answered.

A majority (68.1%) of participants had received formal first aid training. Sixty-five percent of participants had children which were only within the target age group, with the remainder having at least one child older than the target age in addition. The majority of participants (90.6%) had a child who played a sport with at least some potential for contact. Very few participants had children who played only non-contact sports or no sport at all (9.7% in total).

**Terminology.** Understanding of the terminology of traumatic brain injury was measured by the percentage of people who had a mismatch between their answer to the question containing the ‘concussion’ terminology and the parallel question containing the ‘brain injury’ terminology, for each of own experience,

knowing an adult, or knowing a child. Table 4 shows the number of people who had experience with concussion, and the percentage of those who had a mismatch between concussion and brain injury terminology.

Table 4

*Mismatch between Terminologies for Traumatic Brain Injury*

Person who experienced concussion	Yes to Concussion <i>n</i> (%)	Yes to Concussion, No to Brain Injury <i>(n)</i>	Percent with mismatch
Self	80 (39.0)	49	61.3
Child	82 (40.0)	31	37.8
Other Adult	131 (64.0)	35	26.7

Over one-third of the total sample indicated that they had experienced a concussion themselves. Of these, 61.3% indicated that they had not experienced a brain injury, despite the fact that concussion is in fact a type of brain injury. People were more likely to have a mismatch in terminology when they were reporting on a concussion that they had experienced themselves than when reporting on one someone else had experienced. For those reporting that they knew a child who had had a concussion, only 37.8% of people had a mismatch in their answers, and 26.7% of people reporting that they knew another adult with concussion had a mismatch.

It should be noted that this survey could be underestimating the level of confusion, as it is not possible to tell from the data whether those who said yes to both concussion and brain injury were reporting the same injury, or even talking about the same person in the case of the questions about children and other adults.

***Predictors of terminology understanding.*** Chi-squared (categorical predictors) and point-biserial correlation (age only) analysis showed that there were few variables that predicted whether people would have a mismatch in their answers involving terminology. In those people who had experienced a concussion themselves, none of the predictor variables (education, medical occupation, formal first aid training, ethnicity, gender nor age) had a significant ( $p < .05$ ) association with mismatched answers. In those people who said they knew a child with a concussion, only gender had a significant association with mismatched answers, with female participants 4.80 times more likely to have a mismatch than male participants,  $\chi^2(1) = 8.07, p = .008$ . In those who said they knew another adult with a concussion, those with Māori ethnicity were 1.34 times more likely to have a mismatch than those with Other ethnicity, F.E.T. = 6.86,  $p = .031$ , and there was a significant negative correlation with age, with older participants less likely to have a mismatch in their answers than younger ones,  $r = -.28, p = .001$ .

**Symptom knowledge.** The survey asked participants to choose from a list those symptoms which they thought would indicate a brain injury in a child, both acutely and three months after the incident. Figure 1 shows the percentage of participants who endorsed various numbers of real and distracter symptoms.

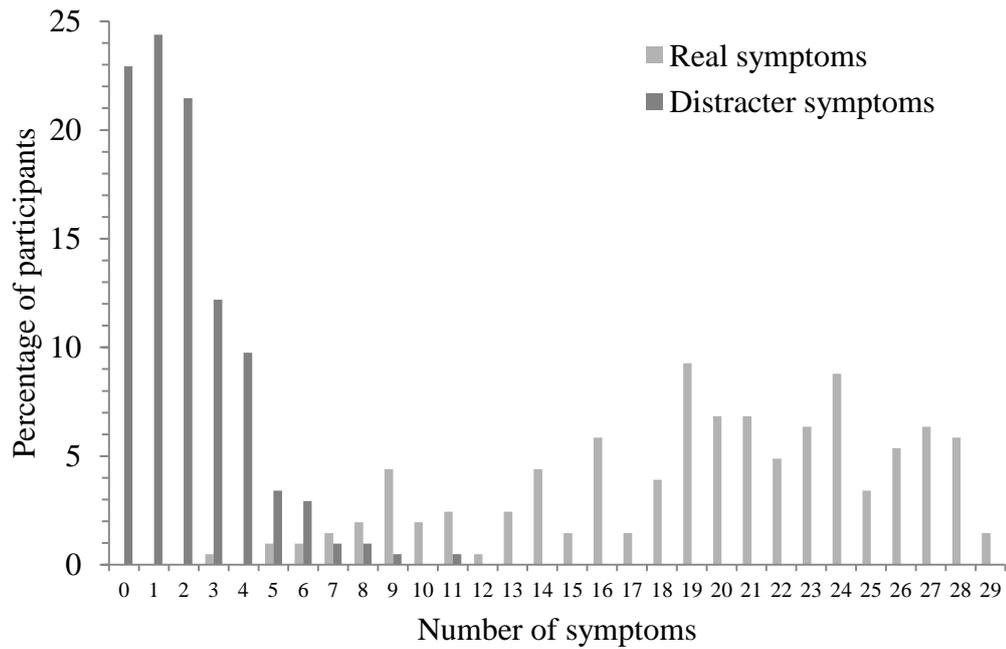


Figure 1. Percentage of participants ( $N = 205$ ) who endorsed various numbers of real ( $n = 29$ ) and distracter ( $n = 17$ ) symptoms.

Approximately 70% of the participants endorsed two or fewer of the distracter symptoms, and no participant endorsed all 17 of the distracters. Most of the participants correctly recognised at least half of the real symptoms, but only two correctly endorsed all 29 real symptoms. Participants endorsed a significantly lower percentage of the distracter symptoms ( $M = 12.05$ ,  $SD = 0.82$ ) in the lists than of the real symptoms ( $M = 67.25$ ,  $SD = 1.53$ ),  $F(1, 203) = 1568.16$ ,  $p < .001$ .

The percentage of participants recognising individual symptoms was further investigated. Chi-squared analysis found that the only symptom for which there was a significant difference between male and female participants was seeing stars, with a higher percentage of male participants (74%) endorsing this symptom than female participants (58%),  $\chi^2(1) = 5.48$ ,  $p = .019$ . Because there

were no other significant differences between male and female participants, the combined data is presented.

Individual symptoms were grouped into acute and chronic, physical, cognitive and behavioural as described in Table 2. Figure 2 shows the percentage of participants who endorsed each individual physical symptom of TBI.

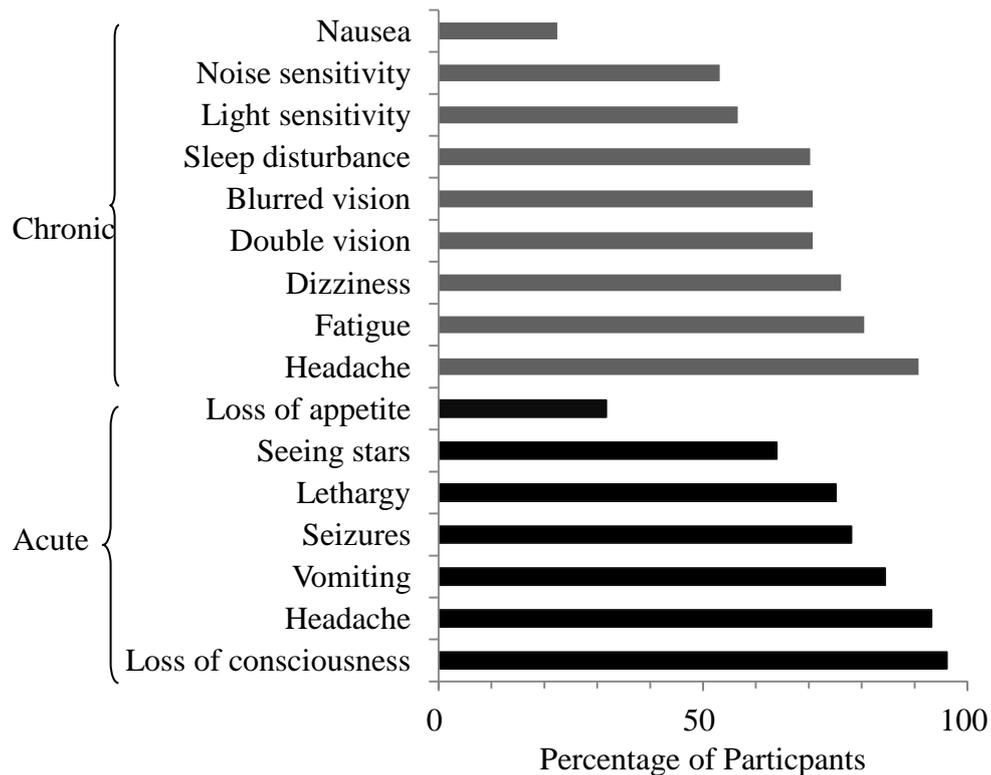
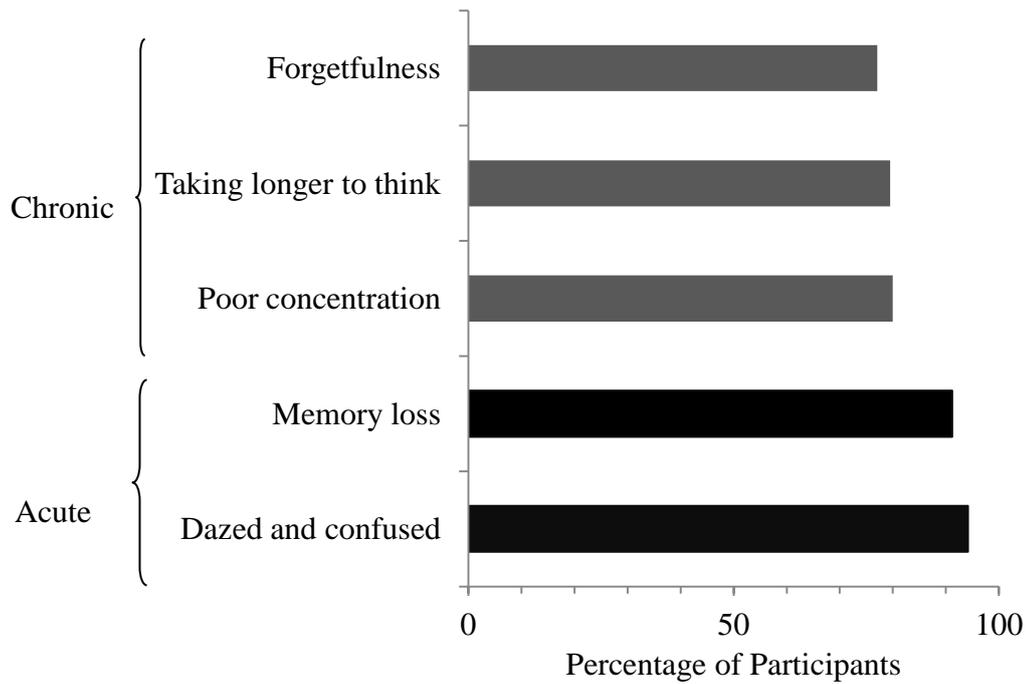


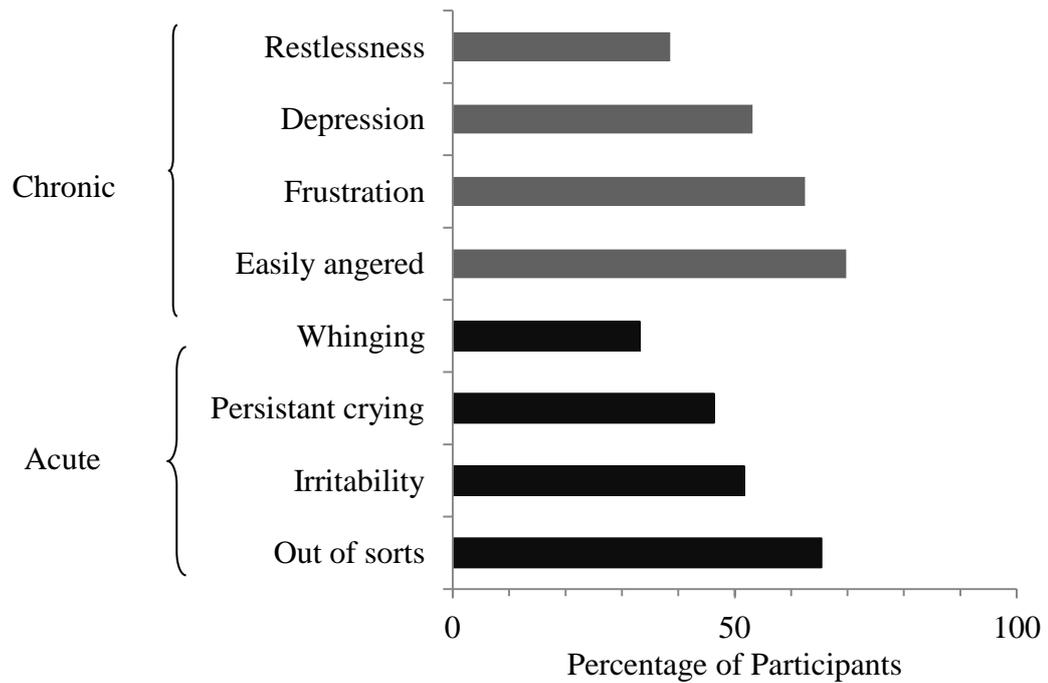
Figure 2. Percentage of participants who endorsed each physical symptom of TBI ( $N = 205$ ).

Loss of consciousness (LOC) was the most commonly endorsed physical symptom, closely followed by headache, both acute and chronic. Although vomiting was expected shortly after injury by a majority of participants, only 22.4% expected to see it at three months after the brain injury. Figure 3 shows the percentage of participants who endorsed each individual cognitive symptom of TBI.



*Figure 3.* Percentage of participants who endorsed each cognitive symptom of TBI ( $N = 205$ ).

Dazed and confused was the most commonly endorsed cognitive symptom, but all cognitive symptoms were endorsed by over three-quarters of the participants. Figure 4 shows the percentage of participants who endorsed each behavioural symptom of TBI.



*Figure 4.* Percentage of participants who endorsed each behavioural symptom of TBI ( $N = 205$ ).

The most commonly endorsed behavioural symptom was being irritable and easily angered at three months after the injury, followed by seeming ‘out of sorts’ acutely and frustration at three months. Whinging was the least commonly mentioned behavioural symptom.

Overall the five most recognised symptoms were LOC (96.1%), dazed and confused (94.1%), headache (acute) (93.2%), memory loss (91.2%), and headache (chronic) (90.7%). The least recognised symptoms were nausea (22.4%), loss of appetite (31.7%), whinging (33.2%), restlessness (38.5%) and persistent crying (46.3%).

The endorsement of individual distracter symptoms was also investigated to see if any of them were notable as being frequently endorsed. Figure 5 shows the percentage of participants who endorsed each of the distracter symptoms.

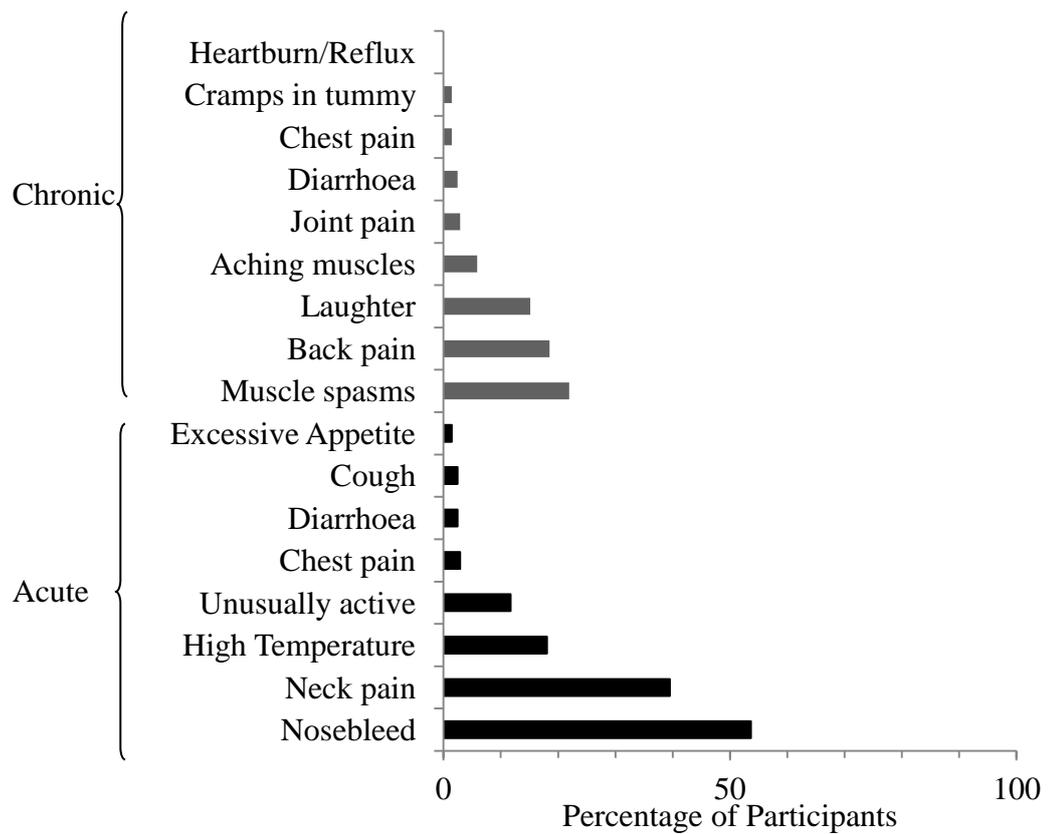


Figure 5. Percentage of participants who endorsed each distracter symptom ( $N = 205$ ).

Of the distracter symptoms, only neck pain and nosebleed were endorsed by more participants than the least endorsed real symptom. While these symptoms are not indicative of brain injury, they were consistent with the scenario in the vignette. It is therefore perhaps not surprising that they were endorsed by a moderate percentage of participants.

A two-way repeated measures ANOVA was used to test whether symptoms of different chronicity and type were endorsed at different rates. Table 5 shows the mean percentage of real symptom types endorsed.

Table 5

*Percentage of Different Symptom Types Endorsed*

Symptom type	Percentage of symptoms endorsed <i>M (SD)</i>		
	Acute	Chronic	Total ( <i>n</i> =205)
Physical	74.6 (21.1)	65.7 (25.3)	69.6 (20.8)
Cognitive	92.7 (20.3)	78.9 (32.1)	84.4 (24.1)
Behavioural	49.2 (34.5)	56.0 (36.4)	52.6 (31.1)

There was a main effect of symptom chronicity,  $F(1,204) = 15.24$ ,  $p < .001$ ,  $\eta^2 = .07$ , indicating that acute symptoms were more likely to be endorsed than chronic. This could suggest participants have better knowledge of the symptoms to be expected immediately after a TBI than of those which may persist or emerge in the longer term post-injury. Alternatively, it could suggest that they expected that symptoms would have resolved by three months after the injury.

There was also a main effect of symptom type,  $F(1.68, 343.85) = 207.33$ ,  $p < .001$ ,  $\eta^2 = .50$ . Post-hoc comparisons of symptom type revealed that both physical ( $t(204) = 10.35$ ,  $p < .001$ ) and cognitive ( $t(204) = 16.71$ ,  $p < .001$ ) symptoms were endorsed at a significantly higher rate than behavioural symptoms. This suggests that participants know more about the cognitive and physical symptoms of TBI than about the possible effects on their child's behaviour.

***Predictors of symptom knowledge.*** Multiple regression analysis revealed only one demographic variable was a significant predictor of the total number of symptoms recognised. Table 6 shows the regression model.

Table 6

*Regression Analysis of Predictors of Symptom Knowledge*

Variable	Total Symptoms		
	<i>B</i>	<i>SE B</i>	$\beta$
Constant	6.70	2.86	
Brain Injury Experience	1.82	0.98	.14
Concussion Experience	1.82	1.12	.12
Pasifika vs. Māori	0.63	3.26	.01
Other ethnicity vs. Māori	2.17	1.27	.13
Education	1.27	1.14	.08
Gender	-1.01	0.90	-.08
Occupation	0.68	1.66	.03
<b>Participant age</b>	<b>0.16</b>	<b>0.06</b>	<b>.19**</b>
First aid training	-1.27	0.93	-.10
$R^2$	.145 ( $p < .001$ )		

*Note.* \*\*  $p < .01$ , **bold** indicates significance.

The overall model for total symptoms, while significant, only predicted 14.5% of the variance in total symptoms endorsed. Formal first aid training or having a medical occupation did not appear to contribute to increased symptom knowledge, and nor did having a post-secondary education. Ethnicity had no significant effect on symptom knowledge and nor did experience with a brain injury or concussion. The only predictor that contributed significantly was participant age, predicting about 3.1% of the variance in symptom knowledge.

**Concussion knowledge.** Participants rated how accurate they believed statements about concussion were, on a plain line anchored by ‘true’ and ‘false’.

The distance of their rating from the mid-point of the line was measured. Ratings near the mid-point of the line indicate uncertainty, while ratings closer to either end should indicate more certainty about whether the statement was either true or false. Due to the highly skewed frequency distributions, median and inter-quartile ranges have been used to represent the data. The size of the inter-quartile range can be interpreted as the level of disagreement among participants about their ratings. Figure 6 shows box-and-whisker plots for the ratings of each statement.

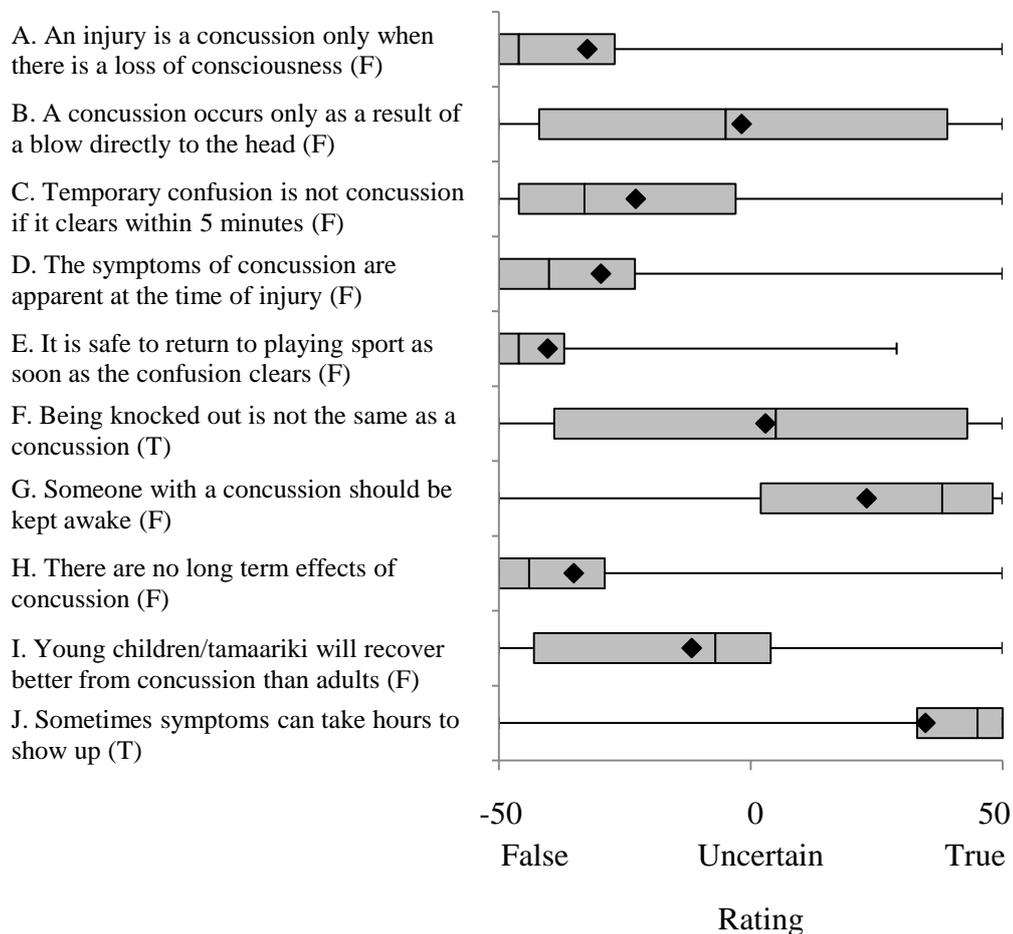
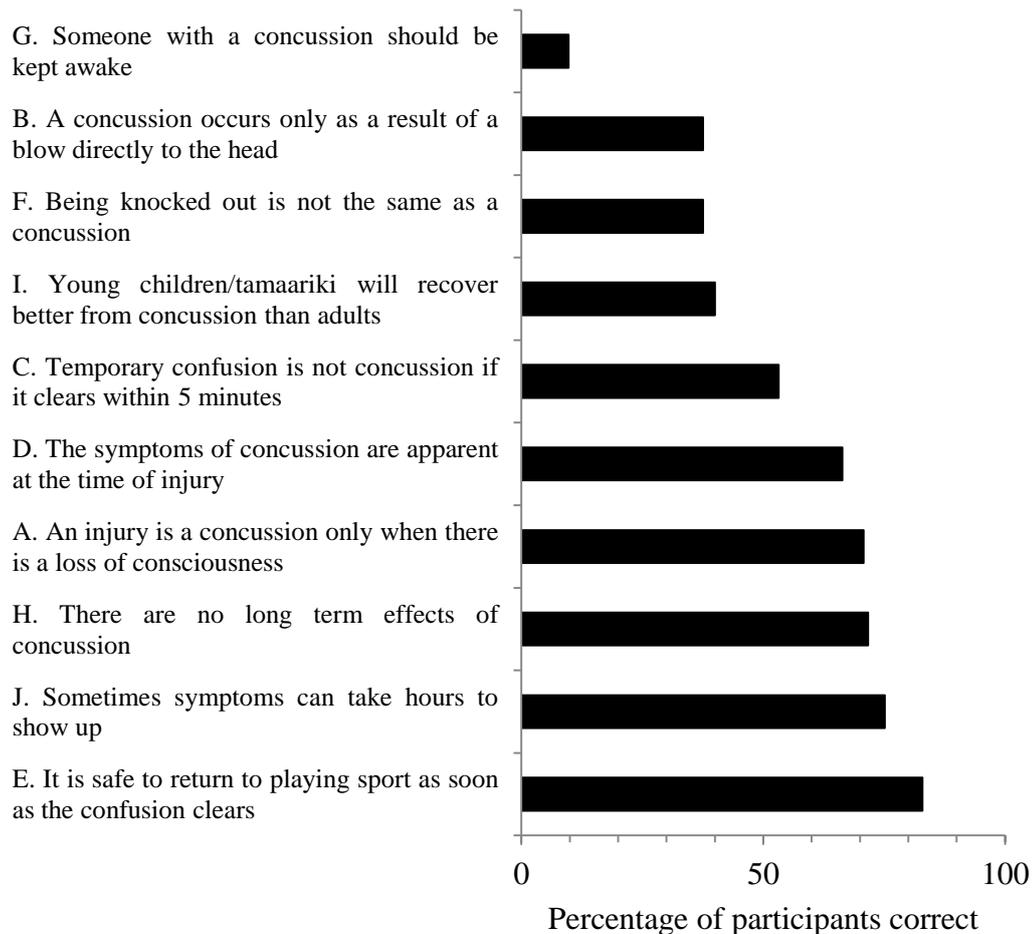


Figure 6. Level of agreement among participants ( $N = 205$ ) for each concussion statement (Whiskers indicate the maximum and minimum, the box indicates upper and lower quartiles, and the diamond indicates the mean).

Participants were most certain about statement E: “It is safe to return to playing sport as soon as the confusion clears”, and the disagreement among participants about this statement was the lowest for all the statements. Participants also showed high certainty and low disagreement that statement H: “There are no long term effects of concussion” and statement A: “An injury is a concussion only when there is a loss of consciousness”, were false, and that statement J: “Sometimes symptoms can take hours to show up” was true. Participants had similar, low, levels of certainty about statements B, F and I, and these statements also had the greatest level of variability in ratings. However, the distribution of ratings for Statement I was quite different from that for B and F, with the majority of the ratings falling below 50 for Statement I, compared with approximately half falling on each side of 50 for statements B and F.

Certainty about answers does not necessarily imply that answers are correct, so the number of participants answering correctly for each statement was analysed. A correct answer was defined as a rating which fell within 20 points of the correct end of the line. Figure 7 shows the percentage of participants who answered each statement correctly.



*Figure 7.* Percentage of participants answering each concussion statement correctly ( $N = 205$ ).

No statement was answered correctly by all of the participants. Most participants knew that it is not safe to return to sport as soon as the confusion clears (Statement E) and that the symptoms of concussion can take hours to show up (Statement J). The majority of participants answered incorrectly about Statement G, indicating their belief that it is important to keep someone with a concussion awake. Interestingly the agreement among participants about this statement, as shown in Figure 6, was quite high, showing that there is widespread belief in this concussion ‘myth’.

About 70% of participants recognised that it is possible to have a concussion without a LOC, which is consistent with the findings on symptom knowledge, where several other symptoms of brain injury were endorsed at nearly as high a level as LOC.

***Predictors of concussion knowledge.*** There was a moderate and significant correlation between the total number of concussion statements answered correctly and the total number of correct symptoms endorsed by participants,  $r = .32, p < .001$ . This finding suggests that participants who have better knowledge about the symptoms of TBI also have better knowledge about other aspects of these injuries and vice versa.

Multiple regression analysis revealed that only two variables were significant predictors of the total number of concussion statements answered correctly. Table 7 shows the regression model.

Table 7

*Regression Analysis of Predictors of Concussion Knowledge*

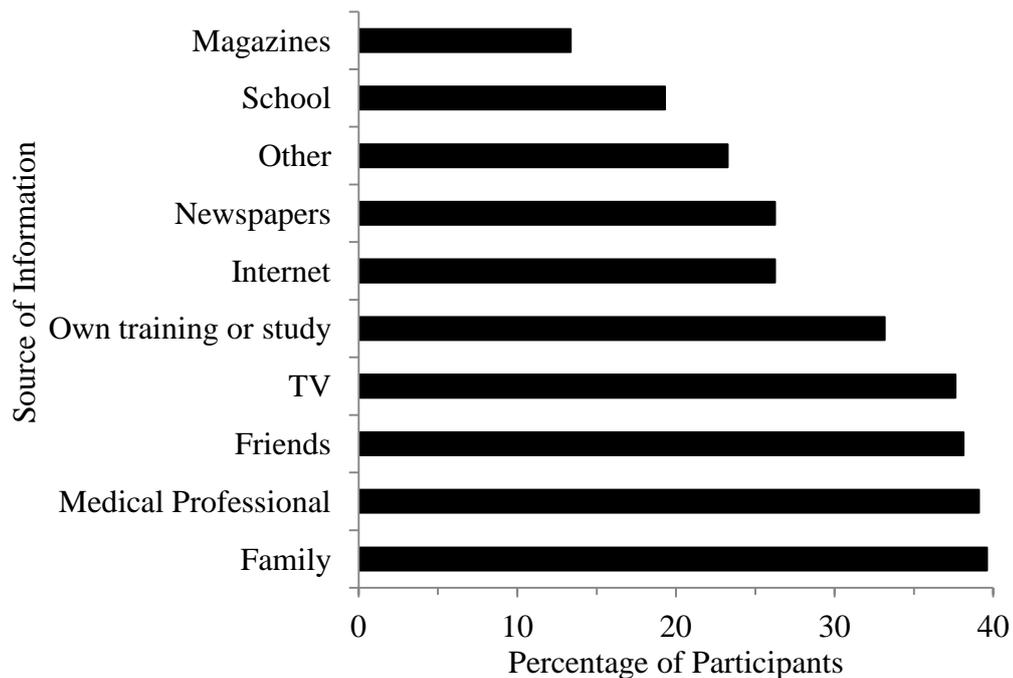
Variable	Total Concussion Correct		
	<i>B</i>	<i>SE B</i>	$\beta$
Constant	3.54	1.08	
Brain Injury Experience	0.16	0.37	.03
<b>Concussion Experience</b>	<b>0.97</b>	<b>0.43</b>	<b>.17*</b>
Pasifika vs. Māori	-0.27	1.23	-.02
<b>Other ethnicity vs. Māori</b>	<b>1.24</b>	<b>0.48</b>	<b>.20*</b>
Education	0.17	0.43	.03
Gender	-0.16	0.34	-.03
Occupation	0.65	0.63	.08
Participant age	-0.00	0.02	-.00
First aid training	-0.19	0.35	-.04
$R^2$	.091	( $p = .029$ )	

*Note.* \* $p < .05$ , **bold** indicates significance

The model predicted 9.1% of the variance in the total number of concussion statements answered correctly. Personal experience or knowing someone with a concussion was a significant predictor, with those having experience answering more concussion questions correctly. This explained 2.4% of the variance. Having a prioritised ethnicity of Other compared with Māori was also a significant predictor, with Māori answering fewer concussion questions correctly. This predicted 3.1% of the variance. None of the other demographic

variables were significant predictors of the number of concussion questions answered correctly.

**Sources of information.** Figure 8 shows the percentage of participants who obtained their knowledge about TBI from various sources. Percentages sum to more than 100% because people could choose more than one option.



*Figure 8.* Percentage of participants ( $N = 205$ ) that obtained their information about TBI from various sources.

No source was endorsed by more than 40% of the participants. Family, friends and medical professionals were the most common sources mentioned by participants. ‘Other’ sources of information included own or life experience, employment and rugby clubs.

The mean number of symptoms correctly endorsed and the mean number of concussion statements answered correctly by participants endorsing each source of information is shown in Table 8.

Table 8

*Mean Number of Real Symptoms Endorsed and Concussion Statements Answered Correctly for Participants Endorsing Particular Information Sources*

Source of information	Symptoms endorsed <i>M (S.D.)</i>	Concussion statements correct <i>M (S.D.)</i>
Family	20.4 (5.6)	5.1 (2.2)
Medical Professional	20.7 (5.7)	5.4 (2.3)
Friends	19.8 (6.1)	5.0 (2.4)
TV	20.2 (5.5)	5.1 (2.3)
Own training or study	21.0 (5.5)	6.0 (2.2)
Internet	20.4 (5.6)	5.5 (2.2)
Newspapers	21.3 (4.9)	5.7 (2.1)
Other	19.1 (6.6)	5.3 (2.2)
School	19.6 (4.5)	5.1 (2.3)
Magazines	21.3 (5.0)	5.0 (2.1)

The mean number of symptoms correctly endorsed ranged from 19.8 to 21.3, suggesting that particular sources of information did not markedly affect symptom knowledge. A similar pattern was seen for the correct answers to concussion questions. Most participants endorsed more than one source of information, which could explain why there is little difference in knowledge across sources.

There was a small positive correlation between the total number of sources of information a participant endorsed and the total number of symptoms endorsed,

$r = .21, p = .003$ . The total number of sources was not correlated with the number of concussion statements answered correctly.

## **Discussion**

The aim of this study was to investigate the knowledge of NZ caregivers of primary and intermediate age children with respect to TBI terminology, TBI symptoms and concussion management. Due to limitations of space, discussion of the results has been restricted to areas where knowledge is particularly lacking or where there is potential for intervention.

**Terminology.** This section investigated to what extent NZ caregivers believed concussion to be a brain injury. Between one quarter and two thirds of participants had a mismatch in their answers to questions about experiencing a concussion and experiencing a brain injury, depending on who they were talking about as having had the concussion. People who were referring to their own concussion were more likely to have a mismatch in terminology than those who were referring to a concussion in other people. These findings indicate that there is a high level of misunderstanding among caregivers that concussion is actually a brain injury. Further, as mentioned previously, the survey could in fact be underestimating the level of confusion, as it is not possible to tell from the data whether those who said yes to both concussion and brain injury were in fact reporting the same injury, or even talking about the same person in the case of the questions about children and other adults.

These findings are similar to those seen in the general public in NZ, where 59% of those who said yes to having a concussion said no to having a brain injury using the same question design as the current study (McKinlay et al., 2011).

Mannings, Kalynych, Joseph, Smotherman, and Kraemer (2014) also found that, when asked about it directly, two-thirds of parents of US children who played tackle football did not agree that concussion is considered to be a mild TBI. This similarity in findings suggests that the high degree of misunderstanding found is not just an artefact of the way the questions were asked in McKinlay et al. (2011) and the current study. In contrast to caregivers and the general public, speech language therapists were more confident that concussion was a brain injury, with 93% agreeing that it was (Duff & Stuck, 2015). This difference may be due to training. Given the previous findings about differences in both hypothetical outcome expectations, and real-life actions and outcomes, depending on whether the concussion or brain injury label was applied, it would seem that it would be helpful for those informing the public to provide a consistent and accurate message about the relationship between concussion and brain injury (DeMatteo et al., 2010; Gordon et al., 2010; K. Sullivan et al., 2014; Weber & Edwards, 2010).

**Symptom knowledge.** NZ caregivers were reasonably knowledgeable about the signs and symptoms of TBI, although none of the symptoms were endorsed by all of the participants, and no participant correctly endorsed all 29 of the possible symptoms. To facilitate comparison with the results of previous studies, Table 9 summarises the top five symptoms endorsed or recalled by a variety of groups of people who might have influence over the treatment of head injury in young people.

Table 9

*Top Five Symptoms of TBI/Concussion Endorsed or Recalled by Various Sample Groups*

Sample group	Reference	Symptom 1	Symptom 2	Symptom 3	Symptom 4	Symptom 5
Caregivers of 5-13 year olds (NZ)	Current study <sup>2</sup>	LOC	headache (acute)	dazed/ confused	memory loss	headache (chronic)
Parents of hockey players (Canada)	(Coghlin et al., 2009) <sup>2*</sup>	headache = difficulty with memory	feeling nauseous = inability to describe time and place = drowsiness/fatigue = dizziness	vision problems = difficulty concentrating = slurred speech = feeling dazed/in a fog	increased sleeping	ringing in the ears
Youth (8-14 years) coaches (US)	(Valovich McLeod, Schwartz, & Bay, 2007) <sup>2</sup>	confusion	dizziness	LOC	headache	amnesia
AFL and RL community coaches (Australia)	(White et al., 2014) <sup>2</sup>	balance problems = blurred vision = dizziness = headache	confusion = memory loss = nausea/vomiting = not feeling right	pressure in head = difficulty concentrating = LOC	feeling like 'in a fog' = feeling tired	seizures
High school football coaches (US)	(Guilmette, Malia, & McQuiggan, 2007) <sup>1</sup>	confusion/ disorientation	dilated pupils	headache	loss of memory	not reported
Parents of rugby players (NZ)	(S. J. Sullivan et al., 2009) <sup>1</sup>	headache	balance problems/dizzy	nausea or vomiting	feeling like 'in a fog'	failing neurological screening

*Note.*\*LOC not included in checklist; <sup>1</sup>Free recall design; <sup>2</sup>Symptom checklist design

The most commonly endorsed symptom in the current study was LOC, endorsed by over 96% of participants. However, LOC, although sufficient, is not necessary for diagnosis of a TBI. It is therefore reassuring to see that there was only a small discrepancy between the percentage of participants endorsing this symptom and the next most common: dazed and confused; memory loss; and headache, of which the first two are also sufficient diagnostic criteria according to the WHO definition of TBI (Carroll, Cassidy, Holm, Kraus, & Coronado, 2004). Taken together with the results from the concussion statement question, in which 70% of the participants knew that a concussion could be diagnosed even in the absence of LOC, this suggests that not all NZ caregivers are aware that a child could have a TBI, even if they have not been knocked out.

LOC was among the top five symptoms endorsed in other studies which used symptom checklist format questions (Valovich McLeod et al., 2007; White et al., 2014), but not in free recall study designs (Guilmette et al., 2007; S. J. Sullivan et al., 2009). In other studies of caregivers which asked directly about whether concussion/TBI could be diagnosed without LOC, Coghlin et al. (2009) found that 76% of participants and S. J. Sullivan et al. (2009) found that 95% of participants knew that a concussion could be diagnosed without LOC. Responses for sports coaches ranged from 49% to 98% answering this correctly (Guilmette et al., 2007; Valovich McLeod et al., 2007; White et al., 2014). There appears therefore to be a wide range of the percentage of participants who know this fact, depending on the sample characteristics. The combined findings suggest that it is useful to continue to educate caregivers to ensure that head injuries are taken seriously even in the absence of LOC.

Table 9 shows that the top five symptoms other than LOC are very similar across sample groups in both checklist and free recall designs, and are consistent with the findings of the current study. This suggests that the main symptoms are well understood across groups of people with influence over the potential medical treatment of children with TBI.

Participants' knowledge of physical and cognitive symptoms of TBI was better than their knowledge of behavioural symptoms. Other studies also suggest that behavioural symptoms tend to be less well recognised by parents (Coghlin et al., 2009; Mannings et al., 2014; S. J. Sullivan et al., 2009). The lack of knowledge of behavioural symptoms could be because they occur at a lower frequency in people who have experienced a TBI, or alternatively because less information is provided about these symptoms in educational literature or other information sources. There is some empirical evidence that behavioural/emotional symptoms occur in fewer children than do physical and cognitive symptoms (Stevens et al., 2010; Zemek et al., 2013). There is little information in the scientific literature about the relative coverage of behavioural symptoms in information sources available to the general public. Studies on hospital discharge pamphlets for TBI are inconsistent, with one finding that behavioural symptoms were mentioned in as many pamphlets as the other types (Kempe, Sullivan, & Edmed, 2014), and another finding that emotional symptoms were mentioned in only half as many pamphlets as were physical and cognitive symptoms (Boddé, Scheinberg, & McKinlay, 2015).

Because early intervention in behavioural problems has been shown to prevent them from leading to greater problems in later life, it is important that they are identified and addressed where necessary (Kutcher et al., 2004). Better

knowledge among caregivers about the possibility of longer term behavioural symptoms post-TBI could help ensure that problems are identified early, and would be a good target for education.

In summary, although NZ caregivers have a fairly good knowledge of symptoms of TBI, they have a lower level of knowledge of the chronic symptoms and of behavioural symptoms, either acute or chronic. Further education efforts would be beneficial in these areas to ensure that all sequelae of TBI are noticed and followed up if necessary. The results of the regression analysis did not suggest that there would be any necessity to target this education to particular demographic groups, so a universal approach would be beneficial.

**Concussion knowledge.** When presented with a list of statements about concussion, participants varied widely in their belief of whether the statements were true or false. This part of the study was a replication in a different sample of a study by McKinlay et al. (2011), and the overall profile of responses was almost identical to that found in their earlier research.

Of particular interest as a potential target for intervention is the knowledge about returning to play sport after a mild TBI/concussion. In the current study, two-thirds to three-quarters of the participants knew that it is possible for symptoms of concussion to emerge after some time, depending on the wording of the statement. Despite only a small majority of participants in the current study (53%) knowing that temporary confusion lasting less than five minutes still counts as concussion (Statement C), participants showed good knowledge (83% correct) that people should not return to sport as soon as the confusion clears (Statement E). Similarly, over 95% of parents, 87% of physicians and nurse practitioners and 63-93% of coaches knew that young players should not return to play the same

day after having a concussion (Coghlin et al., 2009; Guilmette & Paglia, 2004; Valovich McLeod et al., 2007; White et al., 2014; Zemek et al., 2014).

Taken together, these results suggests that the message of the necessity for discontinuing play and monitoring for symptoms over a period of time after a brain injury, however minor it may seem at the time, is fairly well understood by caregivers. However there is still room for improvement, with 27% of participant answering incorrectly that it is safe to return to play as soon as the confusion clears. As found for symptom knowledge, the results of this study do not suggest that there would be any value in targeting education about mild TBI/concussion management to particular demographic groups, but that a more universal approach would be just as useful.

**Sources of information.** Participants endorsed all of the information sources listed although less than half of the sample obtained information from any one particular source. This is somewhat consistent with other studies (Block et al., 2014; R. C. G. Chapman & Hudson, 2010; Gouvier et al., 1988; Rosenbaum & Arnett, 2008). Symptom knowledge was slightly associated with the number of sources that a participant endorsed. This could suggest that participants who get their information from a wider range of sources get exposure to information about a greater number of symptoms. Due to the wide range of sources people access, it is important that information is accurate and consistent across sources, to reduce the potential for confusion and improve the accuracy of people's knowledge.

**Limitations and strengths.** One limitation of this study is that very few of the participants in this study had children who did not play any sport. It is estimated that 60% of NZ children are involved in some kind of organised sport (Maddison, Pfaeffli Dale, Marsh, LeBlanc, & Oliver, 2014) so the sample may not

be representative of caregivers of children who don't play sport. In addition, the face-to-face questionnaire data were mostly collected at sports venues so the caregivers who answered were limited to those who were able to attend their children's events.

Educational attainment in this sample was somewhat higher than the national figures with over 99% of the sample having at least a secondary level education compared with 78.1% in the overall NZ population in 2014 (Statistics New Zealand, 2015). There were no links between education level and any of the knowledge variables, but the segment of the NZ population with a maximum of a primary school level education were essentially unrepresented in the sample. Inclusion of this segment may have affected the relationship between education and knowledge.

The data collected in the study was only about knowledge, not about intentions or actual behaviour. Although knowledge is an important factor in models of health behaviour, it is not the only factor, so it cannot be assumed that the reasonable knowledge of participants seen in the study would translate into appropriate actions if their own child presented with the symptoms listed.

Despite these limitations, a strength of this study is that it is the first to examine the knowledge of a general population of NZ caregivers, as opposed to only parents of rugby players. The collection of demographic and other predictor variable information along with the knowledge variables has provided useful information on whether it is necessary to target education.

In conclusion, NZ caregiver knowledge of TBI terminology, symptoms and facts about concussion is far from perfect, and further education efforts are needed to ensure that all children experiencing a TBI are adequately investigated

and monitored. Education efforts around symptoms should target the fact that LOC is not necessary for a mild TBI/concussion to have occurred. Increased effort should go into informing parents about potential behavioural problems so caregivers are aware of these and can act early to prevent these from escalating into possible psychopathology.

The results of this study did not suggest that there was a need to target particular demographic groups for education, and that a universal approach would be better. Because people obtain their knowledge from a wide range of sources, it is important that all sources present accurate information. Chapter 3 examines how much information is available to the public from one particular source, newspaper articles.

### **Chapter Three: Media Analysis**

Chapter 1 discussed the fact that media form an important part of the lay public's strategies for obtaining health information in many areas (Nagler et al., 2010). Research has shown links between the amount of attention paid by consumers to health information in media sources and their knowledge about (for example) causes of cervical cancer; diabetes; and recommended fruit and vegetable intakes (Kelly, Leader, Mittermaier, Hornik, & Cappella, 2009; Thompson et al., 2011; Zhao, 2014). The amount of coverage in newspapers is also important. Stryker, Moriarty, and Jensen (2008) found that people had better knowledge of cancer prevention behaviours which had greater newspaper coverage than of those with less coverage.

Media are also an important source of information for the public in the TBI area. In a study of public understanding of TBI, Gouvier, Prestholdt and Warner (1988) found that 33% of participants cited newspapers as a source of information, which was similar to the percentages citing television (33%), discussions with friends and family (33-42%) and discussion with professionals (42%) as sources. A study of high school athletes in the US found that 10.9% of athletes questioned reported that media was an important source of their TBI knowledge (Rosenbaum & Arnett, 2008). In a sample of the British general public, 38% of the participants said they had obtained their knowledge of TBI from media (R. C. G. Chapman & Hudson, 2010). In a study of US Army veterans and their significant others, 21.1% of veterans and 31.3% of their family members had obtained information about brain injury by reading newspapers, compared with about 27-28% obtaining information from family members and 25-30% from

talking to a medical professional (Block et al., 2014). The survey of NZ caregiver knowledge, reported in Chapter 2 of this thesis, showed similar results to those described above.

The studies reviewed above suggest that newspapers are one significant source of public information about TBI. Newspapers also form an important part of people's media consumption. Over half a million copies of various daily newspapers are circulated per day in NZ (New Zealand Audit Bureau of Circulation, n.d.) and it is estimated that at least two people read each copy (Roy Morgan Research, n.d.) leading to an estimated total of about one quarter of the NZ population reading a newspaper each day. It is also important to note that general interest media such as newspapers are likely to be a major source of information that most people receive in advance of a personal experience of TBI, unless they receive specific training in the area. Because it is an important source of information, it is crucial that the facts presented about TBI in the print news media are accurate.

Studies of other health issues have shown that both the completeness and the accuracy of information in print media are variable. For example, a study of print media reporting on the use of male circumcision to prevent HIV infection in sub-Saharan African countries found that the 15 key messages on this topic were reported in between 1.4 to 85% of articles in the sample. Where a message was actually mentioned, between 42-100% of the articles presented accurate information (Wang, Duke, & Schmid, 2009). In an Australian study of newspaper articles about the introduction of widespread human papilloma virus (HPV) vaccination, it was found that most references to key facts were accurate, but that

the most frequently reported fact was mentioned in only 57% of articles (Robbins, Pang, & Leask, 2012).

All the published studies which report on the presence or accuracy of information about TBI in media are investigations of various internet-based media such as Facebook (Ahmed, Sullivan, Schneiders, & McCrory, 2010), websites (Ahmed, Sullivan, Schneiders, & McCrory, 2012), YouTube (Williams et al., 2014), and Twitter (S. J. Sullivan et al., 2012). No information was found in the existing literature about the presence or accuracy of information about TBI in the print media. Given the importance of print media this is a gap in the literature which needs to be filled to improve our understanding about the information which is available to the general public. Therefore one aim of the research reported in this chapter was to investigate the potential for newspapers to inform the public on the knowledge questions examined in Chapter 2, about the terminology used for TBI, its symptoms and facts about concussion.

In addition to the importance of accuracy of information, the broader context of articles in which health issues are presented may have an effect on health behaviours. For example, an experiment in a laboratory setting by Coleman, Thorson and Wilkins (2011) showed that how stories are framed could cause changes to people's support for policy change and intention to change their own health behaviours. A story which had more information about societal impacts on a health condition made people both more supportive of policy change, and more likely to report an intention to change their behaviour, than one that focussed on individual responsibility for health.

Another example of how the context in which information is presented may affect behaviour is the studies which have investigated the effects of

reporting of celebrity diagnoses on health behaviours and have shown increases in breast and colon cancer screening as a result of media coverage (S. Chapman, McLeod, Wakefield, & Holding, 2005; Cram et al., 2002). This phenomenon has also been noted in the TBI field, where the reporting of the death of a Canadian actor from a head injury was associated with a significant increase in visits to the Montreal Children's Hospital emergency room (Keays & Pless, 2010).

In addition to the inferred relationship between coverage of health issues and health behaviours described above, media may also both reflect and influence broader societal attitudes and values towards an issue (Hodgetts & Chamberlain, 2006). Simply looking at the information content of a newspaper article is not sufficient to uncover the attitudes towards an issue that are implied by the article (Richardson, 2007). George Gerbner's cultivation theory of media influence proposes that the overall pattern of media coverage on an issue can promote specific values and norms (Morgan & Shanahan, 2010). Although originally developed in an attempt to explain the effects of television, Gerbner's theory has also been investigated empirically in the field of newspapers (Liu, 2006; Lubbers, Scheepers, & Vergeer, 2000). Michel Foucault's theories also consider the way in which dominant societal discourses may open up or close down potential avenues for action (Willig, 2008), such as seeking medical attention after a traumatic brain injury or withdrawing from risky activities.

Several previous studies have investigated TBI in the print media from this perspective. These have mainly focussed on TBI in sport. E. Anderson and Kian (2012) looked at sport media coverage of a US National Football League player's self-withdrawal from play due to a concussion. They found that in the reporting on this incident there was emerging support from the media for players to focus

on their own health rather than upholding a ‘masculine warrior narrative’ which supported playing on after injury. This was seen to be a change from the previous support of media for hegemonic masculinity (E. Anderson & Kian, 2012).

McGannon, Cunningham, and Schinke (2013) also investigated coverage of a key media incident in order to explore the construction of TBI in newspaper reports, in this case a concussion sustained by a Canadian National Hockey League player. As in the E. Anderson and Kian (2012) study, it was found that the media coverage problematized rather than accepted the ‘culture of risk’ narrative in which players are expected to take the hits and return to play (McGannon et al., 2013). The media reports examined in McGannon et al.’s research did not question the player’s masculinity as a result of his decision not to play: on the contrary, he was held up as an example of what can go wrong when hegemonic masculinity norms of playing through pain are adhered to.

In contrast to the two studies above, Cusimano et al. (2013), in an analysis of the reporting in North American newspapers of TBI in ice hockey, found acceptance within media reports that the aggression that results in TBI is integral to the game, and that the risk of TBI is an occupational hazard for professional players. This acceptance persisted across time from 1998 to 2011. However, their analysis also revealed a trend of increased reporting on the potential long-term effects of TBIs and the necessity for rule changes to decrease risk. The authors suggest that this juxtaposition of contradictory views has the potential to cause confusion about TBI in media consumers.

The portrayal of TBI in print media in NZ has not been reported in the literature to date. The only study found on NZ media and TBI investigated the portrayal of concussion in televised professional rugby league games (McLellan

& McKinlay, 2011). This study found that of 20 identified incidences of probable concussion, 60% of players were shown as either continuing to play, or as returning to play later in the game, which is contrary to published guidelines for concussion management (McCrory et al., 2009). Reframed through the discourse analysis lens described above, the majority of portrayals identified in McLellan and McKinlay's (2011) research supported rather than problematized the discourse of it being acceptable to play on while concussed. Though it was not investigated directly, the authors speculate that observing these events in professional sports broadcasts might lead to other, particularly younger, players' resistance to following guidelines for injury management. Due to the absence of information about the portrayal of TBI in NZ print media, it was of interest to investigate the broader thematic content of NZ newspaper articles about TBI in addition to their TBI information content.

The purpose of the current study was to investigate the potential for NZ newspaper articles to contribute to the public's understanding of TBI. The first three research questions in the media analysis paralleled the research questions about knowledge of terminology, symptoms and facts about concussion in parents of NZ children reported in Chapter 2. The fourth question aimed to obtain a better understanding of the context in which the information about TBI in newspaper articles was presented.

The following specific research questions were addressed:

1. What terminology is used in NZ newspapers to describe traumatic brain injury?
2. Are brain injury and concussion treated as the same thing or as different entities?

3. What symptoms of TBI are most commonly reported in newspapers?
4. What information do newspapers provide relating to facts about concussion and how accurate is it?
5. What is the broader context of articles in which the information about TBI is presented?

The method and results are presented separately for the questions investigating the presence and accuracy of information and the question examining contextual factors, with a combined discussion section.

### **Presence and Accuracy of Information about TBI**

**Method.** NZ newspaper articles published in 2009 and 2014 were analysed to answer the research questions concerning traumatic brain injury.

***Data retrieval and management.*** Newspaper articles for analysis were retrieved from the Newstext Plus database<sup>1</sup>. This database indexes all the major newspapers in NZ. The search terms ‘concussion’, ‘brain injury’ and ‘head injury’ were used to search the database. As the database search engine has an automatic stemming function, derivatives of the search terms did not need to be entered separately. For brain injury and head injury the “~5” qualifier was included to ensure that articles where the terms were not consecutive were also retrieved, such as those which contained the text string ‘brain, leg and spinal injuries’.

The time periods from which articles were retrieved were January to June in 2009 and 2014. The 2014 period was chosen so that the article publication dates preceded the start of data collection for the survey of caregiver knowledge

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<sup>1</sup> <http://www.knowledge-basket.co.nz.ezproxy.waikato.ac.nz/databases/newztext-uni/search-newztext/>

described in Chapter 2. The 2009 time period was chosen because it paralleled the 2014 period; because it preceded data collection for McKinlay et al.'s (2011) survey of public knowledge of head injury in NZ; and because it preceded the launch of the BIONIC population-based study of TBI in NZ in 2009, which could potentially have increased coverage of traumatic brain injury.

An initial search of the six-month period from January to June 2014 retrieved too many articles to analyse, so the sample size was reduced by sampling only one week of each month over the six months. The week of the month to be sampled was chosen randomly. The final dataset (Data Set 1) consisted of articles published on the 7<sup>th</sup> to 13<sup>th</sup> of each month, from January to June, in 2009 and 2014. There were 187 articles retrieved from 2009 and 416 from 2014. In order to estimate the total number of articles published during the period of interest, an additional search was carried out over the same time periods using the search term 'the', which could reasonably be expected to be found in almost all articles published in English.

Search results consisting of date of publication, source, and title were copied into Microsoft Excel for further analysis. The full text of all articles was retrieved and copied as plain text into Microsoft Word. Each article was assigned a unique identifier for ease of searching and analysis, and these were added as headings to the Word document. The Find and Replace function of Word was used to highlight 'concuss', 'brain', and 'head inj' in different colours and fonts so the key terms could be easily identified within the body of the text.

Data Set 1 and its subsets were used to answer the various research questions about the presence and quality of information about TBI. Figure 9 shows a flow chart of the various data sets used in the media analysis.

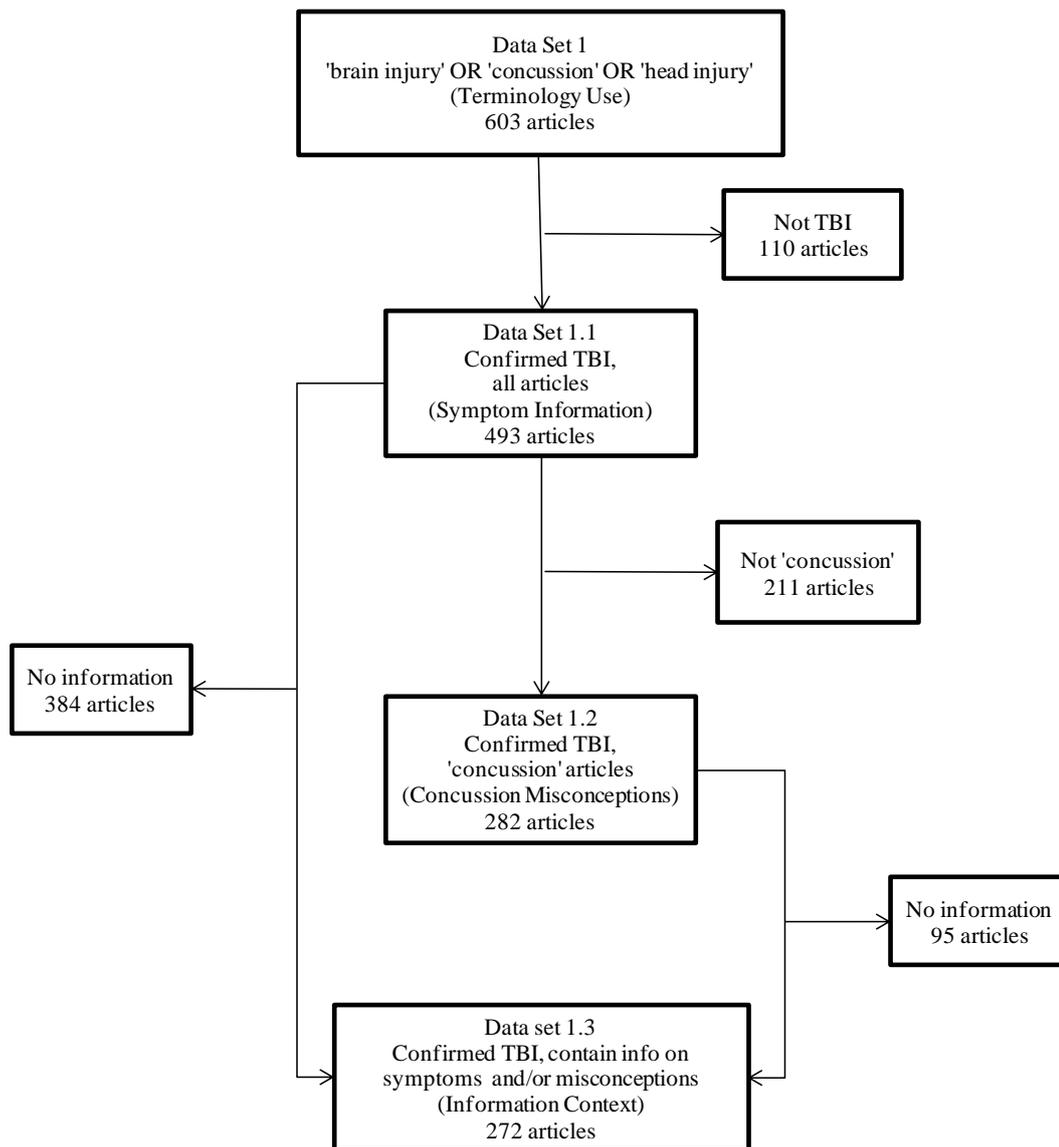


Figure 9. Flow chart showing data sets used for media analysis.

To investigate how the various terms for TBI that are used in lay parlance and medical terminology, i.e. brain injury; concussion; and head injury, were used in newspaper articles, all of the articles in Data Set 1 were used. Due to the very small number of articles containing both ‘concussion’ and ‘brain injury’ terms in Data Set 1, a second data set consisting of the entire population of newspaper articles published in 2009 and 2014 containing both terms (Data Set 2) was retrieved to use for the analysis of whether brain injury and concussion were implied to be the same or different things by newspaper articles. In order to ensure

no articles were missed in this search, the broad search string ‘concussion AND brain’ was used, and articles where the ‘brain’ term did not relate to traumatic brain injury were subsequently excluded. The final numbers of articles in Data Set 2 were 14 in 2009 and 85 in 2014.

To investigate the presence of symptom information, articles from Data Set 1 which were not confirmed to be about TBI (see Coding section for details of coding decisions) were removed. The remainder formed Data Set 1.1. This consisted of 147 articles from 2009 and 346 from 2014 and was used to code for symptom information presence.

To investigate the presence and accuracy of information about concussion, articles which did not contain the term ‘concussion’ were removed from Data Set 1.1 and the remainder, Data Set 1.2, was used for this analysis. Data Set 1.2 included articles where multiple TBI terms were used, provided that ‘concussion’ was one of the terms. Data Set 1.2 comprised 62 articles from 2009 and 220 from 2014. A list of all articles with ID code, data set membership, date, source and title is provided in Appendix 2.

**Coding.** All articles in Data Set 1 were read to determine whether the article referred to TBI. Articles containing ‘concussion’ or ‘brain injury’ were coded as ‘not TBI’ where it was apparent that TBI was not the subject of the article. For example, some of these referred to the use of ‘concussion plates’ in horse racing, or to congenital brain injury or brain injury through stroke. Articles containing head injury were carefully checked because this is a broader term, and people may sustain an injury to the head, such as a scalp laceration, without experiencing a TBI. A journalist confirmed that owing to the desire of newspapers to avoid jargon, head injury tends to be used as a synonym for TBI as well as for

less serious injuries to the head (A. Aitken Worth, personal communication, January 11, 2015). Articles where it was clear from the context that a TBI had occurred, such as the inclusion of TBI symptoms, were coded as ‘TBI’, as were those articles referring to serious or critical head injuries or where it was reported that the victim had died of head injuries. Articles where it was not clear that a TBI had occurred or was referred to were coded as ‘not TBI’. Coding of ‘head injury’ articles was checked by a second coder who was trained on all processes, and differences were resolved by consensus.

The section of the newspaper in which each article was published was noted. For some newspapers, this information was included with the full-text article retrieved from Newstext Plus. Where the information was not included, the section was inferred from the content of the article. Articles were coded as Sport, News or Other. ‘Other’ included editorials, letters to the editor and opinion columns.

The terminology used in articles was coded to determine the numbers of articles which contained the terms ‘concussion’, ‘brain injury’ and ‘head injury’, either singly or in the various combinations of the three terms. Separate codes were used for single terms in articles that did and did not refer to TBI, e.g. either a ‘concussion-TBI’ or ‘concussion-not TBI’ code was assigned to articles containing the search term ‘concussion’.

Articles in Data Set 2 were coded according to whether they implied that brain injury and concussion were the same thing or different. Table 10 shows some examples of text that treated the two terms as the same or as different. This coding was checked independently by a second coder who was trained on all

processes, and differences were resolved by consensus. The number and percent of articles in each category were calculated.

Table 10

*Examples of Text Implying that Concussion and Brain Injury are the Same or Different*

Different	Same
<i>“Serious injuries include spinal and brain injury, fractures, concussion”</i> (715)	<i>“since being concussed ...symptoms that accompany such brain injuries”</i> (744)
<i>“primary diagnosis of concussion or brain injury”</i> (742)	<i>“Concussion is actually a brain injury...”</i> (724)
	<i>“concussion (which is, really, just a polite word for a brain injury)”</i> (789)

*Note.* Numbers in brackets refer to the identification number of the newspaper article. See Appendix 2 for details of articles referenced.

All articles in Data Set 1.1 were read and coded for the presence of references to acute and chronic symptoms of TBI. The list of symptoms used corresponded to those used in the questionnaire on parental knowledge and is shown in Table 2 (Chapter 2). The symptom list was derived from the child inclusion criteria used in the BIONIC study, and from the Rivermead Post-Concussion Syndrome Questionnaire (King et al., 1995; Theadom et al., 2012).

The presence or absence of each individual symptom; of one or more physical symptoms, cognitive symptoms, and behavioural symptoms; and of any symptoms at all, was coded. Both direct and indirect references to symptoms were coded as the symptom being present. For example, for the symptom of memory loss, references to ‘*amnesia*’; ‘*has no idea how he got there*’; and ‘*remembers*

*nothing of the assault*' were all coded as the symptom of memory loss being present. For each article, total number of symptoms and the numbers of physical, cognitive and behavioural symptoms mentioned were summed, and the percentage of symptoms mentioned out of the possible symptoms in each category was calculated to allow comparisons between symptom types.

The presence and accuracy of information in the articles that contained the term 'concussion' (Data Set 1.2) was coded based on the ten statements about concussion used in the caregiver knowledge questionnaire, shown in Table 11.

Table 11

*Statements about Concussion*

- 
- A. An injury is a concussion only when there is a loss of consciousness
  - B. A concussion occurs only as a result of a blow directly to the head
  - C. Temporary confusion is not concussion if it clears within 5 minutes
  - D. The symptoms of concussion are apparent at the time of injury
  - E. It is safe to return to playing sport as soon as the confusion clears
  - F. Being knocked out is not the same as a concussion
  - G. Someone with a concussion should be kept awake
  - H. There are no long term effects of concussion
  - I. Young children/tamariki will recover better from concussion than adults
  - J. Sometimes symptoms can take hours to show up
- 

For each statement the articles were coded as 'absent' if there was no information relating to that statement, 'correct' if information was present and accurate, and 'incorrect' if information was present and inaccurate. Both direct

and indirect (implied) information was counted as present. Table 12 shows examples of indirect references to accurate and inaccurate information about two of the concussion statements.

Table 12

*Examples of Information about Concussion Statements in Newspaper Articles*

Concussion statement	Accurate information	Inaccurate information
It is safe to return to playing sport as soon as the confusion clears	<i>“The French centre was knocked out and covered in blood in a Top 14 semifinal last month. He left the pitch in a groggy state, but he was back 14 minutes later, at the urging of his Toulouse coach... Former International Rugby Board medical adviser Dr Barry O’Driscoll slammed it [the decision] as ‘irresponsible’.” (524)</i>	<i>“the Rabbitohs constructed five tries in 19 minutes despite losing ... Jason Clark temporarily to concussion.” (544)</i>
There are no long term effects of concussion	<i>“his prolonged battle with concussion” (576)</i>	<i>“ ‘Everything I have been told and all the research is that you can recover fully . . . ‘The knocks I have had have been pretty significant and I have recovered pretty quick, which is what you would expect.’ ” (131)</i>

This coding was also checked independently by a second coder and differences wereresolved by consensus. The presence or absence of information relating to any of the concussion statements was coded in an additional

dichotomous variable. The total number of statements mentioned in each article was also calculated.

The presence of any type of information, either symptoms or concussion statements, was coded as a dichotomous variable.

**Analysis.** Chi-squared analysis was used to determine whether there were significant associations between categorical variables such as year of publication, presence of information, newspaper section and terminology used. Fisher's Exact Test was used to correct the test statistic where the calculated expected values in cells were less than five.

Due to the non-normal distribution of the data, non-parametric statistics were used to determine whether there were significant differences between groups for continuous variables such as the number of symptoms and number of concussion statements mentioned. Mann-Whitney tests were used to analyse the effect of year of publication on numbers of symptoms and concussion statements referred to. Friedman's Analysis of Variance (ANOVA) was used to examine whether there was a significant difference in the numbers of different symptom types mentioned.

### **Results.**

**Terminology.** The first research question was about what terminology is used by NZ newspapers to describe TBI. Articles using TBI terms comprised 0.62% and 0.79% of the total articles published within the 2009 and 2014 time periods respectively. Although the total number of articles retrieved was lower in 2009 than in 2014 (187 compared with 416), the percentage they comprised of the total articles published in the same year was similar. Articles containing TBI terms were only a very small percentage of the total articles published in newspapers.

The proportions of articles using different terms for TBI varied between years. Figure 10 and Figure 11 show the proportion and numbers of articles that used each of the terms for TBI in 2009 and 2014 respectively.

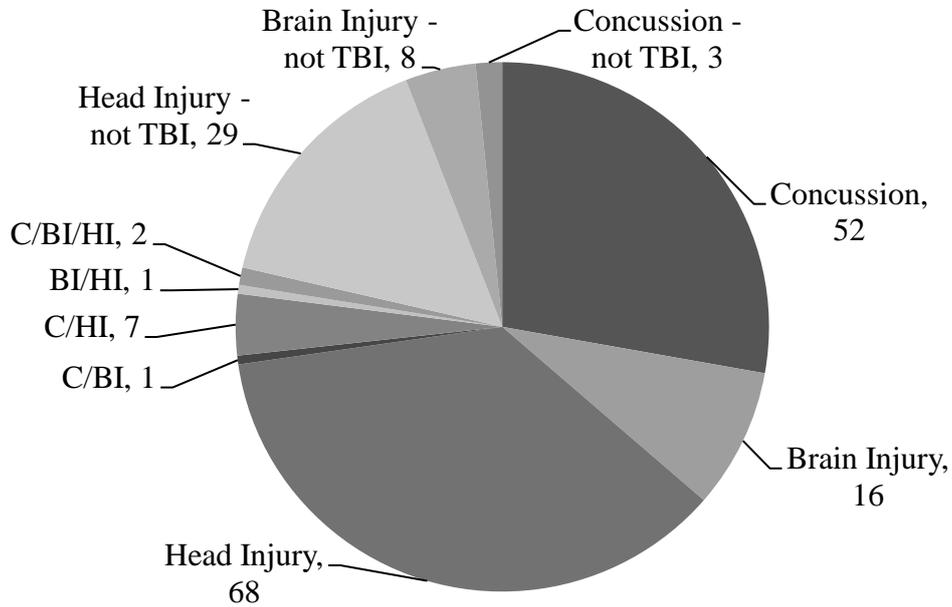


Figure 10. Number of articles using each term for TBI in 2009.  
 Note. C=Concussion, BI=Brain Injury, HI=Head Injury.

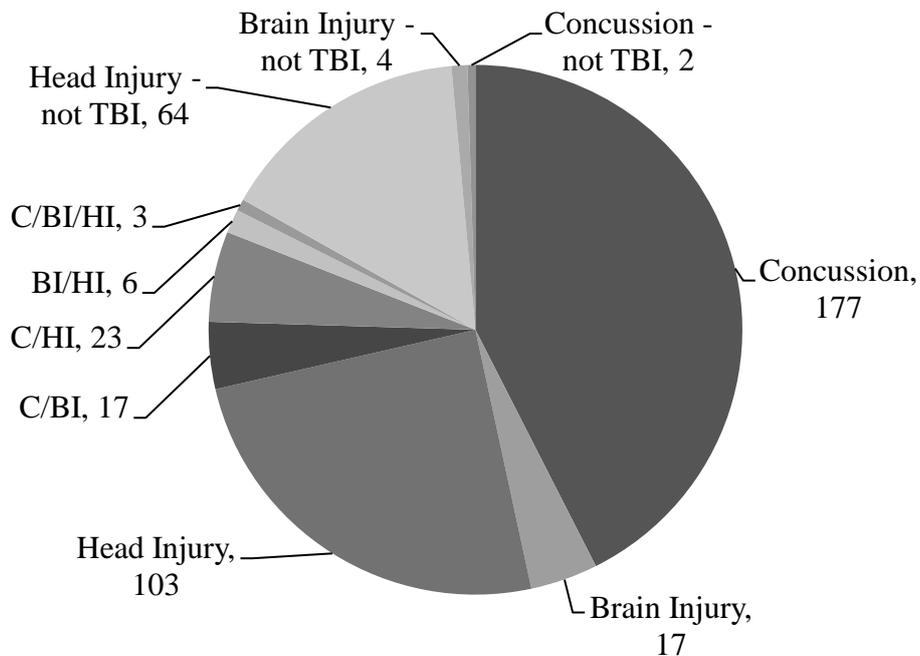


Figure 11. Number of articles using each term for TBI in 2014.  
 Note. C=Concussion, BI=Brain Injury, HI=Head Injury.

The proportion of articles which were about TBI and which used ‘brain injury’ was extremely low in both 2009 and 2014 compared with the proportion using ‘head injury’ and ‘concussion’. When terms were grouped as ‘concussion’, ‘brain injury’, ‘head injury’, ‘multiple’ or ‘not TBI’, chi-squared analysis showed a significant association between the year and the terminology used,  $\chi^2(4) = 24.20, p < .001$ . A higher proportion of articles used ‘concussion’ in 2014 than in 2009, with a concomitant reduction in the proportion of articles using ‘head injury’ between 2009 and 2014.

The use of different terms for TBI was strongly associated with the section of the newspaper in which articles appeared. Figure 12 shows in which section of the newspaper the various terms were found.

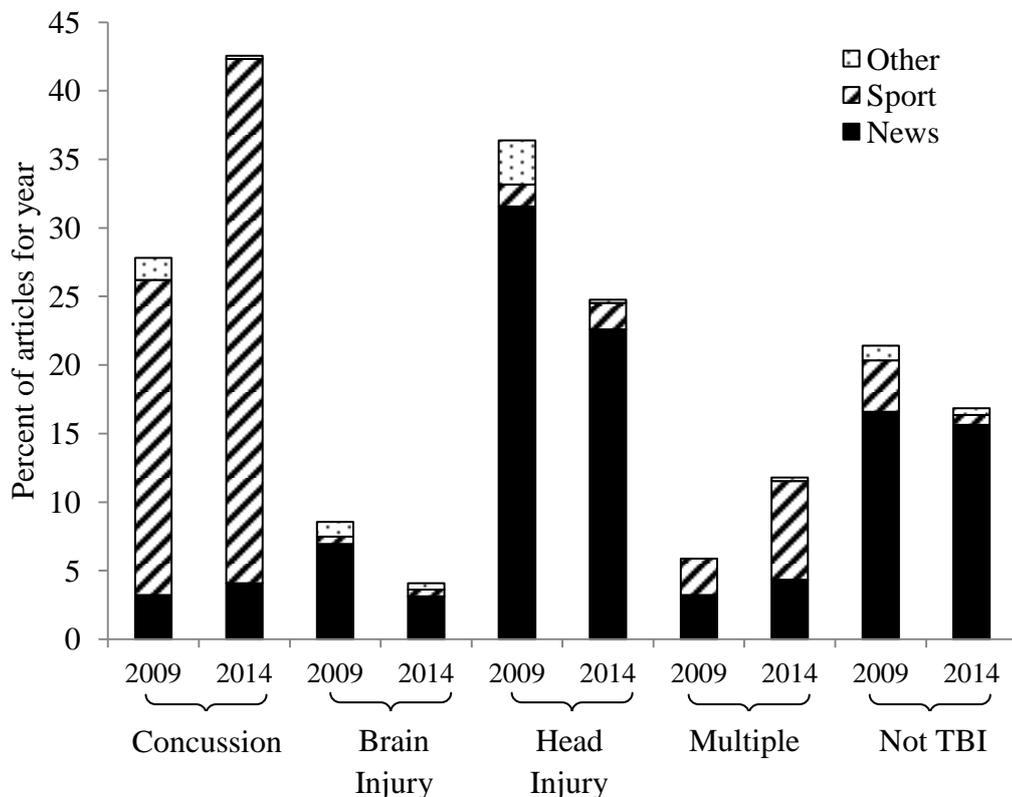


Figure 12. Terms for TBI used in various sections of newspapers.

There was a significant association between the section of the newspaper and the terms used for traumatic brain injury in both 2009 (F.E.T. (8) = 106.67,  $p < .001$ ) and in 2014 (F.E.T. (8) = 303.14,  $p < .001$ ). Most articles using ‘concussion’ were found in the Sport section, while most articles using ‘head injury’ were found in the News section. Of the small percentage of articles using ‘brain injury’, most were found in the News section, as were those articles where the TBI terms used did not actually refer to TBI.

The second research question about terminology was whether NZ newspapers treat brain injury and concussion as the same thing or as different entities. Table 13 shows the number and percent of all articles published in 2014 and 2009 (Data Set 2) that contained both terms, according to whether the article implied concussion and brain injury were the same or different.

Table 13

*Number and Percentage of Articles Implying that Concussion and Brain Injury are the Same or Different Constructs*

	2009		2014	
	<i>n</i>	%	<i>n</i>	%
Same	10	71.4	54	63.5
Different	4	28.6	31	36.5
Total	14	100.0	85	100.0

The number of articles containing both terms for TBI was higher in 2014 than in 2009, and the proportion they comprised of the total articles published in the year was also higher in 2014 (0.02% in 2014 versus 0.005% in 2009).

Approximately two-thirds of articles implied that concussion and brain injury were the same. There was no significant association between year of publication and how the articles classified brain injury and concussion,  $F.E.T = 0.33, p = .765$ , suggesting that this has not changed over time.

**Symptom information.** The third research question concerned which symptoms of TBI were most commonly reported in newspapers. Data Set 1.1 was used for this analysis. Very few articles mentioned symptoms of TBI, with only 23.8% and 24.6% of confirmed TBI articles containing any symptom information at all in 2009 and 2014 respectively. Figure 13 shows the percentage of articles which contained symptoms.

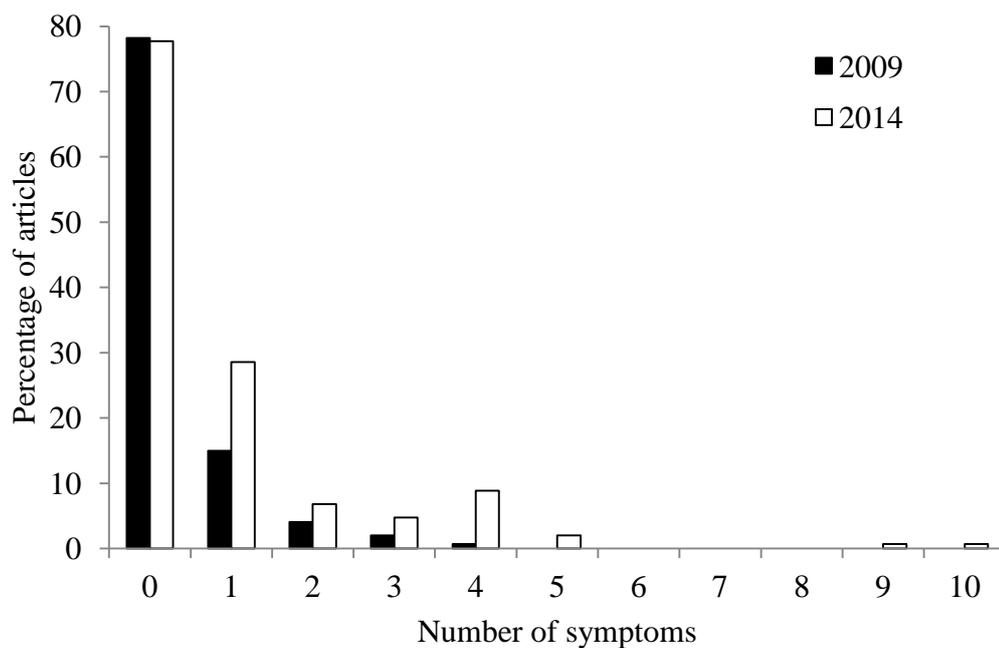


Figure 13. Percentage of articles in 2009 ( $n = 147$ ) and 2014 ( $n = 346$ ) which mentioned various numbers of symptoms.

Although a small percentage of articles in 2014 mentioned nine or ten symptoms, the majority of articles mentioned five or fewer symptoms out of a possible twenty-seven. There was no significant association between the year of

publication and the presence of any symptom information,  $\chi^2(1) = .032, p = .858$ , or in the total number of symptoms mentioned,  $U = 25011, z = -.386, p = .699$ .

The percentage of articles reporting each symptom was further investigated. Chi-squared analysis showed that there was a significant association between the year and mentioning the symptom for only one symptom, ‘out of sorts’,  $\chi^2(1) = 4.34, p = 0.037$ . Therefore the data for the two years was pooled. The percentage of articles mentioning individual physical, cognitive or behavioural symptoms are shown in Figure 14, Figure 15, and Figure 16 respectively.

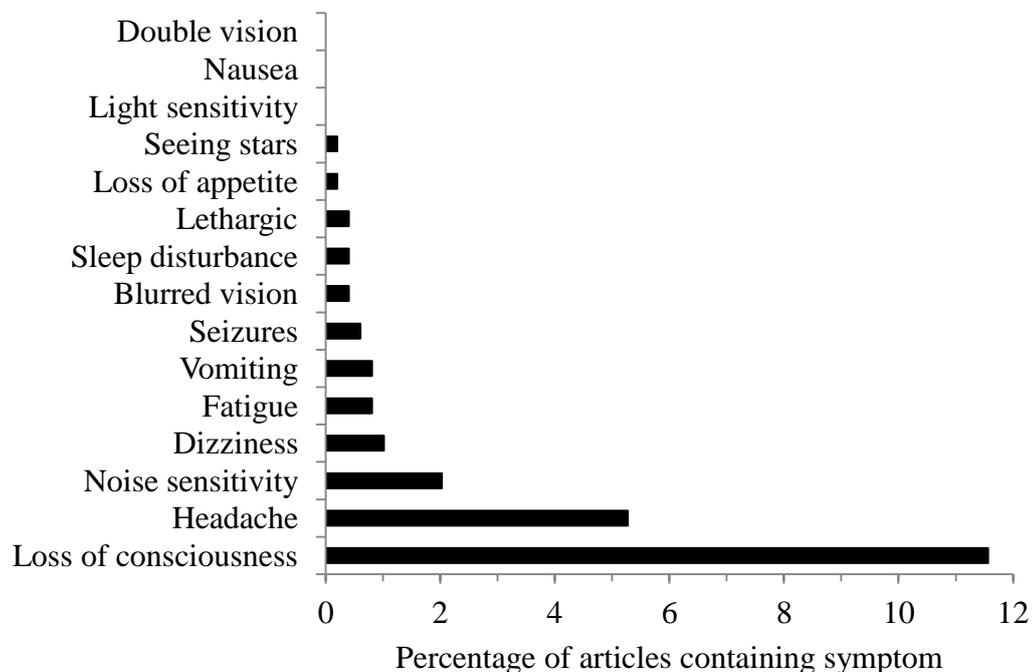
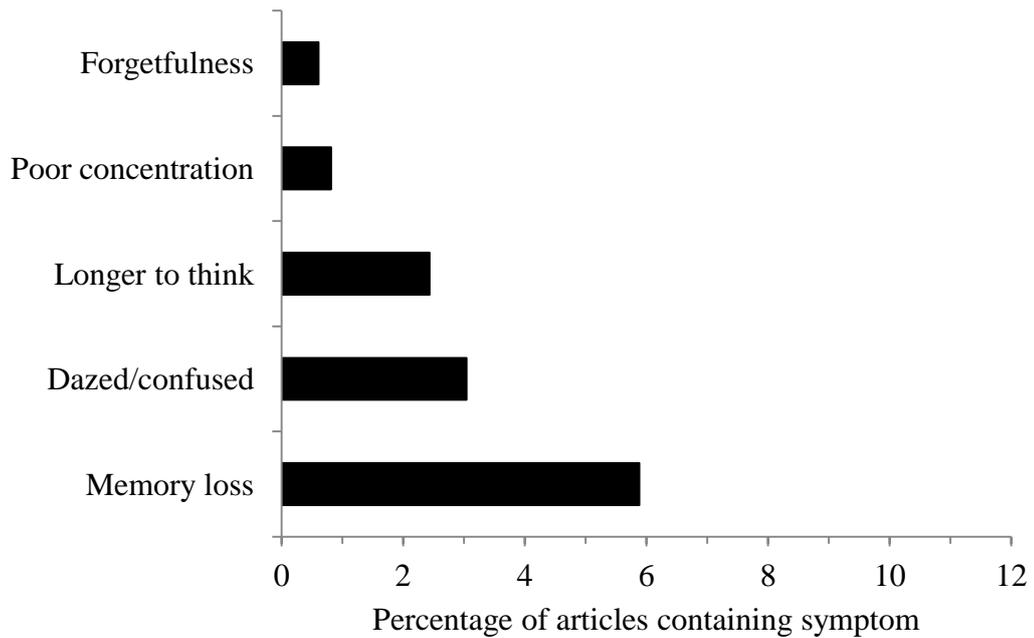


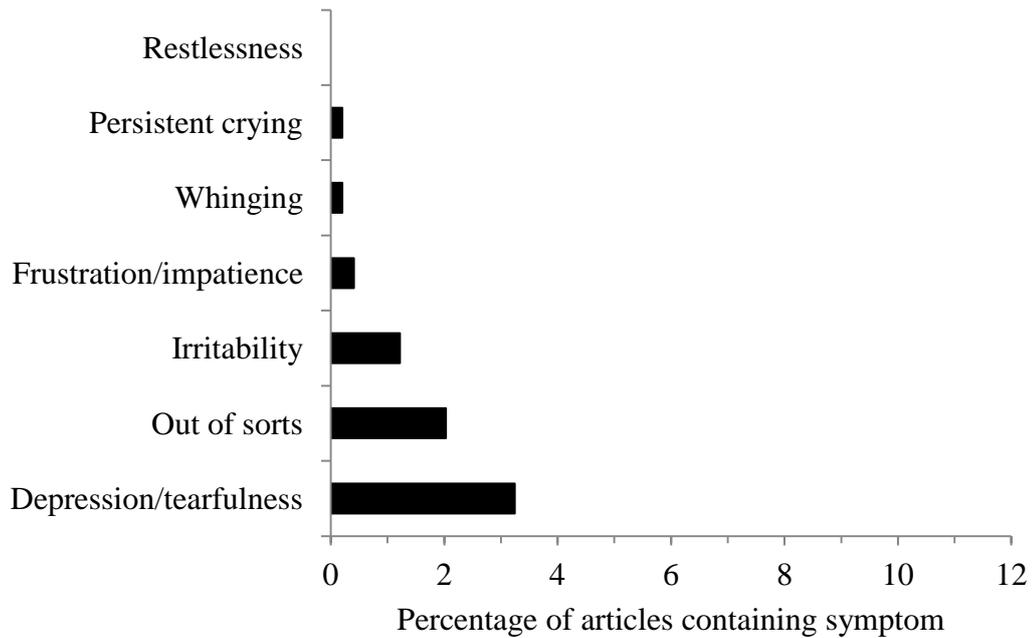
Figure 14. Percentage of articles ( $N = 493$ ) that mentioned each physical symptom of TBI.

LOC was the most commonly mentioned of the physical symptoms, and indeed of all the symptoms. Headache was mentioned at the second highest frequency, but only in about half as many articles as LOC.



*Figure 15.* Percentage of articles ( $N = 493$ ) that mentioned each cognitive symptom of TBI.

The most common cognitive symptom mentioned was memory loss, which was cited at approximately the same rate as headache. Longer term cognitive symptoms (longer to think, poor concentration and forgetfulness) were mentioned in fewer articles than those likely to be present immediately after the incident (memory loss and dazed/confused).



*Figure 16.* Percentage of articles ( $N = 493$ ) that mentioned each behavioural symptom of TBI.

Behavioural symptoms were mentioned in a very low percentage of articles. Depression was the most commonly mentioned behavioural symptom, followed by ‘out of sorts’. The five most commonly endorsed symptoms overall were LOC (12% of articles), memory loss (6%); headache (5%); dazed/confused (3%); and depression/tearfulness (3%).

The coverage of symptoms of different types was analysed. Table 14 shows the number and percentage of articles that mentioned each symptom type. It also shows the mean percentage of possible symptoms of each type mentioned.

Table 14

*Coverage of Symptoms of Different Types in Articles about TBI (N = 493)*

Symptom Type	Articles mentioning at least one symptom		Percentage of possible symptoms mentioned	
	<i>n</i>	%	<i>M</i>	<i>S.D.</i>
Physical	82	16.6	1.6	4.2
Cognitive	53	10.8	2.6	7.9
Behavioural	28	5.7	1.0	4.8

A greater number of articles mentioned one or more physical symptom than mentioned one or more cognitive or behavioural symptom. Of the three types of symptom, behavioural symptoms were mentioned in the lowest number of articles. Friedman's ANOVA showed that there was a significant effect of symptom type on the percentage of possible symptoms mentioned,  $\chi^2(2) = 26.00$ ,  $p < .001$ . Wilcoxon signed-rank tests were used to investigate this finding further. A Bonferonni correction for multiple testing was used, meaning that all the following effects are reported at a .0167 level of significance. Physical symptoms were mentioned at a significantly higher rate than behavioural symptoms,  $z = -2.85$ ,  $p = .004$ ,  $r = -.13$ , as were cognitive symptoms,  $z = -5.03$ ,  $p < .001$ ,  $r = -.23$ . Cognitive symptoms were also mentioned at a significantly higher rate than physical,  $z = -2.97$ ,  $p = .003$ ,  $r = -.13$ .

This finding suggests that despite articles being more likely to cite physical than cognitive symptoms, in those articles where cognitive symptoms were mentioned a greater proportion of them were included. The findings also show that behavioural symptoms are not well covered in newspaper articles,

neither in terms of the numbers of articles that mention them, nor in the rate at which they are mentioned compared to other symptom types.

***Concussion information.*** The fourth research question was: what information do newspapers provide relating to common misconceptions about concussion and how accurate is it? The 282 articles which contained the term concussion (Data Set 1.2) contained very little information that confirmed or negated the concussion statements used in the caregiver questionnaire, and none of the information explicitly or directly addressed any the statements. Rather, the position of the article on the statement needed to be inferred by the reader.

No information was found relating to the following: Statement A: ‘An injury is a concussion only when there is a loss of consciousness’; Statement B: ‘A concussion occurs only as a result of a blow directly to the head’; Statement C: ‘Temporary confusion is not concussion if it clears within five minutes’; Statement F: ‘Being knocked out is not the same as a concussion’; and Statement G: ‘Someone with a concussion should be kept awake’. Table 15 shows the percentage of articles in Data Set 1.2 which contained inaccurate and accurate information relating to the remaining concussion statements.

Table 15

*Number and Percentage of Articles in Data Set 1.2 Containing Information about Concussion Statements*

Concussion statement	2009 (N = 62)				2014 (N = 220)			
	Inaccurate		Accurate		Inaccurate		Accurate	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
D. The symptoms of concussion are apparent at the time of injury (F)	0	0.0	0	0.0	0	0.0	12	5.5
E. It is safe to return to playing sport as soon as the confusion clears (F)	1	1.6	23	37.1	9	4.1	117	53.2
H. There are no long term effects of concussion (F)	2	2.6	19	19.6	9	4.1	62	28.2
I. Young children/tamariki will recover better from concussion than adults (F)	0	0.0	0	0.0	0	0.0	1	0.5
J. Sometimes symptoms can take hours to show up (T)	0	0.0	0	0.0	0	0.0	10	4.5

*Note.* T = True; F = False

Only one article referred to whether children or adults recover more quickly from concussion (Statement I). The percentage of articles which contained references to a possible delay in symptom appearance was also very low (Statements D and J). References to these statements was only found in articles from 2014. All of the information for these three statements was accurate.

The only statements for which information was present in both years were E: 'It is safe to return to playing sport as soon as the confusion clears' and H: 'There are no long term effects of concussion'. Most of the information that was

present regarding these statements was accurate, although for both statements there were some articles with inaccurate information as well. Two articles were deemed by the researchers to contain both accurate (e.g. “*Sadly after getting concussed in the semifinal I was unable to play.*” (291) and inaccurate (e.g. *After coming off in the second half with a split lip, half concussed and a red stained jersey, to come back on and contribute to win the game* (291)) information about the same statement.

There was no significant association between year of publication and the presence or accuracy of the information for either of the concussion statements that had information in both years ( $\chi^2(3) = 6.63, p = \text{n.s.}$  for statement E;  $\chi^2(3) = 4.40, p = \text{n.s.}$  for statement H), suggesting that the amount and accuracy of information has not changed over time.

There was a significant difference in the mean number of concussion statements referred to per article between years of publication,  $U = 19803$ ,  $z = -4.49, p < .001, r = -0.27$ , with articles from 2014 ( $M = 0.68$ ) containing references to more statements than articles from 2009 ( $M = 0.31$ ). There was also a significant association between the year of publication and the presence of any information about the concussion statements,  $\chi^2(1) = 16.25, p < .001$ , with articles from 2014 being 2.5 times more likely to contain any information at all than articles from 2009.

**Total information.** There was a significant association between year and the presence of information of any kind,  $\chi^2(1) = 15.84, p < .001$ . Articles published in 2014 were 2.33 times more likely to have some information about symptoms or concussion facts than articles published in 2009.

In summary, newspaper articles have the potential to contribute to confusion regarding the terminology used to describe TBI, with the term ‘brain injury’ being used very rarely. Additionally, different terms are strongly associated with different sections of the newspaper, meaning that people that habitually read only one section will mostly see only one term used and not be exposed to the other. Although the majority of articles treated brain injury and concussion as the same, some still implied they were different, potentially increasing public confusion about the interchangeability of the terms.

Very few articles about TBI contained information about symptoms of TBI, or information which could inform the public on common concussion misconceptions. In general the percentage of articles mentioning information increased between 2009 and 2014, mainly driven by an increase in the numbers of articles containing references to the concussion statements. The majority of the small amount of information that was present that related to the concussion statements appeared to be accurate.

### **Context in which Information about TBI is Presented**

**Method.** This analysis aimed to look at the broader context and themes of articles in which information about TBI was presented. Qualitative methodology was used for this part of the investigation in order to go beyond a simple quantitative analysis of content, which does not always fully capture the tone and intent of an article (Richardson, 2007). The qualitative method chosen was thematic analysis as described by Braun and Clarke (2006). It was chosen from the wide range of possible qualitative methodologies because it allows the search for patterns across a data set, without being limited to a particular theoretical

orientation in the way that grounded theory or interpretative phenomenological analysis are (Braun & Clarke, 2006). It is also a method which is easy to learn for beginning qualitative researchers in the health field (Braun & Clarke, 2014).

*Data retrieval and management.* Those articles from Data Sets 1.1 and 1.2 which contained information either about symptoms or about the concussion statements were re-combined to form Data Set 1.3, which was used for the thematic analysis. Data Set 1.3 consisted of 272 articles, 61 from 2009 and 211 from 2014.

*Coding and analysis.* A new Excel spreadsheet containing articles from Data Set 1.3 was created from the original database. Articles that were duplicated (the same text published in different newspapers) were filtered so that only one article on each story was used, leaving a total of 162 articles, 59 from 2009 and 103 from 2014. A new Word file was created containing only those articles.

Braun and Clarke (2006) stress the need for researchers using thematic analysis, and indeed any qualitative analytical method, to be specific about their method and process. In this study, an approach described by Braun and Clarke (2006) as ‘contextualist’ (p.81) and by Hodgetts, Masters and Robertson (2004) as “text-and-context” (p. 460) was applied. Thus the texts of the articles were considered to be embedded in and reflective of the broader societal contexts surrounding TBI and the reporting thereof, rather than as a representation of the ‘true’ nature of TBI in NZ.

A combination of inductive and theoretical approaches to analysis was used. Due to their occurrence in existing literature about media treatments of TBI, themes about the portrayal of concussion in sport and the possibility of changing attitudes towards concussion were of interest, references to the culture and

attitudes surrounding concussion in sport were actively sought. In addition, because of prior research on the incidence of TBI in NZ, the coverage of the spectrum of TBI severity and its outcomes was of interest. However, anything else that appeared to me to be relevant to the context in which information is presented to the lay public in newspaper articles was coded and subsequently inductively combined to obtain an overall picture of themes across the whole data set.

In keeping with the contextualist approach, the thematic analysis examined the data at a latent level. This means that the themes did not merely reflect the explicit content of the text of the articles, but instead attempted to examine the “underlying ideas, assumptions and conceptualisations – and ideologies – that are theorized as shaping or informing the semantic content of the data.” (Braun & Clarke, 2006, p. 84).

Themes were identified in the data by following the procedure suggested by Braun and Clarke (2006). Coding was an iterative process. Some codes which had already been identified through the previous readings of the articles for the quantitative content analysis, and from the existing literature, were used as a starting point. The articles were read carefully and the presence of extracts relating to these initial codes was noted. New codes covering additional areas of interest were added to the database as needed, and previously coded articles were re-checked to see if the new codes applied to them.

The text of articles in the Word document was tagged with codes using the Comment feature. Extracts relating to each code were copied and pasted into a column in the Excel spreadsheet to allow comparison of extracts within a code from different articles.

Seemingly related codes were collected into overarching themes and sub themes using visual mapping, and then the coherence of themes were reviewed at the level of the data extracts and the whole data set. Themes were given names that summarised their content.

In the interests of consistency with the quantitative analyses presented in this thesis, and contrary to common practice in qualitative analysis, the results and discussion of the thematic analysis are presented in separate sections.

**Results.** Qualitative thematic analysis was carried out to examine the broader context within which the information on TBI symptoms or concussion statements was presented in newspaper articles.

*'Diverse outcomes'*. One theme that was theorised to be potentially present based on previous reports on TBI incidence and outcomes was the diversity of traumatic brain injuries. The data set used in the current study reflected as a whole the diversity of injury severity and of outcomes after TBI, but the majority of individual articles tended to focus on one severity level or outcome with only a few specifically mentioning that outcomes vary widely from person to person:

*a blanket three-week stand-down period really falls short of a decent management of the specifics and nature of head injuries, which are so diverse. (160).*

The individual outcomes mentioned included some positive outcomes:

*more than a decade on, the 35-year-old Hazledine looks back on that event as a great day. Hazledine says it drove him to abandon a destructive lifestyle and focus on creating a better future for himself. (313),*

but mainly focussed on negative consequences such as the prevention of previous activities

*As for going back to work as a firefighter, Mr Halford said it would be a while off yet. (37)*

*A severe brain injury halted Dr Ali Danesh's successful career as a psychiatrist. (183);*

negative effects on families

*Gail has had to leave her job of 17 years to care for Mike full time ...*

*'This is not what life was supposed to be like for us. We had plans for our future which went out the window in November 2012.'*(451);

and personality and behaviour changes

*His parents, Matt and Carmel, noticed changes in their son's personality and behaviour. The confidence of youth was missing and Paul said his 'anxiety levels went through the roof'. (496).*

**'Head injury is a serious business'**. There was a clear division of articles into two major areas: head injury; and concussion in sport. The theme 'head injury is a serious business' aptly summarises the context surrounding information about TBI symptoms in the head injury articles, which had a consistent pattern of reporting ambulance or air ambulance transport, hospitalisation, and victims being in a serious condition

*The girl was treated at the scene by St John paramedics for more than an hour before she was airlifted to Auckland, still in a critical condition. (218);*

*He was diagnosed as having significant head injuries, ...and was flown to Waikato Hospital where his condition remained critical. (261)*

Causes of TBI in this group of articles were motor vehicle accidents, assaults and falls, and thus often merited police involvement in some way

*Police were yesterday not commenting on the cause of the crash. (218);*

*A police communications spokesman said a group of people had been fighting on the street. (248).*

By contrast, articles on concussion in sport only infrequently mentioned serious outcomes.

**‘Concussion in sport’.** Coverage of concussion in sport was largely limited to reporting on men’s rugby union, with far more limited mention of other sports. Two main sub-themes were identified in the articles on rugby union: “Changing Attitudes” and “Management Response”.

The Changing Attitudes sub-theme summarises a pattern of reporting on the change in attitudes of players, officials and the public towards concussion in sport. Articles contributing to this sub-theme were mostly published in 2014, with little commentary on this theme found in articles from 2009.

The majority of the articles were of a sports news nature and thus limited their discussion of concussion to ‘just the facts’. Nonetheless, the choice of language used in reporting ‘facts’ can affect the implied message (Richardson, 2007). It was notable that only one article in the data set used negative language towards a player’s standing down due to a concussion.

*Collins missed last week's defeat because of concussion and his repeat **defection** [my emphasis] was the latest in the list of casualties. (135)*

The remainder of these articles, although sometimes expressing regret for the loss of a valued player

*the subsequent concussion ruling him out of tonight's match. The inspirational Springbok is a huge loss. (56)*

used language which did not condemn or otherwise blame the player for standing down

*another midfielder, Tom Taylor, has been given more time to recover from concussion. (492);*

*Dave Rennie confirmed yesterday young All Blacks lock Brodie Retallick, tighthead prop Ben Afeaki and first-five/ fullback Gareth Anscombe were all back available for selection for the back-to-back champions this week, the former two coming off concussion layoffs. (345)*

Those articles which were more extensive were overtly supportive of the caution being applied in the treatment of high profile concussion sufferers

*But the conservative (in the best sense of the word) way that the Crusaders' medical and coaching staff are treating Read's return from concussion is setting a stellar example for weekend warriors and grassroots sports coaches to follow. (484)*

and were in favour of concussion being taken seriously at all levels

*Everyone knows concussion is an issue in sport and it's good to see it being addressed at grassroots level. That's where the majority of players are and those with the least amount of medical support. (508).*

These articles acknowledged the presence of a 'hard man' culture in rugby

*"It is a culture in NZ," said the young man ... We have this impression that we are all hard bastards. You take a knock, you get up and get on with it. I have done it myself. (496),*

but generally implied that despite resistance

*the approach is quite appropriately to be very conservative.*

*Unfortunately, at times this can be met by frustration from very enthusiastic players and coaches. (496),*

attitudes were changing and that this was a positive thing

*The old adage in rugby of "toughen up, mate" has long since passed, fortunately. (508).*

The Management Response sub-theme summarises a pattern of reporting on changing rules and guidelines in response to both a changing scientific understanding of concussion

*But medical understanding of the impact of concussion is now more advanced than it was 15 years or so ago when blokes like Blackadder were copping shots to the swede. (484)*

and fears of legal action

*"If rugby doesn't wake up to this and start demonstrating a zero tolerance approach to head injuries, it will be storing up some very serious legal problems for itself," O'Driscoll said. (524).*

Various initiatives at international

*Under the current IRB rules, players who suffer a knock to their head have a mandatory three-week stand-down period. (160),*

national

*Developed by ACC and the NZRU, the Rugby Smart programme is compulsory for all coaches, ... now has a clear focus on concussion management. (496),*

and local union level

*The Tasman Rugby Union wants to form a partnership with a medical organisation to help manufacture and distribute a wallet-sized card with a clear six-step guide to recognise and deal with incidences of concussion (508)*

for managing the concussion problem were reported. Despite some criticism of the effectiveness of their implementation

*Every rugby coach, every rugby referee, should have the latest edition - the Scat3 - in their pocket. But the blunt truth is that most club and school players, coaches, and referees have never heard of it. (235),*

the overall tone of articles towards these initiatives was positive.

One interesting finding from the data is the length of time it takes to implement change, exemplified by a set of 2009 articles which reported on a proposal for a protocol on concussion management by the Northland rugby union

*plans by Northland Rugby Union operations manager Greg Shipton to put forward proposals on dealing with repeated head injuries. He was expected to put some options before the NRU board last night (160)*

which were followed up by an article published in 2014 which reported that the protocol had just been introduced that season

*Northland Rugby Union is running the system for amateurs. ... The blue card system has been used in Northland since March [2014]. (496).*

Taken together these results suggest that people reading articles containing information about TBI symptoms and concussion statements will also be informed of the serious nature of 'head injury' but not necessarily of 'concussion', although they will see support for taking concussion in sport (rugby union) seriously and for following the guidelines and protocols set down by rugby governing bodies.

## **Discussion**

The aim of the research described in this chapter was to investigate how NZ newspaper media could contribute to public knowledge about TBI. Of particular interest were the knowledge areas also examined in the survey of caregiver knowledge: the terminology used for TBI; the symptoms of TBI; and facts about concussion. The broader context in which that information presented was also examined.

**Terminology.** With respect to the first research question about what terminology is used for TBI in the NZ newspaper media, it was found that ‘brain injury’ is used very rarely in articles about TBI. The primary term used in articles about TBI in sport was ‘concussion’. News section articles primarily used the more generic term ‘head injury’. Very few articles used multiple terms. This finding contrasts with studies of hospital discharge information which found that many hospital pamphlets use mixed terminology (Boddé et al., 2015; Kempe et al., 2014).

The use of ‘head injury’ in newspaper articles may be partly due to the conventions of the production of news media, in which journalists try to avoid using jargon, that is “special words or expressions used by a profession or group that are difficult for others to understand” (Oxford Dictionaries, n.d.) (A. Aitken Worth, personal communication, January 11, 2015). Unfortunately, in this case, the attempt to reduce complexity for the reader results in a lack of precision about the injury being discussed.

The use of ‘concussion’ predominated in 2014 articles, reflecting increased coverage of sports concussions. However, in answer to the second

research question, few of these articles implied that concussion was a brain injury, mostly by completely failing to mention the ‘brain injury’ term. Of those that did mention the two terms together, about one-third implied that they were different injuries. This suggests that newspaper articles are not likely to contribute to public knowledge that concussion is a brain injury.

Although not examined directly in this research, the majority of initiatives for the management of TBI in rugby also appear to use the concussion term. The primary use of ‘concussion’ in sports reporting possibly reflects the divide seen in academic publishing, with those focussing on sports injury and its prevention primarily using the term ‘concussion’, sometimes as a synonym for mild TBI, but sometimes with insistence that concussion and mild TBI are different constructs (McCrory et al., 2009). The predominance of ‘concussion’ in sports reporting implies that all brain injuries sustained in rugby are concussions, but it has been shown that at least some meet the WHO definition for a mild TBI (Theadom et al., 2014). Given the previous research on differential expectations and outcomes depending on diagnostic terminology (DeMatteo et al., 2010; K. Sullivan et al., 2014), this implication is of concern for those wishing to ensure that paediatric TBI is taken seriously by caregivers.

**Symptom information.** The third research question concerned which symptoms of TBI are most commonly reported in newspaper articles. Only a small percentage, less than 25%, of articles mentioned any symptoms. Of the symptoms that were mentioned, LOC was by far the most common, mentioned in twice as many articles in the next most common symptom, memory loss. This compares to only 50% of people reporting LOC as a symptom in injuries which were medically confirmed as a TBI (Theadom et al., 2014).

Of the articles that contained symptom information, the largest number of articles mentioned one or more physical symptoms, followed by cognitive then behavioural symptoms. This reflects the predominance of LOC as a symptom. However, when cognitive symptoms were mentioned at all, a greater proportion of the possible symptoms were mentioned. A lower proportion of behavioural symptoms were mentioned than the other two symptom types. This may be because several of the behavioural symptoms included in the list were from the list used for inclusion of children in the BIONIC study (Theadom et al., 2012), but conversely most of the newspaper articles were about TBI in adults. The absence of behavioural symptoms is of concern because it contributes to the lack of recognition of behavioural sequelae of TBI. This could result in less attention than necessary being paid to any such symptoms after a head injury, and reduce the likelihood that people will seek help for them. Given the impact of behaviour problems on the wellbeing of the individual themselves and their families, it is important that the message of behavioural symptoms reaches the public.

**Concussion information.** In relation to the fourth research question, there was little information in the articles containing the term ‘concussion’ which would inform the public about the concussion statements. For five of the statements there was no information at all, and for one, Statement I: ‘Young children/tamariki will recover better from concussion than adults’, there was only one article out of 292 that referenced the statement. The latter finding reflects the weighting of the concussion articles towards the topic of adult male rugby.

Only articles published in 2014 made reference to the fact that symptoms may not be apparent immediately after the injury. This topic was not mentioned in 2009 articles at all. It is possible that this change in newspaper information

content reflects changes with time either in the scientific understanding or in the content of educational material.

The message that concussion can have long term effects was present in about one-quarter of articles. In most of these the message was accurate but there was still a small proportion which had inaccurate information about this fact, which could lead the public to believe that concussion does not need to be taken too seriously. The ratio of accurate to inaccurate information was similar in 2009 and 2014 suggesting that there have not been improvements in this reporting over time.

The message that it is safe to return to sport as soon as the confusion clears was the most commonly represented in both years, being present in over 38% of articles in 2009 and 57% in 2014. This shows an increase in coverage on this topic over time. The ratio of accurate to inaccurate coverage increased between years suggesting better support in newspaper articles for delaying return to play.

Overall, there was little information in newspaper articles which could improve public knowledge about the concussion statements presented in the survey of caregiver knowledge (Chapter 2) and in McKinlay et al. (2011). Given the finding that mass media can contribute to changing health behaviours (Grilli et al., 2002) there may be benefits to those interested in injury prevention and management in working with journalists to improve public knowledge of TBI.

**Context.** This section discusses the research question about the broader context of articles in which the information about TBI is presented. Due to the strong association of the ‘concussion’ terminology with the Sports section, all of the small amount of information pertaining to the concussion statements was also located in the Sport section of the newspaper. Therefore, people who don’t read

the Sport section on a regular basis are less likely to be exposed to information regarding concussion. Even if people read the entire paper, they are still likely to be left with the impression that concussion mainly occurs in male rugby players.

The qualitative analysis found that articles about ‘head injury’ in the News section of the newspaper were more likely to emphasise the seriousness of such injuries than those in the Sports section which used the term ‘concussion’. This predominance of stories about serious injuries does not reflect the incidence of TBI in NZ where approximately 95% of TBIs are mild (Feigin et al., 2013). The focus on serious injury does not provide the public with an accurate picture of the incidence of TBI or of the possible outcomes of milder forms of the injury. Conversely the lack of reporting on serious outcomes in the Sports section could mean that sports TBIs may be believed to be less serious, even though in one study 34% of rugby TBIs were classified as having a high risk of further complication (Theadom et al., 2014).

Of course, as discussed in the introduction, media coverage can rarely be considered a true and complete representation of a particular health issue. What makes it into the news is driven by a multitude of factors affecting news production (Hodgetts, Chamberlain, Scammell, Karapu, & Nikora, 2008). One aspect is that a story has to be considered newsworthy. A number of features have been hypothesised to contribute to the newsworthiness of a story (Galtung & Ruge, 1965), and one of these which has been supported by empirical investigations of both general news stories and health stories (Bartlett, Sterne, & Egger, 2002; Harcup & O'Neill, 2001) is the preference for ‘bad’ news over ‘good’ news. This preference was seen in the thematic analysis, both in the ‘head injury is a serious business’ theme, and in the predominance of negative outcomes

mentioned in the ‘diverse outcomes’ theme. The limitation of reporting on TBI to ‘serious business’ stories has implications for the improvement of public knowledge. Despite the fact that about twice as many school-aged children receive TBIs in falls compared with the more newsworthy motor vehicle accidents (Feigin et al., 2013), newspapers tend not to cover these more mundane, everyday situations. Therefore recognition of the potential for TBI to occur in the latter situations may be reduced.

The subthemes under Concussion in Sport show that information about TBI is presented in a context of increased recognition by management and players that the injury should be taken seriously and that players’ masculinity is not threatened by taking time off. This is consistent with changing attitudes in sports reporting also found in previous studies (E. Anderson & Kian, 2012; McGannon et al., 2013). It is possible that seeing information in this context would make the public and caregivers of children more likely to take sports-induced TBI seriously in their children. However further research is needed to establish whether there is a link between attitudes in the newspaper and the attitudes and actions of the public towards return to play.

**Limitations and strengths.** The sample of newspaper articles examined represents coverage across NZ, and is not necessarily representative of information available to the participants in the survey sample. Coverage from different parts of NZ might have varying emphases. This could affect the exposure to information of caregivers from different geographical regions, but was not looked at in this study.

Duplication of stories across different newspapers owned by the same media company could affect estimations of coverage of symptoms and facts about

concussion if one article containing a lot of information was repeated across several different publications. However, initial investigations of the effect of duplication (data not shown) suggested it did not affect terminology estimates, so it was excluded from further analyses.

Despite the limitations mentioned above, this is the first study to examine the information content of NZ newspapers with respect to TBI. One strength is the use of a mixed methods design, which ensured that attention was paid not only to the information content, but also to the broader context in which that information is presented to newspaper readers. This provides more comprehensive information regarding the implied attitudes of the national press towards TBI.

In conclusion, overall there is little information in NZ newspaper articles that can inform the public on terminology for TBI, its symptoms, and facts about concussion, although there has been an increase in concussion information between 2009 and 2014. The broader context in which the information is presented in some ways fails to inform by only giving a small part of the picture of the spectrum of TBI in NZ. However, the positive support shown for initiatives to manage TBI in rugby is encouraging, as this has the potential to improve the treatment of children with TBI acquired in that context.

## Chapter Four: General Discussion

This study examined both the knowledge of caregivers of primary and intermediate aged children about TBI, and the potential for articles in the news media to contribute to that knowledge. Caregiver knowledge of TBI in this study compared favourably with the amount of information presented in newspaper articles, with participants knowing considerably more than the information available in the newspaper articles. However, caregiver knowledge was still lacking in several areas.

This result suggests that newspapers were not a primary source of information about TBI for participants. For example, the percentage of participants who correctly answered the concussion questions about which there was no information at all in the newspaper articles ranged from 10-70%. This contrasts with the finding by Stryker et al. (2008) that more highly covered cancer prevention behaviours were better known by the public. Participants also had much broader symptom knowledge than what they could potentially have obtained from the symptom coverage present in the newspaper articles. This may be because participants obtained their information about TBI from a variety of sources in addition to newspapers. In addition, newspapers were endorsed as a source by a lower percentage of participants than several other sources. The association between symptom knowledge and the number of sources of information endorsed also supports the conclusion that newspapers were not participants' main information source.

Other studies have shown that the amount of attention paid to information sources is positively associated with knowledge (Kelly et al., 2009; Thompson et

al., 2011; Zhao, 2014). Participants in this study were not asked how much attention they paid to health information from each source. This could be a useful addition to further research in this area.

### **Implications of Findings**

The combination of imperfect caregiver knowledge and lack of information in newspapers suggests there is an opportunity to increase knowledge and potentially the appropriate treatment of children with TBI by increasing the information base in newspapers. Engagement of paediatric TBI researchers with journalists to understand the drivers of what appears in the newspaper would be beneficial, so that research findings can be presented to journalists in a way that meets their needs as well as supporting the drive for better understanding and knowledge about TBI among those who care for children. Areas to focus on should include attention to the terminology used to describe TBI, to continuing to improve the knowledge that LOC is not needed for a TBI to have occurred, and to improving the coverage of potential behavioural symptoms that can occur and may be of concern both immediately and in the months following a TBI event.

### **Limitations and Strengths**

This study did not directly examine the effect of newspaper articles on knowledge or attitudes of caregivers but simply juxtaposes caregivers' knowledge in particular areas with the information available. However being able to examine the two sets of information together, is still a strength of the overall study because it provides some insight into how newspaper coverage could be improved to ensure that knowledge is maintained or improved.

One limitation is that only newspaper articles are included in the study, and as shown by the sources of information from which participants drew their knowledge, newspapers were a source for a minority of participants and do not represent the only source of information. However, newspaper articles do reflect online coverage on websites such as Stuff, which tends to have the same text in an online format. Also many of the sports concussion stories, particularly cases such as Kieran Read's situation, will have been covered on television and radio broadcasts.

### **Future Studies**

Future studies could look at the links between newspaper coverage and caregivers' knowledge, attitudes and intentions with respect to TBI. Of particular interest is the potential link between the attitudes of media portrayals towards concussion in rugby and how that influences caregivers attitudes and reported intentions with respect to return to play and treatment seeking after their child experiences a sporting TBI. This could be explored both experimentally using different story types, and also through qualitative interviews and focus groups, perhaps surrounding a particular story arc such as Kieran Read's on-going concussion problems, which featured prominently in the articles retrieved from 2014 for this study.

Some interesting work has also been done using statistics available from Google Trends showing increases in searching about particular topics after an increase in media articles about a celebrity health issue (Ayers, Althouse, Noar, & Cohen, 2014; Noar, Ribisl, Althouse, Willoughby, & Ayers, 2013). It would be interesting to investigate this with respect reporting on high profile TBIs in NZ.

Given the dearth of literature on the presence and accuracy of information about TBI, or the context in which such information is presented, in NZ media, there is potential for investigating other media sources such as radio, television, and magazines. This would help build a more complete picture of the potential for general information sources to contribute to caregivers' knowledge about TBI. As people receive more 'accidental' exposure to information from these sources, such an investigation would complement existing research about the content of sources where information is more deliberately sought out such as websites and Twitter (e.g. Ahmed et al., 2012; S. J. Sullivan et al., 2012).

## **Conclusion**

The results of this study show that there is still room for improvement in the knowledge of caregivers of children about the terminology used for TBI, its symptoms and facts about concussion. Children are reliant on their caregivers to seek medical attention when they receive a TBI, and this lack of knowledge could result in under-reporting and children not receiving appropriate interventions. The information currently available in newspapers is not ideal to contribute to the improvement of caregiver knowledge. Health researchers in paediatric TBI should make efforts to engage with journalists to improve the presence and accuracy of TBI information in newspapers.

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## Appendix 1: Questionnaire

Note: The pagination of the replicated questionnaire has been affected by the margins required for theses. Actual page breaks on the original questionnaire are indicated by heavy black dotted lines.

### Public Knowledge of Head Injury

#### Information Sheet

Kia ora koutou

The purpose of our study is to find out what parents of primary and intermediate school children/tamaariki know about head injuries.

We are asking participants in the study to:

- 1) Answer some questions about their experience of head injuries
- 2) Answer some questions about symptoms of head injury and rate the accuracy of some statements about concussion.

Completing the Questionnaire should take about 5 minutes

All information will be treated in the strictest confidence. If you have any questions please ask the researcher. Feel free to talk with friends and family before you fill in the questionnaire.

You can withdraw from the study at any time **before** you have returned the completed questionnaire to the researcher, without penalty. Just put the questionnaire in the bin (or return blank forms to the researcher if you want to).

By returning the questionnaire you are agreeing that

- you have had the chance to ask questions of the researcher and discuss your participation with family/friends if necessary
- you agree to take part in the project
- you understand that you will not be able to withdraw your data once you give the questionnaire back to the researcher, because it does not have any identifying information on it

The study has received Ethics approval from the School of Psychology Ethics Committee. If you have any concerns about this project you can contact the convenor of the Research and Ethics Committee (Assoc. Prof. John Perrone, [jpnz@waikato.ac.nz](mailto:jpnz@waikato.ac.nz), 07 838 4466 ext 8292). Please keep this sheet for future reference.

This study is being conducted as part of a Masters thesis. Please contact us if you want more information: Dawn Willix-Payne, M.Soc.Sci student ([djw@students.waikato.ac.nz](mailto:djw@students.waikato.ac.nz)) and Associate Professor Dr Nicola Starkey (supervisor) ([nstarkey@waikato.ac.nz](mailto:nstarkey@waikato.ac.nz)). Our Māori advisor is Dr Margaret Dudley (Te Rarawa, Te Aupouri me Ngati Kahu).

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## **Want more information about head injury?**

**(1) See your family doctor.**

**(2) THINK – The Head Injury Network for Kiwis**

Support and information and advice for people with head injuries, their whanau, and carers.

[www.thinknz.org.nz/](http://www.thinknz.org.nz/)

Phone 07 839 1191

[admin@thinknz.org.nz](mailto:admin@thinknz.org.nz)

11 Somerset Street, Frankton

**(3) Brain Injury Association**

Support and advice for people with brain injuries.

[www.brain-injury.org.nz](http://www.brain-injury.org.nz)

Phone 09 520 4807

[Information@brain-injury.org.nz](mailto:Information@brain-injury.org.nz)

#### (4) ACC

*Concussion leaflet* – provides information about concussion and how to manage it

[http://www.acc.co.nz/PRD\\_EXT\\_CSMP/groups/external\\_ip/documents/publications\\_promotion/pi00258.pdf](http://www.acc.co.nz/PRD_EXT_CSMP/groups/external_ip/documents/publications_promotion/pi00258.pdf)

*Caring for yourself after a head injury* – How to care for yourself after a head injury

<file:///C:/Users/timb/Downloads/ACC572%20final%20-%20Jul07.pdf>

-----

(1) Have you ever experienced a **brain injury**? (Circle response)

**Yes**                      **No**

(2) Do you know a child/tamariki that has experienced a **brain injury**? (Circle response)

**Yes**                      **No**      (please go to Question 3)

└─┬─> If yes, was this your own child/tamariki? (Circle response)

**Yes**                      **No**      (please go to Question 3)

└─┬─> At what age were they injured? \_\_\_\_\_ -  
years

How old are they now? \_\_\_\_\_ years

(3) Do you know an adult that has experienced a **brain injury**? (Circle response)

**Yes**                      **No**

-----

(4) A child/tamariki has fallen from the playground at school and hit their head on the edge of a step. Which of the following symptoms would suggest to you that the child/tamariki had a brain injury? Tick any that apply.

Loss of consciousness

High temperature

Neck pain

Persistent crying

Dazed and confused

Diarrhoea

Excessive appetite

Irritability

Seeing stars

Nosebleed

Can't remember what happened

Seizures

Vomiting

Chest pain

Loss of appetite

Whinging

Persistent cough

Unusually active

Uncharacteristically quiet

Seeming 'out of sorts'

Lethargic

Headache

Other (please specify)

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(5) Which of the following symptoms might the child/tamariki described in Question 4 have three months after the accident? (Tick any that apply)

- |  |   |
|--|---|
| <input type="checkbox"/> Back pain                                   | <input type="checkbox"/> Feeling depressed or tearful                     |
| <input type="checkbox"/> Nausea and/or vomiting                      | <input type="checkbox"/> Noise sensitivity (easily upset by loud noise)   |
| <input type="checkbox"/> Feeling frustrated or impatient             | <input type="checkbox"/> Pain in elbows or knees                          |
| <input type="checkbox"/> Double vision                               | <input type="checkbox"/> Restlessness                                     |
| <input type="checkbox"/> Muscle spasms                               | <input type="checkbox"/> Forgetfulness, poor memory                       |
| <input type="checkbox"/> Occasional bouts of uncontrollable laughter | <input type="checkbox"/> Heartburn/reflux                                 |
| <input type="checkbox"/> Cramps in tummy                             | <input type="checkbox"/> Chest pain                                       |
| <input type="checkbox"/> Taking longer to think                      | <input type="checkbox"/> Aching muscles                                   |
| <input type="checkbox"/> Headaches                                   | <input type="checkbox"/> Blurred vision                                   |
| <input type="checkbox"/> Sleep disturbance                           | <input type="checkbox"/> Poor concentration                               |
| <input type="checkbox"/> Feelings of dizziness                       | <input type="checkbox"/> Light sensitivity (easily upset by bright light) |
| <input type="checkbox"/> Fatigue, tiring more easily                 | <input type="checkbox"/> Recurrent diarrhoea                              |
| <input type="checkbox"/> Being irritable, easily angered             |   |

Other (please specify)

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(6) Have you ever experienced a **concussion**? (Circle response)

**Yes**

**No**

(7) Do you know a child/tamariki that has experienced a **concussion**? (Circle response)

**Yes**

**No** (Please go to Question 8)



If yes, was this your own child/tamariki? (Circle response)

**Yes**

**No** (Please go to Question 8)



At what age were they injured?

\_\_\_\_\_ years

How old are they now?

\_\_\_\_\_ years

(8) Do you know an adult that has experienced a **concussion**? (Circle response)

**Yes**

**No**



(9) Please indicate how accurate you believe the following statements about concussion are by putting a mark on the line below the statement as in the example below:

The sky is always blue

TRUE \_\_\_\_\_  FALSE

Here are the statements about concussion:

a) An injury is a concussion only when there is a loss of consciousness

TRUE \_\_\_\_\_  FALSE

b) A concussion occurs only as a result of a blow directly to the head

TRUE \_\_\_\_\_  FALSE

c) Temporary confusion is not concussion if it clears within 5 minutes

TRUE \_\_\_\_\_  FALSE

d) The symptoms of concussion are apparent at the time of injury

TRUE \_\_\_\_\_  FALSE

e) It is safe to return to playing sport as soon as the confusion clears

TRUE \_\_\_\_\_  FALSE

f) Being knocked out is not the same as a concussion

TRUE

FALSE

g) Someone with a concussion should be kept awake

TRUE

FALSE

h) There are no long term effects of concussion

TRUE

FALSE

i) Young children/tamaariki will recover better from concussion than adults

TRUE

FALSE

j) Sometimes symptoms can take hours to show up

TRUE

FALSE

The following information will help us find out whether we need to target specific groups to provide more information about head injuries.

(10) What is your age in years? \_\_\_\_\_

(11) What is your gender? **Male** **Female** **Other** \_\_\_\_\_

(12) What ethnic group(s) do you identify with (tick as many as apply)

Māori

Pasifika (Please specify e.g. Tongan,  
Niuean) \_\_\_\_\_

NZ European

Other (Please specify ) \_\_\_\_\_

(13) What is your highest level of education? (please tick)

Primary School

Secondary School

Polytechnic/Trade School

University

(14) What is your occupation? \_\_\_\_\_

(15) Have you had any formal first aid training?                      **Yes**                      **No**

-----

(16) Please list the ages and genders of all your children/tamaariki (e.g. 12/M; 6/F)

---

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(17) Please list any sports your children/tamaariki play: \_\_\_\_\_

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(18) Where did you get your knowledge about head injury? (tick any that apply)

- |  |                                   |
|--|-----------------------------------|
| <input type="checkbox"/> Television            | <input type="checkbox"/> School   |
| <input type="checkbox"/> Newspapers            | <input type="checkbox"/> Internet |
| <input type="checkbox"/> Magazines             | <input type="checkbox"/> Family   |
| <input type="checkbox"/> Medical professional  | <input type="checkbox"/> Friends  |
| <input type="checkbox"/> Own training or study |                                   |

Other: \_\_\_\_\_

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Thank you for your time. If you would like to receive a copy of the results of the study please give us your name and email or postal address on the following separate page.



## **Parent/Caregiver Knowledge of Head Injury Study**

If you would like to receive a copy of the results of the study please give us your name and email or postal address.

Name: \_\_\_\_\_

Address (email or  
postal): \_\_\_\_\_

## Appendix 2: Newspaper Articles

Table 16

*List of Articles used in Media Analysis – Data Set 1 and Subsets*

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
1	7/01/09	Taranaki Daily News	Family waits for information	✓	✓		
2	7/01/09	The Press	Surfers v swimmers	✓	✓	✓	✓
3	7/01/09	The Daily Post	Golf has a new hero _ Danny Lee YEAR IN REVIEW	✓	✓	✓	✓
4	8/01/09	Manawatu Standard	Controversies over reports	✓	✓		✓
5	8/01/09	The Daily Post	No headline: 08SPORTBRIEFS	✓			
6	9/01/09	Dominion Post	Ceilidh to celebrate murdered tourist's life	✓	✓		
7	9/01/09	Manawatu Standard	Bloodied man was lying in gutter	✓	✓		✓
8	9/01/09	Northern Advocate	Moving injured big risk: experts	✓	✓		
9	9/01/09	The Daily Post	Authors tell of coping with illness	✓	✓		
10	10/01/09	Manawatu Standard	Head injury victim transferred	✓	✓		✓
11	10/01/09	Bay of Plenty Times	Life after freestyle riding, says stunt star	✓			
12	10/01/09	NZ Herald	Melbourne Cup-winning jockey set to resume next week	✓	✓	✓	
13	10/01/09	Waikato Times	Impressed with care	✓	✓	✓	
14	11/01/09	NZ Herald	Tricky track no obstacle for mare	✓	✓		
15	11/01/09	Herald on Sunday	Experts dispel detox myths	✓			
16	12/01/09	The Daily Post	BRIEFLY	✓			
17	13/01/09	Manawatu Standard	Police failure outrages dad	✓	✓		✓
18	13/01/09	Dominion Post	Left behind	✓			
19	13/01/09	Southland Times	Waimumu man hurt in fall from horse	✓	✓		
20	13/01/09	Bay of Plenty Times	Car found, suspect sought in hammer attack case	✓	✓		
21	13/01/09	The Daily Post	No headline: D13NADBRIEFS	✓	✓		
22	7/02/09	Waikato Times	Flipping good time	✓	✓	✓	
23	7/02/09	Bay of Plenty Times	Dan back in boat after paralysis	✓	✓	✓	✓
24	7/02/09	Hawkes Bay Today	Man injured after safety gear taken	✓	✓		
25	7/02/09	NZ Herald	Newcombe's GP bike ready to roar into action	✓	✓		
26	8/02/09	Sunday Star Times	Witness intimidated: police	✓	✓		
27	9/02/09	Hawkes Bay Today	Barry injured in race crash	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
28	10/02/09	Hawkes Bay Today	Stockcar driver remains critical	✓	✓	✓	✓
29	10/02/09	Manawatu Standard	Driver has head surgery after speedway crash	✓	✓		✓
30	10/02/09	Hawkes Bay Today	High-speed mayhem lost in blur	✓	✓	✓	✓
31	10/02/09	Dominion Post	Welsh forwards star	✓	✓	✓	
32	10/02/09	Bay of Plenty Times	SPORTS BRIEFS	✓	✓	✓	
33	10/02/09	Dominion Post	Dad remanded on baby assault	✓			
34	11/02/09	Hawkes Bay Today	No headline: 11P2BRIEFS	✓			
35	11/02/09	THE PRESS	New rival for top sporting import	✓	✓	✓	✓
36	11/02/09	Bay of Plenty Times	Driver fatigue brings painful end to holiday	✓	✓		✓
37	11/02/09	Waikato Times	Fire hero becomes iron man	✓	✓		✓
38	12/02/09	Hawkes Bay Today	Carol's dip conquers fear	✓			
39	12/02/09	The Daily Post	No headline: 12MĀORI	✓	✓		
40	12/02/09	Dominion Post	Tale of two NZs	✓	✓		
41	12/02/09	Manawatu Standard	Schoolgirl injured crossing highway	✓	✓		
42	13/02/09	Waikato Times	Same Chiefs backs lining up against Crusaders	✓	✓	✓	✓
43	13/02/09	Taranaki Daily News	Our Saint a chance in 2YO Classic at Pukekura	✓			
44	13/02/09	Hawkes Bay Today	No headline: 13ROT BRIEFS	✓			
45	13/02/09	Manawatu Standard	Schoolgirl in critical condition	✓			
46	13/02/09	Dominion Post	What happened to summer?	✓			
47	13/02/09	Hawkes Bay Today	CHB man dies of race injuries	✓	✓		
48	7/03/09	Waikato Times	Heroic fireman turned Ironman	✓	✓		
49	7/03/09	Bay of Plenty Times	LOCAL BRIEFS	✓			
50	7/03/09	Bay of Plenty Times	No headline: tentimesmar7	✓	✓		
51	7/03/09	Dominion Post	Risati murder accused wanted dad's vest back	✓			
52	7/03/09	NZ Herald	Injuries add up to a lifetime of pain	✓	✓	✓	✓
53	7/03/09	NZ Herald	Church tailors teaching to cater for autistic children	✓			
54	7/03/09	Hawkes Bay Today	No headline: sunfield7	✓			
55	7/03/09	Hawkes Bay Today	Mad crowds, steep hills in epic battle	✓	✓	✓	
56	7/03/09	Dominion Post	Time for Canes to get ruthless	✓	✓	✓	✓
57	7/03/09	Dominion Post	Lowe's season starts on a high	✓	✓	✓	✓
58	7/03/09	Taranaki Daily News	Stayer recovered from bad knock, trainer says	✓			
59	8/03/09	Sunday Star Times	Toddler killed in his drive	✓	✓		
60	8/03/09	Herald on Sunday	University outing disaster	✓	✓		
61	9/03/09	Hawkes Bay Today	No headline: 9briefs	✓			

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
62	9/03/09	Dominion Post	Vet student dies after 22m bridge-swing fall	✓	✓		
63	9/03/09	Nelson Mail	Stockcar driver hurt in crash	✓	✓		
64	9/03/09	Taranaki Daily News	Police: Fall at villas 'a mishap'	✓	✓		
65	9/03/09	Dominion Post	Ward gets its own facelift	✓	✓		
66	9/03/09	Southland Times	Different man sought in attack	✓			
67	9/03/09	Nelson Mail	Parents to face hearing	✓	✓		
68	10/03/09	Dominion Post	Bridge swing case goes to coroner	✓	✓		
69	10/03/09	Nelson Mail	Injured driver stable	✓			
70	10/03/09	The Press	Chch woman dies in fall from villa balcony	✓	✓		
71	10/03/09	Taranaki Daily News	Villas owners share family's pain	✓	✓		
72	10/03/09	Nelson Mail	Tramper airlifted from Heaphy	✓	✓		
73	10/03/09	Bay of Plenty Times	No headline: tue10times	✓	✓		
74	10/03/09	NZ Herald	z IN BRIEF 5-week-old's death examined	✓	✓		
75	10/03/09	NZ Herald	McCaw has his eye on Sharks	✓	✓	✓	✓
76	10/03/09	The Press	McCaw back in weeks	✓	✓	✓	✓
77	11/03/09	Hawkes Bay Today	Caught on camera	✓	✓		✓
78	11/03/09	Hawkes Bay Today	Community concern overwhelms parents	✓	✓		✓
79	11/03/09	Taranaki Daily News	Head-on pulverises victim's vehicle	✓	✓		
80	11/03/09	Dominion Post	Rescuers hurt in boat crash	✓	✓	✓	
81	11/03/09	Manawatu Standard	Community House grant risked	✓			
82	11/03/09	Dominion Post	TEAMTALK	✓	✓	✓	✓
83	12/03/09	Taranaki Daily News	Language barrier hinders police	✓			
84	12/03/09	Bay of Plenty Times	No headline: thur1times	✓	✓		
85	12/03/09	NZ Herald	Homicide investigation into death of infant boy	✓	✓		
86	12/03/09	Dominion Post	Infant to be buried today	✓	✓		
87	12/03/09	Hawkes Bay Today	Little Elms fundraisers organised	✓	✓		
88	12/03/09	Dominion Post	Organ donations in 2008	✓	✓		
89	13/03/09	Nelson Mail	Inquiry into speedway crash filed	✓			
90	13/03/09	Hawkes Bay Today	No headline: 13briefs	✓	✓		
91	13/03/09	The Press	BAIN TRIAL	✓	✓		✓
92	7/04/09	Hawkes Bay Today	Speed, alcohol factors in men's deaths: Coroner	✓	✓		
93	7/04/09	Northern Advocate	Drugs bust linked to baby death	✓	✓		
94	7/04/09	Hawkes Bay Today	Vandalised sign sends girl on 75km ride	✓			
95	7/04/09	Dominion Post	Redirect the anger	✓	✓		

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
96	7/04/09	Manawatu Standard	Inquest not needed, coroner	✓	✓		
97	8/04/09	Northern Advocate	Disabled man in bid to catch thugs who viciously beat him	✓	✓	✓	
98	8/04/09	Northern Advocate	Driving course a wake-up call for youths	✓			
99	8/04/09	Manawatu Standard	Recovery progress	✓	✓		✓
100	8/04/09	Hawkes Bay Today	Attack teen faces court	✓	✓		
101	8/04/09	Dominion Post	TO THE POINT	✓	✓		
102	8/04/09	NZ Herald	A minor crash, a punch and a fight for life ROAD RAGE	✓	✓		
103	8/04/09	Waikato Times	Air ambulance	✓			
104	9/04/09	Dominion Post	Driver charged over man found in ditch	✓	✓		
105	9/04/09	Manawatu Standard	Crash death arrest made	✓	✓		
106	9/04/09	Nelson Mail	Hewitt's lengthy rehab at home	✓	✓		
107	9/04/09	The Press	BAIN RETRIAL	✓	✓		
108	9/04/09	Bay of Plenty Times	OUR VIEW Violence defies reason	✓	✓		
109	9/04/09	Bay of Plenty Times	DANCER BASHING: Teen tells of attack	✓	✓		✓
110	9/04/09	NZ Herald	z IN BRIEF Judge warns rugby star	✓	✓		
111	11/04/09	Northern Advocate	Saviours on our streets	✓			
112	11/04/09	Northern Advocate	Slowing down to enjoy the beauty	✓	✓	✓	✓
113	11/04/09	Southland Times	Ben Herring quits rugby	✓	✓	✓	✓
114	11/04/09	Dominion Post	Herring forced to quit	✓	✓	✓	✓
115	11/04/09	Hawkes Bay Today	No headline: 11weekwas	✓	✓		
116	11/04/09	Hawkes Bay Today	Man knocked out, robbed Second violent attack on pedestrian along busy road	✓	✓		✓
117	11/04/09	Hawkes Bay Today	No headline: 11weekwas	✓	✓		
118	11/04/09	The Press	Differing evidence on father's fatal wound	✓			
119	11/04/09	Hawkes Bay Today	No headline: 11briefstt	✓			
120	11/04/09	Taranaki Daily News	Shameful list: The attacks on our streets	✓	✓		
121	13/04/09	Hawkes Bay Today	Karate kid has fight knocked out of him in TQ	✓	✓	✓	
122	13/04/09	Northern Advocate	No headline: nad briefs1304	✓	✓		
123	13/04/09	Hawkes Bay Today	No headline: hbtbriefs	✓	✓		
124	13/04/09	Bay of Plenty Times	Teens were towed behind ute before serious crash	✓	✓		
125	13/04/09	Waikato Times	Easter toll still five	✓			
126	7/05/09	Waikato Times	Youngster ready to show her magic on court in champs	✓	✓	✓	✓
127	7/05/09	NZ Herald	Blues call on Counties lock to help solve crisis	✓	✓	✓	✓
128	7/05/09	Dominion Post	TEAM TALK	✓	✓	✓	

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
129	7/05/09	The Press	CRUSADERS SEEK RIGHT MINDSET FOR BATTLE IN WET	✓	✓	✓	
130	7/05/09	Timaru Herald	Vaccine	✓			
131	7/05/09	The Press	Fit McCaw delights coaches	✓	✓	✓	✓
132	8/05/09	NZ Herald	Rivals at full strength for defining clash	✓			
133	8/05/09	The Daily Post	Weepu's exile is over	✓			
134	8/05/09	Hawkes Bay Today	No headline: 08spotdigestp12	✓	✓		
135	8/05/09	NZ Herald	More injury blues rock Lam	✓	✓	✓	✓
136	8/05/09	Nelson Mail	Nayland girl bashed at school	✓	✓	✓	
137	8/05/09	The Press	Return to Land of the RISING SUN	✓	✓	✓	✓
138	8/05/09	Manawatu Standard	Jets face their biggest challenge	✓	✓	✓	✓
139	9/05/09	NZ Herald	SUPPORT FOR SON HUMBLER FATHER	✓	✓		✓
140	9/05/09	Northern Advocate	Family moved by messages of support	✓	✓		✓
141	9/05/09	Taranaki Daily News	Team Taranaki out to gatecrash party	✓	✓	✓	
142	9/05/09	NZ Herald	No headline: leon09	✓	✓	✓	✓
143	9/05/09	NZ Herald	Recycling ball vital to Blues' ambitions	✓	✓	✓	✓
144	9/05/09	NZ Herald	McCaw passes latest injury test Crusaders 32 Reds 12	✓	✓	✓	✓
145	9/05/09	The Daily Post	Macca's farewell is put on hold	✓			
146	9/05/09	The Press	Edgeware memories still raw	✓	✓		✓
147	9/05/09	Dominion Post	Pulse defender still recovering	✓	✓	✓	✓
148	10/05/09	Sunday Star Times	Why selectors are still at sixes, sevens	✓	✓	✓	✓
149	10/05/09	Sunday Star Times	HEAD LIKE A HOLE	✓	✓	✓	✓
150	11/05/09	Northern Advocate	Still in coma but breathing unassisted	✓	✓	✓	
151	11/05/09	NZ Herald	Man seriously hurt in leap from ferry	✓			
152	11/05/09	Bay of Plenty Times	No headline: tentimesmon	✓			
153	11/05/09	Northern Advocate	No headline: 11-nad-briefs	✓			
154	11/05/09	Dominion Post	Plenty of stress but rewards too	✓			
155	11/05/09	Southland Times	Reduction in child injuries aim of agencies at city forum	✓			
156	11/05/09	The Press	Blackadder expects attack	✓	✓	✓	✓
157	11/05/09	Manawatu Standard	Poor shooting, defence blamed	✓	✓	✓	
158	11/05/09	Dominion Post	Ouch, that'll hurt Pulse, says Solia	✓	✓	✓	
159	12/05/09	Bay of Plenty Times	Youth flown to Waikato	✓	✓		
160	12/05/09	Northern Advocate	Dad supports head injury plans	✓	✓	✓	✓
161	12/05/09	Northern Advocate	INSIDE TODAY Rugby dad welcomes NRU proposals	✓	✓		

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
162	12/05/09	NZ Herald	Lam looks to nurse sore team	✓	✓	✓	
163	12/05/09	The Press	Top seven miss training but Blackadder stays confident	✓	✓	✓	✓
164	12/05/09	Waikato Times	Smith has good recall of Brumbies' winning visit	✓	✓	✓	
165	13/05/09	NZ Herald	z IN BRIEF NRL exec offers victim support	✓	✓		
166	13/05/09	NZ Herald	Ferry-leap victim was Waiheke paper editor by Beck Vass police reporter	✓	✓		
167	13/05/09	Taranaki Daily News	Son comes across father minutes after fatal motorcycle crash	✓	✓		
168	13/05/09	Northern Advocate	Safe rugby may go to extra time	✓	✓	✓	✓
169	13/05/09	The Daily Post	Four years' jail for domestic attacks	✓	✓		✓
170	13/05/09	NZ Herald	Blues aim to end painful season in style	✓	✓	✓	
171	8/06/09	Dominion Post	Injury stumps Pulse defender	✓	✓	✓	✓
172	8/06/09	Dominion Post	The same old sob story	✓	✓	✓	
173	8/06/09	The Press	Decisive display gives heart to Tactix	✓	✓	✓	✓
174	9/06/09	Northern Advocate	Crane needed after meat truck takes tumble off road	✓	✓		
175	9/06/09	Bay of Plenty Times	Recovering from brain injury means practice	✓	✓	✓	✓
176	10/06/09	Dominion Post	Ropati gets chop as Cleary wields axe	✓	✓	✓	✓
177	10/06/09	The Press	Try, NRL start put Brown 'on top of world'	✓	✓	✓	✓
178	10/06/09	NZ Herald	Late Knights for Warriors' fans	✓	✓	✓	✓
179	11/06/09	Northern Advocate	How snores gave Mike his best night's sleep	✓	✓		✓
180	12/06/09	Bay of Plenty Times	Rescue drama follows inner-city fall	✓			
181	12/06/09	The Daily Post	Warriors not ready to give up on finals chance	✓	✓	✓	✓
182	12/06/09	Nelson Mail	Dog badly injured after attack by neighbour	✓	✓	✓	✓
183	13/06/09	NZ Herald	Never give up, doctor tells the brain-injured	✓	✓	✓	✓
184	13/06/09	Southland Times	Head injury enables man to avoid jail	✓	✓		
185	13/06/09	Nelson Mail	Rehabilitation service lifts street presence	✓	✓		
186	13/06/09	Bay of Plenty Times	No headline: tentimes13	✓	✓		
187	13/06/09	The Press	Brain injury sufferer makes painful plea for compassion	✓	✓		✓
188	7/01/14	Marlborough Express	Boy recovers	✓			
189	7/01/14	Manawatu Standard	Toddler hit by car	✓			
190	7/01/14	Manawatu Standard	Yankee great dies	✓	✓		
191	7/01/14	Southland Times	Port worker injured	✓			

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
192	7/01/14	Dominion Post	Port worker hurt when container topples	✓			
193	7/01/14	The Press	Safety fears after accident	✓			
194	7/01/14	NZ Herald	Punch victims' families push for tougher laws	✓	✓		
195	7/01/14	Hawkes Bay Today	King-hit Kiwi recovering	✓	✓		✓
196	7/01/14	NZ Herald	Punch victim improving slowly but may face long recuperation	✓	✓		✓
197	7/01/14	Bay of Plenty Times	King-hit Kiwi recovering	✓	✓		✓
198	7/01/14	Taranaki Daily News	Taranaki Rescue Helicopter Trust	✓	✓		
199	7/01/14	Marlborough Express	Schumacher still critical	✓	✓		
200	7/01/14	Hawkes Bay Today	Quick thinking saves teen's life	✓	✓	✓	
201	7/01/14	Timaru Herald	Plaque unveiling delayed	✓	✓		
202	8/01/14	Nelson Mail	Head injury keeps teen from overseas trip	✓	✓		✓
203	8/01/14	Hawkes Bay Today	Girl, 3, hit after running on to road	✓			
204	8/01/14	Manawatu Standard	Girl out of hospital	✓			
205	8/01/14	NZ Herald	\$30 insurance slip-up costs \$90,000	✓	✓		✓
206	8/01/14	Bay of Plenty Times	No headline: DDDBriefsNation08	✓			
207	8/01/14	The Daily Post	No headline: DDBriefsNation08	✓			
208	8/01/14	Northern Advocate	No headline: DBriefsNation08	✓			
209	8/01/14	Hawkes Bay Today	No headline: DBriefsNation08	✓			
210	8/01/14	Bay of Plenty Times	Newsmaker	✓	✓		
211	8/01/14	NZ Herald	Around the world	✓	✓		
212	8/01/14	The Daily Post	Newsmaker	✓	✓		
213	8/01/14	Northern Advocate	Newsmaker	✓	✓		
214	8/01/14	Bay of Plenty Times	Newsmaker	✓	✓		
215	8/01/14	Hawkes Bay Today	No headline: 08morebriefs King-hit bail remand	✓	✓	✓	✓
216	8/01/14	Bay of Plenty Times	There's no better time than NOW	✓	✓		
217	9/01/14	The Press	Change to depot stacking	✓	✓		
218	9/01/14	Northern Advocate	Girl, 5, badly injured in smash	✓	✓		✓
219	9/01/14	Taranaki Daily News	Deaths on road put at cost of \$4.5m each	✓	✓	✓	
220	9/01/14	Southland Times	Road deaths have a shocking \$4.54m cost	✓	✓	✓	
221	9/01/14	DOMINION POST	Every road death carries a \$4.54m cost to country	✓	✓	✓	
222	10/01/14	Northern Advocate	Three women injured in highway crash on the Brynderwyns	✓	✓		
223	10/01/14	Northern Advocate	Year in Review 2013 Spring brings cup anguish, police dog stabbing	✓			

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
224	11/01/14	The Daily Post	Grace cheered by the all-clear	✓	✓		✓
225	11/01/14	Northern Advocate	Grace cheered by all-clear	✓	✓		✓
226	11/01/14	Northern Advocate	No headline: 11-3briefs	✓	✓		
227	11/01/14	Timaru Herald	MODERN	✓	✓		
228	11/01/14	Hawkes Bay Today	Helmet hair a small price to pay for safety	✓	✓		
229	11/01/14	NZ Herald	Bozzone's back with a vengeance	✓	✓	✓	✓
230	11/01/14	NZ Herald	Manning and Denver Broncos to open playoff run against San Diego Chargers	✓	✓	✓	
231	12/01/14	Sunday Star Times	Teen dies after king-hit punch	✓	✓		✓
232	12/01/14	Sunday Star Times	IN BRIEF	✓	✓	✓	✓
233	12/01/14	Sunday Star Times	Briefly	✓	✓	✓	✓
234	12/01/14	Sunday Star Times	HEAD CASES	✓	✓	✓	✓
235	12/01/14	Sunday Star Times	He was nervous, said he didn't want to let anyone down	✓	✓	✓	✓
236	12/01/14	Sunday Star Times	Big bang theory creates aftershocks around the globe	✓	✓	✓	✓
237	12/01/14	Sunday Star Times	Spellbinder turns in a blinder	✓			
238	13/01/14	Manawatu Standard	NEWS - NATIONAL	✓	✓		
239	13/01/14	NZ Herald	10,000 fined for no helmet, some get speeding tickets	✓	✓		
240	13/01/14	Taranaki Daily News	Victim making determined recovery	✓	✓		✓
241	13/01/14	DOMINION POST	Community backs bashed fireman as he recovers	✓	✓		✓
242	13/01/14	NZ Herald	MP draws on police wisdom in the House	✓	✓		
243	13/01/14	Northern Advocate	Celebrating a vibrant Whangarei Whangarei Community Spirit	✓	✓		
244	7/02/14	Timaru Herald	Maitland ruled out	✓	✓	✓	
245	7/02/14	The Press	Maitland ruled out	✓	✓	✓	
246	7/02/14	NZ Herald	Migraine sufferer Kerr gets his head together at Blues	✓	✓	✓	✓
247	7/02/14	NZ Herald	Mr Smith goes to Washington	✓	✓	✓	
248	7/02/14	Nelson Mail	Man critical after brawl	✓	✓		✓
249	7/02/14	Manawatu Standard	Man seriously hurt in street fight	✓	✓		✓
250	7/02/14	NZ Herald	Father's relief	✓	✓		
251	7/02/14	Hawkes Bay Today	Armed police arrest man following incident in Napier	✓			
252	7/02/14	NZ Herald	The future is now The future is now	✓	✓		✓
253	8/02/14	Hawkes Bay Today	Ironman training scuppered by crash	✓	✓	✓	✓
254	8/02/14	Manawatu Standard	Fans check out stockcar favourites	✓	✓	✓	

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
255	8/02/14	Taranaki Daily News	Taranaki losing the big battler up front	✓	✓	✓	✓
256	8/02/14	Dominion Post	Wellington hope Timmins gets clearance	✓	✓	✓	
257	8/02/14	Timaru Herald	Yamaha heroine Duncan back	✓	✓	✓	
258	8/02/14	Dominion Post	Jaywalk and you could be in court	✓	✓		✓
259	8/02/14	Waikato Times	Jaywalker fined after cyclist left with injuries	✓	✓		✓
260	8/02/14	Hawkes Bay Today	Napier man charged after club attack	✓			
261	8/02/14	Waikato Times	Attack on couple 'gutless'	✓	✓		✓
262	8/02/14	Taranaki Daily News	Promising signs for girl injured in bike accident	✓	✓		✓
263	8/02/14	Waikato Times	Promising signs for girl injured in accident	✓	✓		✓
264	8/02/14	Hawkes Bay Today	Attack sparks raids	✓			
265	9/02/14	Sunday Star Times	Hailing the Chiefs in 2014 would be a Super idea	✓	✓	✓	✓
266	10/02/14	Dominion Post	Kiwi quartet misses final	✓	✓	✓	✓
267	10/02/14	Manawatu Standard	Awesome Foursome bow out in semifinals	✓	✓	✓	✓
268	10/02/14	Nelson Mail	Kiwi quartet out of contention	✓	✓	✓	✓
269	10/02/14	Marlborough Express	Top Kiwi quartet out of contention	✓	✓	✓	✓
270	10/02/14	Southland Times	Awesome Foursome bow out in semifinals	✓	✓	✓	✓
271	10/02/14	Taranaki Daily News	NZ's awesome four bow out in semis	✓	✓	✓	✓
272	10/02/14	The Press	Awesome Foursome bow out in semis	✓	✓	✓	✓
273	10/02/14	NZ Herald	NZers fail to make finals in snowboard slopestyle	✓	✓	✓	✓
274	10/02/14	Hawkes Bay Today	NZers fail to make finals in snowboard slopestyle	✓	✓	✓	✓
275	10/02/14	Timaru Herald	Cooper grabs slender lead after opening round	✓	✓	✓	✓
276	10/02/14	Bay of Plenty Times	Beneficiaries seek legal highs	✓			
277	10/02/14	Dominion Post	Three hurt	✓			
278	10/02/14	The Daily Post	No headline: 10briefs5	✓	✓		✓
279	10/02/14	Hawkes Bay Today	Man critical after `diving accident' at falls	✓			
280	10/02/14	Northern Advocate	No headline: DprisonersMISTAKES	✓			
281	11/02/14	The Press	'It's not all bad'	✓	✓	✓	✓
282	11/02/14	Marlborough Express	Cheer despite missing out	✓	✓	✓	✓
283	11/02/14	Taranaki Daily News	Coach optimistic about future	✓	✓	✓	✓
284	11/02/14	Timaru Herald	Potential despite failure to qualify	✓	✓	✓	✓
285	11/02/14	Manawatu Standard	Optimism despite missing out	✓	✓	✓	✓
286	11/02/14	Waikato Times	Optimism despite failure to qualify	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
287	11/02/14	Southland Times	Coach optimistic despite team's failure to qualify	✓	✓	✓	✓
288	11/02/14	Manawatu Standard	Boy flown to hospital	✓			
289	11/02/14	Hawkes Bay Today	Injured falls diver remains in critical condition	✓	✓		✓
290	12/02/14	Otago Daily Times	Academics see opportunities for brain health research	✓	✓	✓	✓
291	12/02/14	Nelson Mail	Doing the best they can	✓	✓	✓	
292	12/02/14	NZ Herald	Victim of king-hit attack now stable	✓	✓		
293	12/02/14	The Daily Post	Helicopter callouts	✓			
294	12/02/14	Northern Advocate	Biker killed in Far North crash	✓			
295	12/02/14	Northern Advocate	No headline: 12-3briefs	✓			
296	13/02/14	NZ Herald	Rennie hits back over Clarke concussion claim	✓	✓	✓	✓
297	13/02/14	Taranaki Daily News	Clarke numbers 'don't add up'	✓	✓	✓	✓
298	13/02/14	Waikato Times	Rennie hits out over slurs	✓	✓	✓	✓
299	13/02/14	Bay of Plenty Times	Rennie unhappy with Lam's injury assertion	✓	✓	✓	✓
300	13/02/14	The Press	Rest no longer considered the best cure	✓	✓	✓	✓
301	13/02/14	Northern Advocate	The lone survivor	✓			
302	7/03/14	Manawatu Standard	Tot calls for parents	✓	✓		✓
303	7/03/14	Taranaki Daily News	Hurt toddler brain damaged - doctors	✓	✓		
304	7/03/14	Dominion Post	'Little ripper' Caleb shows improvement	✓	✓		
305	7/03/14	Nelson Mail	Pussy Riot attacked	✓			
306	7/03/14	Marlborough Express	Pussy Riot attacked	✓			
307	7/03/14	Marlborough Express	Drivers seriously hurt in head-on	✓	✓		✓
308	7/03/14	Dominion Post	Two cut free	✓	✓		
309	7/03/14	The Press	Two seriously injured in head-on	✓	✓		✓
310	7/03/14	Southland Times	SUV driver spoken to about crash	✓			
311	7/03/14	Timaru Herald	SUV driver spoken to about crash	✓			
312	7/03/14	Hawkes Bay Today	Man drowned after night outCORONER'S COURT	✓			
313	7/03/14	NZ Herald	Fighting tips for the little guy	✓	✓		✓
314	7/03/14	Manawatu Standard	Panthers chase redemption	✓	✓	✓	✓
315	7/03/14	NZ Herald	Honour for uni's champion	✓			
316	7/03/14	Manawatu Standard	Expert says toddler's brain turned into 'mush'	✓	✓		
317	8/03/14	Nelson Mail	Toddler recovering	✓	✓		
318	8/03/14	Southland Times	Toddler stable	✓	✓		
319	8/03/14	Dominion Post	Toddler on the improve	✓	✓		

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
320	8/03/14	Manawatu Standard	Toddler improving	✓	✓		
321	8/03/14	Northern Advocate	Pussy Riot members attacked by thugs	✓	✓	✓	
322	8/03/14	Bay of Plenty Times	Pussy Riot members attacked by thugs	✓	✓	✓	
323	8/03/14	Northern Advocate	Bitter-sweet memories are tinged with Red	✓			
324	9/03/14	Sunday Star Times	\$60k award after baby wrongly seized	✓	✓		
325	9/03/14	Herald on Sunday	Legend has brain damage	✓	✓	✓	✓
326	9/03/14	Herald on Sunday	Jury is out after Broncos' first-up win	✓	✓	✓	✓
327	9/03/14	Sunday Star Times	Panthers start the season with a roar	✓	✓	✓	✓
328	9/03/14	Herald on Sunday	'Miracle' only hope now for injured Schumacher	✓	✓		
329	10/03/14	Dominion Post	Pool room fall	✓	✓		✓
330	10/03/14	Manawatu Standard	Girl in pool room fall	✓	✓		✓
331	10/03/14	Marlborough Express	Kaikoura crash victim dies in hospital	✓	✓		✓
332	10/03/14	The Press	Serious assaults concern police	✓	✓		
333	10/03/14	Hawkes Bay Today	No headline: DDDDDDeath Motocross Lead	✓	✓		
334	10/03/14	The Daily Post	No headline: DDDDDeath Motocross Lead	✓	✓		
335	10/03/14	Bay of Plenty Times	No headline: DDDDDDeath Motocross Lead	✓	✓		
336	10/03/14	Northern Advocate	No headline: DDDDeath Motocross Lead	✓	✓		
337	10/03/14	Waikato Times	Bikers killed in horror weekend	✓	✓		
338	10/03/14	The Press	Of all animals, sheep do farmers most harm	✓	✓		
339	10/03/14	Southland Times	Sheep do most harm to farmers	✓	✓		
340	10/03/14	NZ Herald	Brain focus of promising research	✓			
341	10/03/14	NZ Herald	Mum wants research fast-tracked	✓			
342	11/03/14	Waikato Times	Accident victim back to school	✓	✓		✓
343	11/03/14	NZ Herald	Tot's brain damage lasting, dad says	✓	✓		✓
344	11/03/14	Manawatu Standard	Court told accused checked on 2-year-old	✓	✓		✓
345	11/03/14	Taranaki Daily News	Chiefs get players back but need quicker ball	✓	✓	✓	✓
346	11/03/14	Manawatu Standard	Chiefs' focus on quicker ruck ball	✓	✓	✓	✓
347	11/03/14	Waikato Times	Focus on more ball to attack	✓	✓	✓	✓
348	11/03/14	Bay of Plenty Times	Injury woes ease as Chiefs face tough run	✓	✓	✓	✓
349	11/03/14	NZ Herald	Troops marshalled for road trip	✓	✓	✓	✓
350	11/03/14	Hawkes Bay Today	Troops marshalled for trips on the road	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
351	11/03/14	The Daily Post	Troops rallied for road trip	✓	✓	✓	✓
352	11/03/14	Waikato Times	Ton for team man Latimer	✓	✓	✓	✓
353	12/03/14	Taranaki Daily News	Tot calls for parents	✓	✓		✓
354	12/03/14	Dominion Post	Lasting injury	✓	✓		
355	12/03/14	Marlborough Express	Toddler expected to have some brain damage	✓	✓		✓
356	12/03/14	Waikato Times	Tot, 2, will have brain damage	✓	✓		✓
357	12/03/14	Dominion Post	Scan to reveal extent of toddler's brain damage	✓	✓		✓
358	12/03/14	Timaru Herald	Injured tot will have brain damage	✓	✓		✓
359	12/03/14	Nelson Mail	Child's brain damaged	✓	✓		
360	12/03/14	Manawatu Standard	Brain injury likely	✓	✓		✓
361	12/03/14	Southland Times	Fan's deadly fall	✓	✓		
362	12/03/14	Northern Advocate	No headline: D12-four	✓	✓		
363	12/03/14	Waikato Times	Fan's deadly fall	✓	✓		
364	12/03/14	Bay of Plenty Times	No headline: 12-Spt-wrldbrfs	✓	✓		
365	12/03/14	Hawkes Bay Today	Rescue callouts	✓			
366	12/03/14	Southland Times	Seven weeks on, George bounces back to school	✓	✓		✓
367	12/03/14	Marlborough Express	Girl knocked off scooter	✓			
368	12/03/14	Nelson Mail	Screams in car crash	✓			
369	12/03/14	Marlborough Express	Crash at holiday park	✓			
370	12/03/14	Nelson Mail	Masters sides win NZ titles	✓	✓		
371	12/03/14	Timaru Herald	Teens admit assault	✓	✓	✓	
372	13/03/14	Manawatu Standard	Accused 'found hurt toddler on the floor'	✓	✓		✓
373	13/03/14	Marlborough Express	Man kicked, beaten in town-centre attack	✓	✓		✓
374	13/03/14	Marlborough Express	Stormers no worry for Squire	✓	✓	✓	✓
375	13/03/14	Bay of Plenty Times	Chiefs hatch plan to blow away Stormers	✓	✓	✓	✓
376	13/03/14	Waikato Times	Squire ready to tackle Stormers	✓	✓	✓	✓
377	13/03/14	Taranaki Daily News	A tough start but Squire ready to tackle Stormers' challenge	✓	✓	✓	✓
378	13/03/14	Nelson Mail	Squire is ready to mix it with Stormers	✓	✓	✓	✓
379	7/04/14	Nelson Mail	Crusaders bank on Read's return	✓	✓	✓	
380	7/04/14	NZ Herald	Crusaders look to open up with Read's return	✓	✓	✓	
381	7/04/14	The Press	Crusaders eye clean sweep in South Africa	✓	✓	✓	✓
382	7/04/14	Manawatu Standard	Crusaders bank on Read's return	✓	✓	✓	
383	7/04/14	Timaru Herald	Crusaders hunt S Africa clean-sweep	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
384	7/04/14	Bay of Plenty Times	No longer the game for everyone	✓	✓	✓	✓
385	7/04/14	NZ Herald	Speedway Grand Prix looks to be Auckland's last	✓	✓	✓	
386	7/04/14	Manawatu Standard	Rennie needs quick-fix for Chiefs' slow starts	✓	✓	✓	
387	7/04/14	Waikato Times	Chiefs need quick fix to slow starts	✓	✓	✓	
388	7/04/14	Nelson Mail	Rennie needs quick-fix for sluggish starts	✓	✓	✓	
389	7/04/14	Taranaki Daily News	Quick fix needed for Chiefs' slow starts	✓	✓	✓	
390	7/04/14	Waikato Times	Rider suffers head injury	✓	✓		
391	7/04/14	Marlborough Express	Riders cool off	✓			
392	8/04/14	Marlborough Express	Injured forestry worker airlifted	✓			
393	8/04/14	Taranaki Daily News	Marist Dragons overwhelm Coastal Cobras	✓	✓		✓
394	8/04/14	NZ Herald	No headline: Twues Breefs	✓			
395	9/04/14	Taranaki Daily News	Bulldogs cop fine	✓	✓	✓	✓
396	9/04/14	Timaru Herald	Bulldogs fined	✓	✓	✓	✓
397	9/04/14	Southland Times	Bulldogs cop NRL fine	✓	✓	✓	✓
398	9/04/14	Bay of Plenty Times	No headline: 09-Spt-wrldbrfs	✓	✓	✓	
399	9/04/14	Nelson Mail	Sons put it on the line for stocks	✓	✓	✓	
400	9/04/14	Timaru Herald	Nurses failed drugged man, inquiry finds	✓	✓		✓
401	9/04/14	Dominion Post	DHB finds nurses should not have let drugged man drive	✓	✓		✓
402	9/04/14	Marlborough Express	Man who drove drugged 'failed by nurses'	✓	✓		✓
403	9/04/14	Nelson Mail	Nurses blamed over car crash	✓	✓		✓
404	9/04/14	The Press	Drugged man 'failed by nurses'	✓	✓		✓
405	9/04/14	Manawatu Standard	Man 'panicking' when he assaulted ambulance officer	✓			
406	10/04/14	The Daily Post	No headline: sport briefs	✓	✓	✓	
407	10/04/14	Bay of Plenty Times	No headline: breeefsssss	✓	✓	✓	
408	10/04/14	Northern Advocate	No headline: Dsptbriefs-10	✓	✓	✓	
409	10/04/14	Nelson Mail	Wary Crusaders aiming to exploit Cheetahs' fragile defence	✓	✓	✓	
410	10/04/14	Timaru Herald	Cheetahs defence gives Crusaders chance	✓	✓	✓	
411	10/04/14	The Press	Cheetahs' slack defence gives Crusaders a chance	✓	✓	✓	
412	10/04/14	Dominion Post	Toddler home	✓	✓		
413	10/04/14	Nelson Mail	Caleb home from hospital	✓	✓		
414	10/04/14	The Press	More blast fines	✓			
415	11/04/14	Dominion Post	LEAGUE NRL	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
416	11/04/14	NZ Herald	Mauger warns on early fancy stuff	✓	✓	✓	
417	11/04/14	NZ Herald	Brain injuries at epidemic levels	✓	✓	✓	✓
418	11/04/14	Marlborough Express	Rolling the dice in Bloemfontein	✓	✓	✓	
419	11/04/14	Nelson Mail	Crusaders to roll dice in Bloemfontein	✓	✓	✓	
420	11/04/14	The Press	Crusaders roll dice against Cheetahs	✓	✓	✓	
421	11/04/14	Timaru Herald	Crusaders roll dice with Ellis on the bench against the Cheetahs	✓	✓	✓	
422	11/04/14	Taranaki Daily News	Crusaders roll dice against Cheetahs	✓	✓	✓	
423	11/04/14	Manawatu Standard	Emery back from Highlanders for Kias' big clash	✓	✓	✓	
424	11/04/14	Marlborough Express	Classic contest on cards	✓	✓	✓	
425	11/04/14	NZ Herald	Long, hard trip back for athlete	✓	✓		✓
426	11/04/14	The Press	Port shores up safety strategy	✓			
427	11/04/14	Dominion Post	Seriously injured toddler laughs and chatters in his new home	✓	✓		✓
428	11/04/14	Manawatu Standard	Nature wins best drama	✓			
429	12/04/14	Dominion Post	Blair affair forced Murdoch divorce	✓	✓		
430	12/04/14	Timaru Herald	Youth agrees blow could have killed	✓	✓		
431	13/04/14	Sunday Star Times	Flying feet-first into trouble	✓	✓	✓	
432	7/05/14	Nelson Mail	Serious BMX injury	✓			
433	7/05/14	Taranaki Daily News	Officer hurt in BMX crash	✓			
434	7/05/14	Dominion Post	Police officer critical after accident on BMX track	✓			
435	7/05/14	The Press	Policeman critical after fall at BMX track	✓			
436	7/05/14	Northern Advocate	Club reviews safety BMX death inquest finding coincides with serious accident	✓			
437	7/05/14	Taranaki Daily News	Pedestrian hit by 4WD	✓	✓		
438	7/05/14	The Daily Post	Rescue helicopter	✓			
439	7/05/14	Bay of Plenty Times	Phone use focus of fatal crash	✓			
440	7/05/14	Dominion Post	'Grey's Anatomy' survives with sheer, brute charm	✓	✓		
441	7/05/14	NZ Herald	Around the world	✓			
442	7/05/14	Dominion Post	Slade's hot form gets high-level approval	✓	✓	✓	✓
443	7/05/14	Nelson Mail	Slade's improved form noted by coach Hansen	✓	✓	✓	✓
444	7/05/14	Taranaki Daily News	High-level approval for soaring Slade	✓	✓	✓	✓
445	7/05/14	Southland Times	Slade's hot form gets Hansen's nod	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
446	7/05/14	Timaru Herald	Slade's hot form leads to change of fortune	✓	✓	✓	✓
447	7/05/14	The Press	Slade's hot form gets the approval	✓	✓	✓	✓
448	7/05/14	Taranaki Daily News	Chiefs used to a battle	✓	✓	✓	
449	7/05/14	Timaru Herald	Chiefs used to being battlers	✓	✓	✓	
450	7/05/14	Waikato Times	Chiefs are ready to do battle	✓	✓	✓	
451	7/05/14	NZ Herald	Fleeting attack brings lifetime of suffering	✓	✓		✓
452	8/05/14	Marlborough Express	BMX crash proves fatal	✓			
453	8/05/14	Taranaki Daily News	BMX-crash cop dies	✓			
454	8/05/14	Manawatu Standard	BMX crash proves fatal	✓			
455	8/05/14	Nelson Mail	Police officer dies	✓			
456	8/05/14	Timaru Herald	Injured BMX rider dies	✓			
457	8/05/14	Dominion Post	Cop dies after bike crash	✓			
458	8/05/14	Waikato Times	BMX crash proves fatal	✓			
459	8/05/14	Dominion Post	Cop dies after bike crash	✓			
460	8/05/14	Taranaki Daily News	Agonising choice for family	✓	✓		
461	8/05/14	Southland Times	Ex-solicitor denies drink-drive charge	✓	✓		
462	8/05/14	Bay of Plenty Times	Read ruled out for Reds match	✓	✓	✓	✓
463	8/05/14	Taranaki Daily News	Read on ice	✓	✓	✓	✓
464	8/05/14	Waikato Times	Ngatai late scratching from Chiefs team for crunch derby	✓	✓	✓	✓
465	8/05/14	Taranaki Daily News	Ngatai late scratching for clash at stadium	✓	✓	✓	✓
466	8/05/14	Manawatu Standard	Caution over concussion	✓	✓	✓	
467	8/05/14	Marlborough Express	Caution over concussion	✓	✓	✓	
468	8/05/14	Nelson Mail	Caution over concussion	✓	✓	✓	
469	8/05/14	The Press	Read upbeat on concussion	✓	✓	✓	✓
470	8/05/14	Nelson Mail	Read on the mend but will miss Reds	✓	✓	✓	✓
471	8/05/14	Dominion Post	Read on the mend but will miss Reds clash	✓	✓	✓	✓
472	8/05/14	Timaru Herald	Read on the mend but will miss Reds clash	✓	✓	✓	✓
473	8/05/14	Marlborough Express	Read on the mend but will miss Reds	✓	✓	✓	✓
474	8/05/14	Bay of Plenty Times	Read ruled out for Reds match	✓	✓	✓	✓
475	8/05/14	Manawatu Standard	Read upbeat about health	✓	✓	✓	✓
476	8/05/14	Taranaki Daily News	Read on ice	✓	✓	✓	✓
477	8/05/14	Timaru Herald	Read on the mend but will miss Reds clash	✓	✓	✓	✓
478	8/05/14	Nelson Mail	Read on the mend but will miss Reds	✓	✓	✓	✓
479	8/05/14	Manawatu Standard	SPORT	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
480	8/05/14	Dominion Post	Visinia's versatility a good fit for Blues' back-three	✓	✓	✓	✓
481	9/05/14	Northern Advocate	No headline: nat briefs 1 copy	✓	✓		
482	9/05/14	NZ Herald	Children's progress relief for dad	✓	✓		
483	9/05/14	Bay of Plenty Times	`Every day gets better and better' for dad	✓	✓		
484	9/05/14	Dominion Post	Read's concussion treatment is a knockout new trend	✓	✓	✓	✓
485	9/05/14	Timaru Herald	Read precaution right thinking	✓	✓	✓	✓
486	9/05/14	The Press	Read sets trend for others to follow	✓	✓	✓	✓
487	9/05/14	Hawkes Bay Today	No headline: 09sptbriefs	✓	✓	✓	✓
488	9/05/14	Northern Advocate	No headline: 09-Spt-brfs	✓	✓	✓	✓
489	9/05/14	Hawkes Bay Today	Set of six	✓	✓	✓	✓
490	9/05/14	NZ Herald	No headline: ss-sos09	✓	✓	✓	✓
491	9/05/14	NZ Herald	Reds pasting opens floodgates for Blues	✓	✓	✓	✓
492	9/05/14	The Press	All go for Lee-Lo	✓	✓	✓	✓
493	9/05/14	The Press	Ready to rumble	✓			
494	10/05/14	Manawatu Standard	Bracing for son's funeral	✓	✓		✓
495	10/05/14	Hawkes Bay Today	Barry hops into Holden for Aussie ute race	✓	✓		
496	10/05/14	Nelson Mail	School of hard knocks	✓	✓	✓	✓
497	10/05/14	Nelson Mail	Tasman puts focus on rugby concussion	✓	✓	✓	✓
498	10/05/14	Dominion Post	All Blacks fullback still down in the mouth	✓	✓	✓	
499	10/05/14	Timaru Herald	Dagg and mouthguard not mixing	✓	✓	✓	
500	10/05/14	The Press	All Black and mouthguard not mixing	✓	✓	✓	
501	10/05/14	Nelson Mail	Pulse here with a vengeance	✓	✓	✓	✓
502	10/05/14	The Press	Pulse out for redemption against Tactix	✓	✓	✓	✓
503	10/05/14	Dominion Post	Kelly steps into breach as Viard principal	✓	✓	✓	
504	10/05/14	The Press	FOR THE LOVE OF FOOD	✓	✓		
505	10/05/14	NZ Herald	Questions asked over police search of Irishman	✓	✓		✓
506	11/05/14	Herald on Sunday	NEWS IN BRIEF	✓			
507	11/05/14	Herald on Sunday	Farewell card for mum	✓			
508	12/05/14	Nelson Mail	Concussion in sport needs to be tackled	✓	✓	✓	✓
509	12/05/14	Northern Advocate	No headline: Dsptd2	✓	✓	✓	
510	12/05/14	NZ Herald	Wynne Gray's 100 Greatest All Blacks 1st XV _ No 15 Kieran Read Set apart by intensity and drive to succeed	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
511	12/05/14	Manawatu Standard	Cru-Sladers rise as Kiwi playoff scrap looms	✓	✓	✓	✓
512	12/05/14	Waikato Times	Tough tests to come for Chiefs	✓	✓	✓	✓
513	12/05/14	Timaru Herald	Cru-Sladers rise as scrap looms	✓	✓	✓	✓
514	12/05/14	Dominion Post	Ominous rise of the Cru- Sladers	✓	✓	✓	✓
515	12/05/14	The Press	Blackadders' men rise as Kiwi playoffs scrap looms	✓	✓	✓	✓
516	13/05/14	NZ Herald	Ambulance abuse on the rise	✓			
517	13/05/14	NZ Herald	Focus goes on rising talent and who can make cut	✓	✓	✓	✓
518	13/05/14	The Press	Luke in a race against time	✓	✓	✓	
519	13/05/14	Dominion Post	Vito looks set for test recall	✓	✓	✓	✓
520	7/06/14	Northern Advocate	Tongan police officers guilty of killing	✓	✓		
521	7/06/14	Nelson Mail	Injury proved recipe for writing	✓			
522	7/06/14	Bay of Plenty Times	Two crash victims still in hospital	✓	✓		
523	7/06/14	Hawkes Bay Today	Rugby players more likely to be benched with injuries	✓	✓	✓	
524	7/06/14	The Press	Put Read's head in Dr Deb's hands	✓	✓	✓	✓
525	7/06/14	Timaru Herald	It's time to put Read's head in Dr Deb's hands	✓	✓	✓	✓
526	7/06/14	Waikato Times	Funds for head injury study	✓	✓		✓
527	7/06/14	Taranaki Daily News	Old Boys search for consistency	✓	✓	✓	
528	8/06/14	NZ Herald	Tot's sad death a murder probe	✓	✓		
529	8/06/14	NZ Herald	NEWS IN BRIEF	✓	✓		
530	8/06/14	Sunday Star Times	IN BRIEF	✓	✓		
531	8/06/14	NZ Herald	Compo ordered over fall	✓			
532	8/06/14	Sunday Star Times	Community rocked by road deaths	✓	✓		
533	8/06/14	Sunday Star Times	Ruck & maul	✓	✓	✓	✓
534	9/06/14	NZ Herald	Police silent on how tot fatally hurt	✓	✓		
535	9/06/14	Dominion Post	Cyclist better	✓	✓		
536	9/06/14	NZ Herald	Rugby collision fright for parents	✓	✓	✓	✓
537	9/06/14	Manawatu Standard	First XV injury fears relieved	✓	✓	✓	✓
538	9/06/14	Bay of Plenty Times	Motocross champ farewellled	✓	✓		
539	9/06/14	The Daily Post	THAT'S GOTTA HURT p4, 13Sports injuries cost \$2m	✓	✓	✓	
540	9/06/14	Bay of Plenty Times	Football fever set to grip again	✓	✓	✓	
541	9/06/14	Hawkes Bay Today	Football fever set to grip again	✓	✓	✓	
542	9/06/14	Manawatu Standard	Tuilagi a star as territorial game kept England in the hunt	✓	✓	✓	✓
543	9/06/14	Marlborough Express	Bunnies bounce woeful Warriors	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
544	9/06/14	Dominion Post	Warriors rue the win that got away	✓	✓	✓	✓
545	9/06/14	Taranaki Daily News	McFadden mad at wasteful Warriors	✓	✓	✓	✓
546	9/06/14	Southland Times	Warriors' woeful play in second half punished	✓	✓	✓	✓
547	9/06/14	Waikato Times	Bunnies bounce woeful Warriors in Perth	✓	✓	✓	✓
548	9/06/14	The Press	Bunnies bounce woeful Warriors	✓	✓	✓	✓
549	9/06/14	Timaru Herald	Rampant Rabbitohs beat woeful Warriors	✓	✓	✓	✓
550	9/06/14	Manawatu Standard	No excuses, says McFadden of woeful Warriors	✓	✓	✓	✓
551	9/06/14	NZ Herald	ABs vowing to lift game evenwithout Read	✓	✓	✓	✓
552	9/06/14	Bay of Plenty Times	All Blacks vow to up their game for test in Dunedin	✓	✓	✓	✓
553	9/06/14	Hawkes Bay Today	ABs vow to up tempo in Dunedin	✓	✓	✓	✓
554	9/06/14	Northern Advocate	All Blacks vow to up their game for test in Dunedin	✓	✓	✓	✓
555	9/06/14	Taranaki Daily News	Hansen: We don't need to panic	✓	✓	✓	✓
556	9/06/14	Southland Times	Dramatic team changes not likely, Hansen says	✓	✓	✓	✓
557	9/06/14	Dominion Post	All Blacks too 'cluttered', England gutted	✓	✓	✓	✓
558	9/06/14	The Press	Dramatic changes unlikely - Hansen	✓	✓	✓	✓
559	9/06/14	Timaru Herald	Hansen: Dramatic changes unlikely	✓	✓	✓	✓
560	9/06/14	Nelson Mail	Major changes unlikely in ABs for Dunedin	✓	✓	✓	✓
561	9/06/14	Marlborough Express	Major changes unlikely in ABs	✓	✓	✓	✓
562	9/06/14	Manawatu Standard	Marist wins marathon battle with HSHC	✓	✓	✓	
563	10/06/14	Manawatu Standard	Head knock puts teen out for season	✓	✓	✓	✓
564	10/06/14	Hawkes Bay Today	Players' head clash on rugby field just 'unlucky'	✓	✓	✓	
565	10/06/14	NZ Herald	Match-fixing at RWC could kill sport's integrity	✓	✓	✓	
566	11/06/14	NZ Herald	Rescue experts race to pull injured cave researcher from subterranean labyrinth	✓			
567	11/06/14	The Daily Post	Dairy owners living in fear	✓	✓		
568	11/06/14	Dominion Post	Coaches shun panic button	✓	✓	✓	✓
569	11/06/14	Southland Times	Foster: Shoddy start will help motivate us	✓	✓	✓	✓
570	11/06/14	Timaru Herald	ABs not panicking after shoddy start	✓	✓	✓	✓
571	11/06/14	Waikato Times	All Blacks won't hit panic button	✓	✓	✓	✓
572	11/06/14	The Press	Dagg in doubt, Read on hold	✓	✓	✓	✓

ID	Date	Source	Title	Data Set			
				1	1.1	1.2	1.3
573	11/06/14	Taranaki Daily News	Key man Read OK but might not play	✓	✓	✓	✓
574	12/06/14	NZ Herald	Teachers lot letter to ed	✓			
575	12/06/14	NZ Herald	McCaw shy of his high standards	✓	✓	✓	✓
576	12/06/14	The Daily Post	Hansen resists urge to tinker with line-up for Dunedin test	✓	✓	✓	✓
577	12/06/14	Hawkes Bay Today	Hansen resists making major changes	✓	✓	✓	✓
578	12/06/14	NZ Herald	Savea the sole change as Hansen backs his men	✓	✓	✓	✓
579	12/06/14	Bay of Plenty Times	Hansen resists making major changes to ABs squad	✓	✓	✓	✓
580	12/06/14	Marlborough Express	No Dagg, no Read, no worries	✓	✓	✓	✓
581	12/06/14	Dominion Post	Smith moves back, Savea moves in	✓	✓	✓	✓
582	12/06/14	Southland Times	Dagg, Read out of All Blacks in second test	✓	✓	✓	✓
583	12/06/14	Waikato Times	Smith gets run at fullback, Read absent	✓	✓	✓	✓
584	12/06/14	Taranaki Daily News	Smith slides back, but Read a no-show again	✓	✓	✓	✓
585	12/06/14	Timaru Herald	Dagg, Read ruled out for second test	✓	✓	✓	✓
586	12/06/14	The Press	Dagg, Read ruled out for test	✓	✓	✓	✓
587	12/06/14	Manawatu Standard	Dagg, Read ruled out for All Blacks test	✓	✓	✓	✓
588	12/06/14	Nelson Mail	No Dagg, no Read no worries for test	✓	✓	✓	✓
589	13/06/14	DOMINION POST	SPORT	✓			
590	13/06/14	Northern Advocate	No headline: 13-3briefs	✓	✓		
591	13/06/14	DOMINION POST	'A crack like lightning' and branch fells Kiwi, inquest told	✓	✓		
592	13/06/14	Bay of Plenty Times	Hansen sticks with players	✓	✓	✓	✓
593	13/06/14	Marlborough Express	Back to business after some DIY and golf	✓	✓	✓	✓
594	13/06/14	NZ Herald	Kiwi kids: How we can save them	✓	✓	✓	✓
595	13/06/14	Taranaki Daily News	Read's season of frustration continues	✓	✓	✓	✓
596	13/06/14	Waikato Times	Read's frustration continues	✓	✓	✓	✓
597	13/06/14	Dominion Post	You wouldn't Read about it	✓	✓	✓	✓
598	13/06/14	Manawatu Standard	3rd test likely for unfit Read	✓	✓	✓	✓
599	13/06/14	Timaru Herald	Read's season still frustrating	✓	✓	✓	✓
600	13/06/14	The Press	Read's season of frustration continues	✓	✓	✓	✓
601	13/06/14	Nelson Mail	Concussion cards a wake-up call	✓	✓		✓
602	13/06/14	Hawkes Bay Today	Injured Myers to return	✓	✓	✓	
603	13/06/14	Bay of Plenty Times	Injured Myers to return	✓	✓	✓	

Table 17

*List of Articles used in Media Analysis – Data Set 2*

ID	Date	Source	Title
701	19/02/09	The Press	Caregivers put at risk
702	28/02/09	Waikato Times	Taking care at the crossroads
703	24/03/09	The Press	Patient-centred one-stop approach to rehabilitation
704	23/05/09	Northern Advocate	Call for brain injury register in rugby
705	9/06/09	Bay of Plenty Times	Recovering from brain injury means practice
706	13/06/09	NZ Herald	Never give up, doctor tells the brain-injured
707	4/07/09	Waikato Times	Four suspended after bullying
708	15/07/09	NZ Herald	Use your brain with concussion
709	30/08/09	Sunday Star Times	Child's play but adults paying price
710	3/09/09	Northern Advocate	Home closer for player who nearly died
711	2/10/09	Northern Advocate	Call for rugby headgear discounted
712	7/10/09	NZ Herald	KO is a deliberate brain injury READERS' FORUM EMMERSON'S VIEW
713	7/10/09	Manawatu Standard	ACC issues add to woman's stress
714	11/12/09	NZ Herald	ROADING Cycle safety measures fast-tracked
715	9/01/14	Taranaki Daily News	Deaths on road put at cost of \$4.5m each
716	9/01/14	Southland Times	Road deaths have a shocking \$4.54m cost
717	9/01/14	Dominion Post	Every road death carries a \$4.54m cost to country
718	12/01/14	Sunday Star Times	He was nervous, said he didn't want to let anyone down
719	12/01/14	Sunday Star Times	Big bang theory creates aftershocks around the globe
720	12/01/14	Sunday Star Times	HEAD CASES
721	26/01/14	Sunday Star Times	NRL payout intrigue as payout stalled
722	26/01/14	Sunday Star Times	Microchip may be answer to knocks to head
723	2/02/14	Herald on Sunday	Rugby's lesson for NFL
724	9/02/14	Sunday Star Times	Hailing the Chiefs in 2014 would be a Super idea
725	17/02/14	Waikato Times	One in five brain injuries suffered in sports, study shows
726	17/02/14	Dominion Post	Concussion risks ignored - study
727	17/02/14	Nelson Mail	Players still ignoring head injury warnings
728	17/02/14	The Press	NZ sport too casual with brain injuries
729	23/02/14	Sunday Star Times	Northland Rugby trials blue-card head bin
730	24/02/14	Northern Advocate	Northland rugger part of rehab trial `Blue cards' mean concussion
731	19/03/14	Northern Advocate	Injury survivor intent on making difference

ID	Date	Source	Title
732	11/04/14	NZ Herald	Brain injuries at epidemic levels
733	21/04/14	Taranaki Daily News	Bird-brain attack let off lightly
734	23/04/14	Southland Times	IRB needs to tackle judicial failings head on
735	23/04/14	The Press	The IRB needs to tackle judicial failings head on
736	23/04/14	Timaru Herald	IRB needs to tackle failings
737	23/04/14	Manawatu Standard	IRB needs to tackle judicial failings
738	1/05/14	Timaru Herald	Head knock rules Read out
739	1/05/14	Marlborough Express	Read ruled out again
740	1/05/14	The Press	Read out for Brumbies clash
741	1/05/14	Nelson Mail	Crusaders won't risk Read
742	10/05/14	Nelson Mail	School of hard knocks
743	12/05/14	Nelson Mail	Concussion in sport needs to be tackled
744	29/05/14	Taranaki Daily News	Read out of the fog and ready to tackle the Force head on
745	29/05/14	Dominion Post	Read out of the fog and ready to play
746	29/05/14	Timaru Herald	Read out of the fog and ready for the Force
747	29/05/14	The Press	Read out of fog, set for Force
748	29/05/14	Nelson Mail	Fog finally lifts for Kieran Read
749	29/05/14	Marlborough Express	Read down from the clouds, ready for Force
750	29/05/14	The Press	Read out of fog, set for Force
751	29/05/14	Manawatu Standard	Read returns in only change for Crusaders
752	31/05/14	The Press	Crusaders grind out ugly victory
753	31/05/14	Taranaki Daily News	Crusaders win but fail to flatter
754	31/05/14	NZ Herald	Star's courageous brain-injury battle
755	4/06/14	NZ Herald	Long break will help star _ and rugby
756	7/06/14	Hawkes Bay Today	Rugby players more likely to be benched with injuries
757	9/06/14	Hawkes Bay Today	Football fever set to grip again
758	9/06/14	The Daily Post	THAT'S GOTTA HURT p4, 13Sports injuries cost \$2m
759	9/06/14	Bay of Plenty Times	Football fever set to grip again
760	13/06/14	Timaru Herald	Read's season still frustrating
761	13/06/14	Waikato Times	Read's frustration continues
762	13/06/14	Dominion Post	You wouldn't Read about it
763	13/06/14	Manawatu Standard	3rd test likely for unfit Read
764	13/06/14	The Press	Read's season of frustration continues
765	14/06/14	Bay of Plenty Times	Concussion at forefront of their mind
766	14/06/14	NZ Herald	Concussion a threat to All Blacks
767	14/06/14	Northern Advocate	Concussion at forefront of their mind

ID	Date	Source	Title
768	15/06/14	Sunday Star Times	Cyclists go head-to-head over safety
769	16/06/14	Bay of Plenty Times	Rugby's \$2.6m injury cost
770	17/06/14	NZ Herald	IRB takes concussion issue seriously, and out to make sure all involved do the same
771	19/06/14	Northern Advocate	Figures show rugby injuries cost NZ \$67 million in 2013
772	7/07/14	The Press	Deans calls into the coach's lair
773	7/07/14	Manawatu Standard	Deans catches up with old comrades
774	8/07/14	Southland Times	Rugby player's death from unrelated brain bleed - doctor
775	8/07/14	Dominion Post	'Player may have died from unrelated brain bleed'
776	8/07/14	Hawkes Bay Today	Coach calls for forum on brain injury risks
777	8/07/14	Northern Advocate	Bid for players to wear protective head gear
778	8/07/14	NZ Herald	Coach calls for forum on rugby head injuries after teen's death
779	8/07/14	NZ Herald	Learning to live with brain injury
780	8/07/14	Bay of Plenty Times	Coach calls for forum on brain injury risks
781	12/07/14	NZ Herald	Fulton says 'no' to legal action over concussion
782	9/08/14	Waikato Times	BACK FROM THE BRINK
783	9/08/14	NZ Herald	Rugby star opens up on head knocks
784	26/08/14	Northern Advocate	A knock to head can be serious injury
785	26/08/14	The Daily Post	Knock to head can deliver serious injury
786	13/09/14	Hawkes Bay Today	Warning to properly manage concussion
787	13/09/14	Dominion Post	Heading for a row over youth players
788	18/09/14	The Press	Brain injury shadow can last years
789	12/10/14	Sunday Star Times	NFL fails to confront the brain injury toll
790	16/10/14	Hawkes Bay Today	Counting the cost of concussion in sport
791	20/10/14	Northern Advocate	Rise in head injury claims
792	22/10/14	Bay of Plenty Times	Harder stance a good thing
793	22/10/14	Bay of Plenty Times	Concussions rise but it's not all bad
794	22/10/14	Bay of Plenty Times	Wider context
795	24/10/14	The Daily Post	Head injuries cost \$200,000
796	29/11/14	Dominion Post	Hughes victim of 'incredible bad luck'
797	2/12/14	NZ Herald	Mother's fight to beat serious head injury
798	6/12/14	Hawkes Bay Today	Cricketers don't need safer gear, parents told
799	10/12/14	Northern Advocate	Helmet rule on cards after Hughes tragedy