Downloaded from injuryprevention.bmj.com on 1 March 2008

Immediate care of school sport injury

L Abernethy, D MacAuley, O McNally and S McCann

Inj. Prev. 2003;9;270-273
doi:10.1136/ip.9.3.270

Updated information and services can be found at:
http://injuryprevention.bmj.com/cgi/content/full/9/3/270

These include:

Data supplement *"Web-only Questionnaire"*
http://injuryprevention.bmj.com/cgi/content/full/9/3/270/DC1

References This article cites 21 articles, 13 of which can be accessed free at:
http://injuryprevention.bmj.com/cgi/content/full/9/3/270#BIBL

Rapid responses You can respond to this article at:
http://injuryprevention.bmj.com/cgi/eletter-submit/9/3/270

Email alerting service Receive free email alerts when new articles cite this article - sign up in the box at the top right corner of the article

Topic collections Articles on similar topics can be found in the following collections

Other sports and exercise medicine (1331 articles)

Notes

To order reprints of this article go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to *Injury Prevention* go to:
http://journals.bmj.com/subscriptions/

Downloaded from injuryprevention.bmj.com on 1 March 2008

BRIEF REPORT

Immediate care of school sport injury

L Abernethy, D MacAuley, O McNally, S McCann

Injury Prevention 2003;**9**:270–273

See end of article for authors' affiliations

Correspondence to: Dr Liz Abernethy, Accident and Emergency Department, Ulster Hospital, Dundonald, Belfast BT16 1RH, UK; liz.abernethy@btopenworld.com

School sport is a major cause of injury in the post-primary age group. The importance of primary prevention in sport has been identified; however secondary prevention of school related sport injury has not been described in Ireland.

A random sample of 450 schools in Northern Ireland and the Republic of Ireland was studied using a postal questionnaire. Current management of sport injury, with particular interest in the expertise and training of teachers and coaches, was explored.

Replies were received from 333 (74%) schools. There was no physical education teacher with up to date first aid training in 37% schools. Immediate care in terms of mechanisms and equipment to deal with injury was available in 35%–81% of schools responding. Correct response ranged from 65%–90% to four scenarios: commonly presenting yet potentially serious management problems. This study demonstrated deficiencies in sport injury care. In addition to concern about current training, a need for basic life support training is highlighted. These findings have implications for the prevention of school sports injuries.

The health benefits of exercise are well documented,[1 2] and school sport is recognised as an important means of promoting physical activity in children.[3] Sport is, however, a major cause of injury in the post-primary age group (11–18 years) in both Europe and North America.[4–7] Injury occurs during organised sport (62%), physical education class (20%), and in non-organised or unsupervised sport (18%).[6] Reports suggest that a fourth of all school injuries are serious (that is, fracture, dislocation, and brain injuries),[8] and 61% of sports injuries are minor (sprains, strains, contusions, abrasions, and lacerations).[9] Fatalities are rare but one national school injury study in USA identified 30 sports related deaths in a six year period, all of which were in the 15–19 age group.[8]

School sport must be safe and enjoyable if we are to implement current public health policy in promoting physical activity. The importance of primary prevention—for example, the wearing of personal protective gear—has been identified.[10 11] The epidemiology of school sport injury has been documented in Ireland,[12–15] but we know little about readiness for and early management of injury, that is, secondary prevention. The literature suggests that appropriate intervention can influence outcome.[16–21]

The purpose of this study was to identify the current state of equipment and staff to manage injury in post-primary schools throughout Ireland.

School sport is an integral part of the physical activity promotion, with increasing UK government emphasis on physical education in the school.[3 22] All pupils participate in physical education (PE) unless there is a medical reason for exclusion. The national curriculum for physical education in Northern Ireland (NI) and the Republic of Ireland (ROI) ensures that PE activities are uniform in all schools—that is, percentage of time spent in aerobic activities, contact sport, etc. However extracurricular activities and percentage participation by pupils is variable between schools.

METHOD

This was a postal questionnaire study of post-primary schools in NI and the ROI. We developed our questionnaire in consultation with relevant experts: two physical education teachers, a consultant in accident and emergency (A&E) medicine, and a consultant in sports medicine. The draft questionnaire focused on the following areas: demographic features and location of each school, contact sport participation, current immediate care of sports injury, and education and experience of the teaching and coaching staff. We sought further advice from the advisor on physical education for the education and library boards in NI, and the Physical Education Inspectorate Office in the ROI, and consulted the recommendations of the British Association of Advisors and Lecturers in Physical Education.[23]

We pilot tested the questionnaire for face and content validity on a convenience group of six senior PE teachers from NI and one from the ROI. We explained the aims and objectives of the study and asked for comments on the relevance and clarity of the questionnaire. We invited this pilot group to complete the questionnaire again after modification seeking further comment.

The questionnaire used is illustrated in appendix 1 on the website (www.injuryprevention.com/supplemental).

Our population comprised all post-primary schools in NI and the ROI based on lists obtained from the Department of Education Northern Ireland, and from the Department of Education and Science, Ireland. There were 244 schools in NI and 759 in the ROI. This represented 155 553 pupils aged 11–18 years in NI and 346 409 pupils aged 12–18 years (together with a small number of 11 year olds) in the ROI. We selected a computerised random sample of schools from these two groups using SPSS (v9.0). The sample comprised 450 schools: 150 schools from NI and 300 from the ROI. Each school principal was sent a letter of explanation assuring confidentiality and anonymity, together with a questionnaire and reply paid envelope. The principal was asked to give the questionnaire to a member of the PE department for completion. The questionnaires were colour coded so that we could separate responses from NI and the ROI. One reminder was sent to all schools after six weeks, explaining that anonymity prevented identification of schools that had already replied.

Abbreviations: A&E, accident and emergency; NI, Northern Ireland; PE, physical education; ROI, Republic of Ireland

Downloaded from injuryprevention.bmj.com on 1 March 2008

Table 1 Scenario test results

Scenario/optional response	Percentage of teachers selecting response
• A pupil collides with an opponent at a football match and is knocked out for a few seconds. He/she comes round and wants to resume play.	
I would allow the pupil to play	0
I would send the pupil to the changing rooms/bus to rest	1.8
I would get the pupil to rest by the pitch side, where someone would observe him/her	94.8
I would get the pupil to rest for a few minutes before allowing him/her to return to play	3.4
• A pupil is hit on the hand with a hurling/hockey stick. He/she complains of pain but wishes to continue playing. On inspection there is swelling.	
I would let the pupil return to play	0.3
I would apply ice (when available) and take the pupil out of play for the rest of the match	91.4
I would strap the hand and let them return to play	0.9
I would allow the pupil to return to play until I could see that he/she was in difficulty	7.4
• A pupil/child collapses after a race	
I would put the child in the recovery position and call an ambulance	22.4
I would try to rouse the child using smelling salts	0
I would check if the child was breathing, if not I would commence basic life support and send someone to call an ambulance	64.5
I would keep the child warm with a blanket/clothing and call an ambulance	13.1
• A rugby scrum collapses or a child falls 10 feet off the climbing wall. He/she says they can't move	
I would straighten the pupil out to ease discomfort and call an ambulance	0.3
I would sit the pupil up to assess him/her more easily	0.3
I would place the pupil in the recovery position and call an ambulance	4.7
I would immediately immobilise the neck by holding the head and instruct him/her not to move until help arrived (paramedics with a spinal board)	94.7

Bold type indicates the most appropriate response.

We also attempted to explore the response to common injuries using scenario testing. The scenarios were chosen to represent commonly presenting yet potentially serious problems. These are described in table 1.

The results were entered onto the database using SPSS for Windows and analysed using Mann-Whitney, Spearman's and Kendall's correlation coefficients, *t* test, and Pearson's χ^2 as appropriate. All p values are two tailed and a level of significance of 0.05 or less.

RESULTS

We received replies from 128 schools in NI (85.3%) and 205 in the ROI (68.3%) giving us an overall response of 333 (74%), with minimal variation in the response to individual questions.

Schools varied greatly in size ranging from 32 to 2300 pupils. NI schools (mean (SD) 700 (342), median 650) and ROI schools (mean (SD) 487 (269), median 450).

We also estimated the proportion of pupils taking part in contact sport both timetabled and extracurricular; this is summarised in table 2.

School policy requires documentation of sports injury in the PE department accident book. Altogether 64% of schools studied documented fewer than five injuries per month and 1.2% more than 15 per month. Seventy nine percent of schools (NI 75.9%, ROI 78.9%) reported that less than 10% of injured pupils attended their hospital A&E department for assessment and treatment of their injury.

Table 2 Proportion of all pupils who participate in contact/collision sport: timetabled and extracurricular; values are number (%)

Percentage pupil participation	Northern Ireland	Republic of Ireland
<10	4 (3.2)	8 (3.9)
10–25	9 (7.1)	30 (14.8)
25–50	23 (18.3)	70 (34.5)
50–75	30 (23.8)	56 (27.6)
>75	60 (47.6)	39 (19.2)
Total	126 (100)	203 (100)

Immediate care

There was wide variation in the first aid training of school sport personnel. No PE teacher with up to date first aid training was available in 33.4% of schools (32% NI, 33.9% ROI). The number of pupils per teacher or coach with first aid training ranged from 50–1000 (ROI mean (SD) 298 (184), median 250; NI mean (SD) 312 (99), median 263).

We also explored issues relating to immediate injury treatment and communication with emergency services (table 3).

We explored the relationship between the size of the school, the number and training of staff, and immediate injury care. There was a significant correlation between the size of the school and the proportion of staff with current first aid training so that larger schools had a greater proportion of PE teachers with up to date first aid training ($p<0.05$). This ratio was greater in NI than in than in the ROI ($p<0.01$). The ratio of first aid trained coach to pupil was positively correlated with the availability of a portable first aid kit ($p<0.001$), pupil supervision outside school grounds ($p<0.01$), and ice availability outside the school grounds ($p<0.05$).

Interestingly, there were more trained PE teachers per pupil, and more trained games coaches (PE and other staff) per pupil ($p<0.05$), in those schools where there was more contact sport participation. Similarly, ice availability was more likely with a higher level of pupil participation in contact sports ($p<0.05$).

Some schools appeared to have better all-round immediate care so that, for example, if one aspect of care was high quality (for example, telephone access) then other areas of care tended to be good (for example, ice availability). The converse was also true.

Injury management

We explored the theoretical management of four potentially serious injury scenarios. Participants were invited to select the one most appropriate response. Almost all participants completed this section, response options and results for each scenario question are summarised in table 1.

Downloaded from injuryprevention.bmj.com on 1 March 2008

Table 3 Immediate injury care in schools in Ireland; values are percent

Question	Always	Often	Sometimes	Rarely	Never
• "How often is a portable first aid kit brought by the person in charge when activities are outside the school building (>few minutes walk from departmental first aid box)?"	34.8	21.0	15.3	14.9	13.1
• "How often is a telephone accessible within 2 minutes when activity is in school grounds?"	80.7	10.2	3.3	3.6	2.1
• "How often is a telephone accessible within 2 minutes, when activity is outside school grounds?"	48.7	28.0	14.0	5.1	4.1
• "How often can another member of staff be made available to supervise children while casualty is being taken care of, when activity is in school grounds?"	67.6	18.6	9.9	3.6	0.3
• "How often can another member of staff be made available to supervise children while casualty is being taken care of, when activity is outside school grounds?"	24.2	22.7	24.2	21.7	7.1
• "How often is ice available for treatment of soft tissue injury when activity is in school grounds?"	77.2	11.7	4.8	3.3	3.0
• "How often is ice available when activity is outside school grounds?"	24.8	19.3	30.0	16.8	9.2

There was no significant relationship between the proportion of PE teachers with first aid training and scenario score. A total score of four points, one for each correct response, was possible for the scenario questions. There was a significantly higher mean total scenario score in NI (mean (SD) 3.61 (0.63), variance 0.4) compared with ROI (mean (SD) 3.39 (0.79) variance 0.63) ($p<0.01$).

There was a trend for teachers in larger schools to score well in scenario testing overall but this relationship did not achieve statistical significance ($p=0.051$). There was a significant relationship in selection of correct response to the management of the collapsed child, however, so that teachers from larger schools were more likely to give the correct response ($p<0.01$). There was, interestingly, no significant relationship between the proportion of PE teachers with first aid training and scenario score. In schools where all PE teachers had up to date first aid training the mean scenario score was 3.51 and in those schools where not all had up to date training the score was 3.46.

Advice to parents on the need to take a pupil to hospital after head injury or hand injury was not influenced by travel time to an A&E department or first aid training ratios of staff. However, teachers who scored more highly in scenario testing were more likely to advise A&E referral ($p<0.01$). There was no correlation between scenario score and travel time from an A&E department.

Interest in further training

We asked participants if a member of the school games staff would be interested in attending a first aid workshop with particular reference to the sporting environment and 93% (NI 95.2%, ROI 91.6%) indicated that they would be interested. We explored the relationship between reported interest in attending a workshop and the score on scenario testing and found that those interested in attending had a significantly higher mean score on scenario testing (3.5) than those who were not (3.0) ($p<0.01$).

DISCUSSION

The overall response rate of 74 % is comparable to a recent similar survey of schoolteacher attitudes to first aid training ($n=36$), with an 83.3% response rate.[24]

We were interested in the diversity of training of staff in first aid: in 5.4% of schools, all games staff had first aid training yet, there were other schools where no members of staff had up to date first aid training. In those schools with trained staff the ratio of trained games staff to pupil ranged from 1:50 to 1:1000 pupils (mean 1:298). We can compare this finding to Canada where the reported ratio of first aid trained staff to pupil ratio is 1:205.[25] It was also interesting to note the trend for larger schools to have greater ratio of first aid training among games staff per pupil. This may account for the greater first aid ratios in NI where there are larger schools than in the ROI. However this may also be influenced by the grater pupil participation in contact sport in schools in NI.

Table 3 illustrates inconsistencies in immediate care. We were concerned at the variable ability to communicate with emergency services by telephone. It may be that this highlights an omission in school policy.

We were concerned about the response to the scenario testing and, in particular, in the example of how one should deal with a pupil collapsing after a race. This scenario was designed to test response in a life threatening situation and only 64.5% of teachers selected the correct response in a potentially serious situation. Selection of an inappropriate response by nearly one third of participants may demonstrate limitations in this method in that it is possible that respondents did not consider that the child had stopped breathing. However keeping an unconscious child warm with a blanket without considering the recovery position, option four in the scenario selected by 13.1%, is clearly wrong and indicates inadequate knowledge and poor management. This is in keeping with studies from North America which found that 30% of coaches had no specific training in first aid, and 40% had never been trained in cardiopulmonary resuscitation.[25–27]

Our inclusion of a question on first aid training allowed us to explore the relationship between current training, and interest in future training, with the scenario tests. That we were unable to demonstrate a relationship between current training and the response to the scenario test raises questions about the quality and value of current training. Clearly, it did not equip the respondents to deal with the scenarios presented. In mitigation, however, there was enormous interest in attending a training workshop on first aid with particular reference to the sporting environment. Several teachers made additional comments on the questionnaire to stress their interest. More worrying, however, is the inverse relationship between interest in training and performance on the scenario tests, so that those who appeared to need training most were the least interested.

While some authors have suggested that improved training may lead to a reduction in accidental injury rate,[28 29] there are no systematic reviews available to show that improved training in immediate care reduces injury. In addition there is conflicting opinion on the need for childhood injury prevention in relation to sport.

In one review of childhood injury prevention, school sport was not identified as a major issue.[30] Conversely a review of adolescent injury identified legislative and regulatory controls, including environmental factors with relatively low

Downloaded from injuryprevention.bmj.com on 1 March 2008

Key points

- This study demonstrated deficiencies in sport injury care in schools.
- In addition to concern about current training, we highlight a need for basic life support training.
- Teachers appeared very willing to undertake further training.
- These findings have significant implications for health care professionals and schools in the prevention of school sports injuries.

implementation costs, as the most effective measures to prevent accidental injury in sport.[31]

Notwithstanding the need for an evidence base for enhanced training of sports teachers in the secondary prevention of sports injuries, the findings of this study highlight the need for basic life support training in school games staff. This is consistent with the joint recommendations of the British Association of Paediatricians and the British Association of Paediatric Surgeons,[32] and the FIMS/WHO ad hoc committee on sport and children.[1]

CONCLUSION

In conclusion this study demonstrated deficiencies in sports injury care in all aspects studied: immediate care, staff first aid training, and injury scenario performance. In addition to concern about the quality and value of current training we highlight a need for basic life support training. These findings have significant implications for health care professionals and schools in the secondary prevention of school sports injuries.

See the website for appendix 1 (www.injuryprevention.com/supplemental)

Authors' affiliations
L Abernethy, Accident and Emergency Department, Ulster Hospital, Dundonald, Belfast
D MacAuley, Department of Epidemiology and Public Health, Queens University of Belfast
O McNally, School of Nursing, University of Ulster at Jordanstown
S McCann, School of Nursing, University of Ulster at Magee

REFERENCES

1 **Anonymous**. Sports and children: consensus statement on organized sport for children. FIMS/WHO ad hoc committee on sport and children. *Bull World Health Organ* 1998;**76**:445–7.
2 **Nicholl JP**, Coleman P, Williams BT. *A national study of the epidemiology of exercise related injury and illness*. London: Sports Council, 1991.
3 **Department of National Heritage**. *Sport—raising the game*. London: Department of National Heritage, 1995.
4 **Knight S**, Veron DD, Fines RJ, *et al*. Pre hospital emergency care for children at school and non-school locations. *Pediatrics* 1999;**103**:e81.
5 **Haq SM**, Haq MM. Injuries at school: a review. *Tex Med* 1999; **95**:62–65.
6 **Backx FJG**, Beijer HMJ, Bol E, *et al*. Injuries in high risk persons and high risk sports: a longitudinal study of 1818 school children. *Am J Sports Med* 1991;**19**:124–30.
7 **Gratz RR**. School injuries: what we know, what we need. *Journal of Pediatric Health Care* 1992;**6**:256–62.
8 **Miller TR**, Spicer RS. How safe are our schools? *Am J Public Health* 1998;**88**:413–18.
9 **Taylor BL**, Attia MW. Sports related injuries in children. *Acad Emerg Med* 2000;**7**:1376–82.
10 **Hergenroeder AC**. Prevention of sports injuries. *Pediatrics* 1998;**101**:1057–63.
11 **Helms PJ**. Sports injuries in children: should we be concerned? *Arch Dis Child* 1997;**77**:161–3.
12 **Weir MA**, Watson AWS. A twelve month study of sports injuries in one Irish school. *Ir J Med Sci* 1996;**165**:165–9.
13 **Cuddihy B**, Hurley M. Contact sports and injury. *Ir Med J* 1990;**83**:98–100.
14 **Watson AWS**. Sports injuries in school gaelic football: a study over one football season. *Ir J Med Sci* 1996;**165**:12–16.
15 **Watson AWS**. Sports injuries during one acaedemic year in 6799 Irish school children. *Am J Sports Med* 1984;**12**:65–71.
16 **Sharples PM**, Storey A, Aynsley-Green A, *et al*. Avoidable factors contributing to the death of children with head injury. *BMJ* 1990;**300**:87–91.
17 **McCoy GF**, Piggot J, MacAfee A, *et al*. Injuries of the cervical spine in schoolboy rugby football. *J Bone Joint Surg Br* 1984;**66**:500–3.
18 **Cantu RC**. Head injuries in sport. *Br J Sports Med* 1996;**30**:289–96.
19 **Glaun R**, Egnal A, Allen J, *et al*. Are high schools adequately prepared to cope with serious rugby injuries? *S Afr Med J* 1984;**66**:768–70.
20 **Cooney M**, Coleman F, Flynn A. A study of the knowledge that school rugby coaches have in the management and prevention of serious neck injury. *Ir Med J* 2000;**93**:171–4.
21 **Barker M**, Power C, Roberts I. Injuries and risk of disability in teenagers and young adults. *Arch Dis Child* 1996;**75**:156–8.
22 **Trippe H**. Children and sport. *BMJ* 1996;**312**:199.
23 **British Association of Advisors and Lecturers in Physical Education**. *Safe practice in physical education*. Fakenham, Norfolk: British Association of Advisors and Lecturers in Physical Education, 1999
24 **Bowen C**. Educating teachers in children's illness: a study. *Nursing Stand*ard 1996;**10**:33–6.
25 **Brown BR**, Butterfield SA. Coaches—a missing link in the health care system. *Am J Dis Child* 1992;**146**:211–17.
26 **Feldman W**, Woodward CA, Hodgson C, *et al*. Prospective study of school injuries: incidence, types, related factors and initial management. *Can Med Assoc J* 1983;**129**:1279–83.
27 **Gagliardi M**, Neighbours M, Spears C, *et al*. Emergencies in the school setting: are public school teachers adequately trained to respond? *Pre-hospital and Disaster Medicine* 1994;**4**:222–5.
28 **Glendon AI**, McKenna SP. Using accident injury data to assess the impact of community first aid training. *Public Health* 1985;**99**:98–109.
29 **Frederick K**, Bixby, Orzel M-N, *et al*. An evaluation of the effectiveness of the injury minimization programme for schools (IMPS). *Inj Prev* 2000;**6**:92–5.
30 **Injury Prevention and Research Centre at University of Washington**. Available at: http://depts.washington.edu/hiprc/childinjury/index.htm.
31 **Munro J**, Coleman P, Nicholl J, *et al*. Can we prevent accidental injury to adolescents? A systematic review of the evidence. *Inj Prev* 1995;**1**:249–55.
32 **Working party of the British Paediatric Association and British Association of Paediatric Surgeons Joint Standing Committee on Childhood Accidents**. *Guidelines on the management of head injuries in childhood*. London: Royal College of Paediatrics and Child Health, 1991.