QUEENSLAND INJURY SURVEILLANCE UNIT

INJURY BULLETIN

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Sports Injuries

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Summary

- 10% of injury emergency department (ED) presentations were sport related
- Football codes made up more than 60% of sport injuries
- A third of sporting injury victims were children aged 5– 14 years
- Male victims outnumbered females 3:1
- The highest number of injury presentations were aged 10 to 14 years, 70% were aged 5 to 24 years
- Two thirds of injuries were fractures or sprains or strains
- The parts of body injured varied from sport to sport, but overall the most common parts of the body injured were the hand and ankle
- Seventy per cent of injuries were caused by either a fall or being struck by or collision with another person
- Taking participation into account the most dangerous sport in Queensland was rugby league

Introduction

The purists in sports medicine will tell you that -*it's all about prevention…..if we can prevent sports injuries in the first place, the battle is almost won*. However, we need to research the trends and incidences of sports injury in order to be able to educate everyone concerned as to how injuries can be reduced in severity or prevented.

Federal and State governments have identified *injury* as a priority health issue with sport and recreation being one of the identified target areas. Whilst many isolated reports into sports injuries have been carried out, the methodology, coding, incidence and reporting continue to lack consistency.

Governments have traditionally been reluctant to invest in prevention, preferring to fund reactive options that might be more readily identified. One factor certain to change this would be an accurate account of the direct and indirect costs of sports injuries to the health budget and the economy in general. (In 1990, Egger[1] estimated this to be in excess of $1b per annum to the Australian economy.)

* QISU data is based on emergency department presentations to the following hospitals: Mater Children's Hospital, Mater Adult Hospital, Mater Private Emergency Care Centre, Queen Elizabeth II Jubilee Hospital, Redland Hospital, Logan Hospital, Royal Children's Hospital, Mt Isa Hospital, Mackay Base Hospital , Proserpine Hospital, Sarina Hospital, Clermont Hospital, Dysart Hospital and Moranbah Hospital

Egger went on to postulate that between 30 – 50% of sports injuries were preventable if only a small amount of funding were to be placed on improving the education of players, officials and parents.

Recently, attempts have been made to quantify the disability burden which injury places on our community. During 1996 sporting injuries were estimated to have made up almost a quarter of disability adjusted life years (DALY) lost due to non-traffic related unintentional injury in Australia[2].

Whilst the majority of research has been carried out on elite level and professional athletes, many more injuries occur in community sport and physical activities because there are much greater numbers of these participants[3].

The data presented in this Injury Bulletin attempts to address some of these issues by characterising the extent and nature of sporting injuries presenting at hospital Emergency Departments in Queensland.

Results

During 1998-99 Queensland Injury Surveillance Unit collected data on 9031 emergency department presentations at participating hospitals for an injury where the activity was reported as being engaged in a sports activity. These injuries represent nearly ten per cent of all injury presentations. Of those identified as being sport related almost four-fifths were associated with traditional organised sports.

Sport	All	Proportion aged 5-14
Football - NS	21.3%	28.4%
Football - League	15.3%	36.8%
Football - Soccer	14.3%	44.8%
Football - Union	4.52%	26.0%
Football - AFL	3.7%	27.7%
Football - Touch	3.1%	15.1%
All Football	62.3%	33.3%
Netball	9.46%	31.5%
Basketball	7.1%	38.2%
Cricket	6.1%	27.4%
Hockey	3.0%	31.1%
Martial Arts	2.6%	19.2%
Gymnastics	1.6%	80.2%
Softball	1.5%	38.0%
Volleyball	1.5%	17.8%
All sports	100.0%	33.6%

Table 1 Sports injuries presenting at participating hospital EDs, all age by sport and prportion of children, 1998 & 1999, Queensland

Code

For all ages football, particularly rugby league dominated sporting injury presentations making up more than 60% of all sport related presentations (Table 1). Within the football codes the greatest number of injuries were recorded for football-code *not specified (NS)* (21%) followed by *league* (15%), *soccer* (14%), *union* (5%), *AFL* (4%) and *touch* (3%). However when the *football-NS* cases were examined it is clear that these cases are almost all league or union which would increase the league and union percentages to around 30% and 10% respectively.

Other sports with significant numbers of injuries were netball (9%), basketball (7%), cricket (6%), hockey (3%) and martial arts (3%).

	Males		Females
1	Football - not spec	1	Netball
2	Football - League	2	Basketball
3	Football - Soccer	3	Football - Soccer
4	Cricket	4	Football - NS
5	Basketball	5	Hockey
6	Football - Union	6	Gymnastics
7	Football - AFL	7	Softball
8	Football - Touch	8	Football - Touch
9	Martial Arts	9	Volleyball
10	Hockey	10	Martial Arts

Table 2 Rank order of sports injuries presenting at participating hospital EDs by sport and gender, 1998 & 1999, Queensland

Sport	Males	Females
Football - not spec	93.2%	6.8%
Football - League	97.5%	2.5%
Football - Soccer	84.2%	15.8%
Football - Union	94.3%	5.7%
Football - AFL	96.2%	3.8%
Football - Touch	70.6%	29.4%
All Football	91.3%	8.7%
Netball	12.3%	87.7%
Basketball	62.4%	37.6%
Cricket	90.9%	9.1%
Hockey	54.1%	45.9%
Martial Arts	73.6%	26.4%
Gymnastics	32.4%	67.6%
Softball	31.5%	68.5%
Volleyball	46.7%	53.3%
All sports	76.9%	23.1%

Table 3 Sports injuries presenting at participating hospital EDs by sport and gender, 1998 & 1999, Queensland

Sport	Superficial	Open wound	Fracture	Sprain/strain	Intracranial
Football - NS	8.8%	9.6%	20.7%	38.7%	5.8%
Football - League	6.7%	8.4%	23.0%	38.6%	9.0%
Football - Soccer	9.4%	3.9%	25.5%	46.0%	5.1%
Football - Union	7.3%	10.2%	22.2%	35.6%	7.9%
Football - AFL	9.6%	8.5%	28.1%	31.2%	6.9%
Football - Touch	3.7%	4.6%	25.2%	48.2%	0.9%
All Football	8.1%	7.7%	23.2%	40.1%	6.4%
Netball	6.1%	1.4%	21.1%	59.4%	1.5%
Basketball	4.8%	7.4%	23.5%	49.2%	2.6%
Cricket	6.3%	9.4%	26.0%	37.2%	3.3%
Hockey	16.7%	23.0%	15.8%	30.6%	6.2%
Martial Arts	15.9%	7.7%	19.2%	38.5%	1.6%
Gymnastics	4.5%	4.5%	32.4%	40.5%	2.7%
Softball	10.2%	5.6%	20.4%	44.4%	4.6%
Volleyball	5.6%	2.8%	18.7%	62.6%	0.0%
All sports	8.0%	7.5%	22.9%	42.6%	5.1%

Table 4 Sports injuries presenting at participating hospital EDs by sport and nature of main injury, 1998 & 1999, Queensland

Sport	Head	Face	Shoulder	Elbow	Lower arm	Hand	Knee	Ankle	Foot
Football - NS	7.2%	10.5%	13.2%	2.6%	9.4%	13.1%	9.6%	10.4%	3.6%
Football - League	9.2%	10.8%	13.5%	2.8%	7.5%	11.7%	10.4%	7.3%	2.7%
Football - Soccer	5.7%	4.8%	5.8%	3.5%	14.7%	8.6%	12.1%	16.8%	8.1%
Football - Union	8.6%	13.7%	12.4%	2.2%	7.0%	9.5%	11.4%	7.3%	2.2%
Football - AFL	6.9%	9.6%	14.6%	3.5%	9.2%	15.0%	6.2%	10.8%	2.3%
Football - Touch	2.8%	2.3%	18.3%	1.8%	10.6%	17.4%	10.6%	19.7%	3.2%
All Football	7.2%	9.0%	11.9%	2.8%	10.0%	11.8%	10.3%	11.4%	4.2%
Netball	1.4%	2.3%	2.4%	3.6%	15.6%	18.2%	12.3%	33.8%	3.9%
Basketball	3.6%	6.8%	3.2%	3.0%	13.1%	20.3%	10.4%	25.9%	4.0%
Cricket	5.2%	9.8%	6.8%	3.7%	5.6%	30.2%	8.9%	6.3%	3.7%
Hockey	7.2%	23.9%	4.3%	0.5%	6.2%	22.0%	8.6%	12.0%	1.9%
Martial Arts	3.8%	7.7%	7.1%	3.3%	12.6%	15.9%	9.9%	7.1%	14.8%
Gymnastics	1.8%	3.6%	2.7%	13.5%	17.1%	9.0%	9.0%	9.9%	10.8%
Softball	1.9%	10.2%	9.3%	4.6%	14.8%	16.7%	10.2%	14.8%	3.7%
Volleyball	0.9%	1.9%	3.7%	0.9%	13.1%	24.3%	15.9%	28.0%	5.6%
All sports	5.9%	8.5%	9.3%	3.1%	10.7%	14.9%	10.4%	14.6%	4.5%

Table 5 Sports injuries presenting at participating hospital EDs by sport and part of body, 1998 & 1999, Queensland

For injuries in children aged 5-14 years which made up a third of all sporting injuries, the pattern was similar except that there were more soccer (19%) and gymnastics injuries (4%) and fewer martial arts injuries (1%).

Due to the varying nature of the injuries sustained and participation level the characteristics, cause, nature, body location and outcome was analysed separately for each sporting code.

Age and gender

For all sports, injuries to males outnumbered females three to one. The predominance of males was seen for the majority of sports the exceptions being netball, hockey, gymnastics, softball and volleyball. Amongst the injuries for the football codes only touch and soccer were not totally male dominated with 29% and 16% of the injuries being to females respectively (Table 3).

For injury presentation involving females the largest group involved netball (38%) followed by basketball (12%), soccer (10%), football-NS (7%), hockey (6%), gymnastics (5%), softball (5%) and touch (4%) (Table 2).

More than 70% of the sports injury presentations were aged between five and 24 years with the highest prevalence occurring in the 10 to 14 years age group. The numbers of sports injury presentations droped steeply with increasing age (Fig 1). For the majority of sports the age group with the highest number of injuries was 10 to 14 years followed by the 15 to 19 years age group.

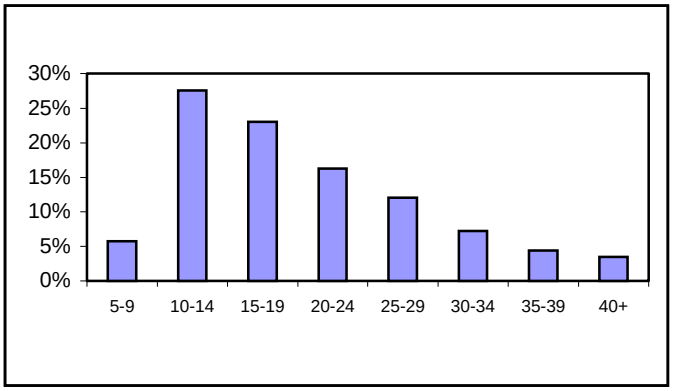

Figure 1 Sports injuries presenting at participating hospital EDs by age, 1998 & 1999, Queensland

Within the football codes union and in particular touch players tended to be older. For the other sporting codes there was a greater proportion of older players injured in netball, cricket and martial arts while injured gymnasts tended to be younger with 80% aged under 15 years.

Nature and body location

Almost two thirds of sports injuries were fractures or sprains and strains, a pattern that was repeated in almost all sporting codes (Table 4). The exceptions were hockey – open wounds and superficial injuries, martial arts – superficial injuries, cricket, rugby union and football NS – open wounds. Head (intracranial) injuries featured mostly in league, union, AFL, hockey and football NS.

For all sports combined the most common part of the body injured was the hand (15%) and the ankle (15%) although this varies from sport to sport (Table 5). For football codes other than soccer shoulder injuries were more common while for both rugby codes injuries to the face were more prevalent.

Amongst netball and basketball players ankle injuries were the most common injury sustained while for cricket, hockey and softball players face and hand injuries were the most frequent. The most common injuries suffered by gymnasts were elbow, forearm and ankle injuries.

External cause

Seventy per cent of sports injuries were reported to have been caused by either a *low fall* or being *struck by or collision with another person* (Table 6). As would be expected being *struck by or collision with a person* was particularly prevalent in all football codes except soccer while being *struck by or collision with an object* was more common amongst cricket, hockey and softball players. Gymnasts were the only group to suffer a significant number of injuries as a result of *high falls*.

Sport	Falls	Struck by/ collision with person	Struck by/ collision with object	Other specified cause
Football - NS	25.2%	56.4%	8.1%	6.8%
Football - League	27.8%	54.9%	6.3%	4.2%
Football - Soccer	36.6%	36.4%	15.5%	6.5%
Football - Union	26.7%	57.8%	3.8%	4.4%
Football - AFL	31.5%	49.6%	8.5%	5.4%
Football - Touch	47.2%	27.5%	6.0%	14.7%
All Football	30.1%	49.7%	9.0%	6.2%
Netball	53.8%	12.9%	15.3%	15.0%
Basketball	47.0%	18.1%	19.5%	11.8%
Cricket	23.7%	6.1%	55.0%	11.2%
Hockey	22.5%	9.1%	56.0%	5.7%
Martial Arts	15.9%	52.2%	16.5%	11.5%
Gymnastics	72.1%	1.8%	9.0%	11.7%
Softball	25.0%	12.0%	47.2%	13.0%
Volleyball	35.5%	16.8%	24.3%	20.6%
All sports	33.4%	37.7%	15.9%	8.4%

Table 6 Sports injuries presenting at participating hospital EDs by sport and external cause, 1998 & 1999, Queensland

Outcome

Overall only 7% of ED presentations for sports injuries resulted in admission to hospital. The sports with the highest admission rates were gymnastics (17%), AFL (9%) league (9%) and soccer (8%). The high admission rate for gymnasts relates to the higher prevalence of fractures amongst this group and their relatively young age.

Participation

To be able to quantify relative safety of the different sporting codes the level of exposure or participation is required. It is difficult to obtain reliable estimates of exposure or participation at all ages in the various sports but the Australian Bureau of Statistics conducts regular population surveys of participation in sport and physical activities which provide 'best' estimates for participation for persons aged 18 years and over[4].

Participation for various sports in Queensland for 1998-99 is given in Table 7. The most striking feature of these data is the over representation of some sports in the injury data relative to participation and the virtual complete absence of others. For example, golf and tennis rarely figure in ED injury presentations yet they have around three times the participants as do all the football codes combined. Using these participation data it is possible to estimate the relative injury index for adult participants in sport.

Relative to all sports combined league players are around four times more likely to be injured while those playing touch were 2.5 times less likely to be injured.

Prevention

A number of countermeasures have been introduced by sporting bodies in an attempt to reduce injury. **Rules** have been modified in a number of sports to enable children and / or older persons to participate more safely within their physical and physiological capacity. **Playing areas** and **duration** have been reduced; **equipment** has been modified in size and substance; rules have been changed to provide more involvement and reduced chance of injury. In addition, there has been a concerted effort to encourage attendance at **educational courses** for coaches, sports trainers and administrators.

The use of **protective equipment** is far more vigilantly monitored than previously was the case both during competition and at training. Why would one not expect an injury to take place where training simulates competition? Many injuries have been avoided in sports such as cricket with the introduction of helmets with faceguards and extra padding for forearms, chest and hands. Mouthguards in contact and some court sports and eye protection in squash and indoor cricket are essential.

There is undoubtedly some way to go in the design and use of protective equipment. The soft helmet in football will not protect from a concussive injury and, in fact, may contribute to heat and vision problems as well as providing something else for opposition players to grasp. The *false sense of security* offered by a soft helmet might lead to more reckless behaviour by the wearer.

Pre-participation screening is proving to be more accepted as individual weaknesses are increasingly

	Number (,000)			%			
Sport	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**	**Injury index**
Football - League	23.5	0	23.5	8.2%	0.0%	5.2%	435
Football - Soccer	37.7	3.9	41.6	13.2%	2.4%	9.2%	201
Football - Union	31.2	0	31.2	10.9%	0.0%	6.9%	113
Football - Touch	48	23.2	71.2	16.8%	14.1%	15.8%	39
All Football	140.4	27.1	167.5	49.1%	16.5%	37.2%	149
Netball	8.4	66.9	75.3	2.9%	40.7%	16.7%	91
Basketball	35.4	14.8	50.2	12.4%	9.0%	11.1%	93
Cricket	36	6.8	42.8	12.6%	4.1%	9.5%	110
Martial Arts	23.4	14	37.3	8.2%	8.5%	8.3%	60
Gymnastics	25	21.2	46.2	8.7%	12.9%	10.3%	7
Volleyball	17.6	13.5	31.1	6.1%	8.2%	6.9%	43
All sports	286.2	164.3	450.4	100.0%	100.0%	100.0%	100
Golf	206.2	68.2	274.4				
Aerobics/fitness	79.7	168.1	247.8				
Tennis	87.9	106.6	194.5				
Ten pin bowling	39.8	52.3	92.1				
Squash	51.7	32.4	84				
Lawn bowls	43.1	24.2	67.3				

Table 7 Australian Bureau of Statistics adult sport participation and injury index, 1998 –99, Queensland

Prevention continued

being identified as predisposing factors to injury. It is, therefore, important for sporting clubs to have access to a Sports Medicine team that can look after its participants in the areas of prevention, management and rehabilitation of injuries.

Parents should be increasingly selective as to which sport and to which club or organisation they entrust their children. They should identify a club that has a good administrative structure from the State level down and that has well-maintained playing, changing and spectator areas; qualified and experienced coaches throughout the grades and not just at senior level; an experienced sports medicine professional in charge of safety; and a qualified sports trainer present at all competitions in all grades.

Safety hints

Special attention needs to be paid to the incidence of **intracranial head injuries**, particularly in the football codes of league and union. Coaches must place more emphasis on tackling techniques and obeying the laws of the game – many head injuries occur from poor tackling technique and foul play.

Ankle and **knee** injuries occur most frequently in multi-directional sports where the combined effects of playing surface and conditions, appropriate footwear and preventative ankle taping all need consideration.

Injuries to **hands** and **feet** in netball, basketball, football, hockey, cricket and martial arts can all be reduced by more careful attention to hitting, catching and falling techniques and the use of protective equipment such as gloves, where appropriate.

Superficial and **open** wounds occur more regularly in hockey, cricket, martial arts and football due largely to inferior technique on the part of the recipient and other participants. Mistimed tackles, hits and reckless play are all preventable instances. In some cases, protective equipment such as mouthguards, helmets and faceguards can reduce this type of injury without constituting a hazard in their own right.

Resources

There are a number of publications available to assist clubs, organisations and parents to conduct safer sport. Sports Medicine Australia has produced a resource *How to become a SportSafe Club* and is currently in the process of following this up with *How to become a SportSafe Facility* and *How to become a SportSafe School*. In addition, SMA has available *Safety Guidelines for Children's Participation in Sport* and a series of pamphlets on *Women in Sport*.

The Sports Medicine Australia *Safer Sport* education and training programs for individuals interested in working with community sport and recreation on prevention and management of injuries can be accessed by contacting SMA on (07) 3870 4195 or **www.sportsmedicine.com.au** for Brisbane and regional contacts.

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QISU Web site

www.qisu.qld.gov.au

QISU Data

QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals (acknowledged on page 1) represent three distinct regions of Queensland. QISU publications and data are available on request for research, prevention and education activities.

QISU Injury Bulletin

Injury Bulletin comment or feedback is welcomed and can be directed to:
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