



HAL
open science

The Effect of Sporting Events on Emergency Department Attendance Rates in a District General Hospital in Northern Ireland.

Angela Mcgreevy, Lynn Millar, Brian Murphy, Gareth Davison, Robin Brown,
Mark Edward O'Donnell

► **To cite this version:**

Angela Mcgreevy, Lynn Millar, Brian Murphy, Gareth Davison, Robin Brown, et al.. The Effect of Sporting Events on Emergency Department Attendance Rates in a District General Hospital in Northern Ireland.. International Journal of Clinical Practice, 2010, 64 (11), pp.1563. 10.1111/j.1742-1241.2010.02390.x . hal-00576629

HAL Id: hal-00576629

<https://hal.science/hal-00576629>

Submitted on 15 Mar 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



The Effect of Sporting Events on Emergency Department Attendance Rates in a District General Hospital in Northern Ireland.

Journal:	<i>International Journal of Clinical Practice</i>
Manuscript ID:	IJCP-11-09-0684.R2
Manuscript Type:	Original Paper
Date Submitted by the Author:	18-Jan-2010
Complete List of Authors:	McGreevy, Angela; Daisy Hill Hospital, Surgery Millar, Lynn; Daisy Hill Hospital, Surgery Murphy, Brian; Daisy Hill Hospital, Surgery Davison, Gareth; University of Ulster, Sport and Exercise Sciences Research Institute Brown, Robin; Daisy Hill Hospital, Surgery O'Donnell, Mark; Daisy Hill Hospital, Surgery; University of Ulster, Faculty of Life and Health Sciences
Specialty area:	



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

The Effect of Sporting Events on Emergency Department Attendance Rates in a District General Hospital in Northern Ireland

Authors

A McGreevy MB BCh¹.

L Millar MB BCh¹.

B Murphy¹.

GW Davison BSc PhD².

R Brown MD FRCS¹.

ME O'Donnell DipSEM(GB&I) MMedSc MD MFSEM(RCSI&RCPI) MFSEM(UK) MRCSEd^{1&3}.

Institution

Department of General Surgery¹, Daisy Hill Hospital, 5 Hospital Road, Newry, BT35 8DR, Sport and Exercise Sciences Research Institute² and Faculty of Life and Health Sciences³, University of Ulster, Newtownabbey BT37 0QB, Northern Ireland.

Corresponding author

Mark E. O'Donnell, 11 Wicket Lane, Saintfield BT24 7FJ. Northern Ireland, United Kingdom. Tel. 0044-7793-585686. Fax. 0044-2890-263951.

E-mail: modonnell904@hotmail.com

Type of article for submission

Original Article.

Keywords

Attendance Rates, Emergency Department, European Working Time Directive, Sporting Events.

Presentations

Association of Surgeons in Training of Great Britain and Ireland Annual Meeting, Nottingham, 27th to 29th March 2009 and Ulster Medical Society Annual Research Meeting, Belfast, 5th November 2009.

ABSTRACT

Background:

Previous studies have reported a conflicting relationship between the effect of live and televised sporting events on attendance rates to emergency departments (ED). The objectives of this study were to investigate the relationship of major sporting events on emergency department attendance rates and to determine the potential effects of such events on service provision.

Methods:

A retrospective analysis of ED attendances to a district general hospital (DGH) and subsequent admissions over a 24-hour period following live and televised sporting activities was performed over a 5-year period. Data was compiled from the hospital's emergency record books including number of attendances, patient demographics, clinical complaint and outcome. Review patients were excluded. Analysis of sporting events was compiled for live local, regional and national events as well as world-wide televised sporting broadcasts.

Results:

137668 (80445 male) patients attended from April 2002 to July 2007. Mean attendance rate per day was 80 patients (Male=47). Mean admission rate was 13.6 patients per day. Major sporting events during the study period included; Soccer: 4 FA Cup and 1 World Cup (WC) finals; Rugby: 47 Six Nations, 25 Six Nations games involving Ireland, 1 WC Final, 2 WC semi-finals, 2 WC quarter-finals and 4 WC games involving Ireland; and Gaelic Football (GAA): 5 All-Ireland finals, 11 semi-finals, 11 quarter-finals and 5 provincial finals. There was a significantly higher patient admission rate during the soccer FA Cup final, rugby 6 nations and games involving Ireland and for GAA semi- and quarter-final games ($p=0.001$ to 0.01). There was no difference identified in total attendance or non-admission rates for sporting events throughout the study period. Although there was no correlation identified between any of these sporting events and total emergency department attendances ($r<0.15$, $p>0.07$), multinomial logistic regression demonstrated that FA Cup final ($p=0.001$), Rugby Six Nations ($p=0.019$), Rugby WC games involving

1
2
3 Ireland ($p=0.003$), GAA All-Ireland semi- and quarter-finals ($p=0.016$ & $p=0.016$)
4 were predictors of patient admission rates.
5
6
7

8
9 **Conclusion:**

10 This study suggests that live or televised sporting events do not significantly affect
11 ED attendances to a DGH. However, some events appeared to be predictors of patient
12 admission rates. Although it may be beneficial to consider the effect of sporting
13 events on service stratification during these periods, the overall effect is probably
14 minimal and should not create a major concern for future service provision despite the
15 implementation of the European Working Time Directive.
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

INTRODUCTION

Large sporting events have historically led to intense media coverage and huge public interest. Approximately 14.5 million people in the UK watched the 2003 Rugby World Cup corresponding to a quarter of the total population, and in Ireland, up to half of the population have been estimated to watch world cup soccer matches at any one time.¹⁻²

Previous studies have suggested a conflicting relationship between the effect of sporting events and attendance rates in emergency departments (ED), where both live and televised sport have been shown to have significant effects on hospital workload. Miró *et al* (2000) found a significant decrease in ED use during UEFA Champions League televised soccer matches in Barcelona particularly when the home team were involved.³ American Football's Super Bowl has also been reported to be associated with a reduction in ED attendances.⁴ In Buffalo (US), an ED census identified a significant decrease in attendances coinciding with 4 out of 5 Superbowl televised broadcasts during January, between 1988 and 1992, when compared to days without televised coverage during the same month. They found that this relationship was augmented when the local team was a playoff participant. This may be of particular importance to smaller communities, particularly the region surrounding our DGH, which would be considered to have a high interest in local, national and international sporting events. Decreases in ED attendances during a sporting event may be explained by a number of factors including viewing of the event either at home or a licenced premises or actual attendance at the live event itself particularly if it is locally based.

This potential for sporting events to affect a local population is an important phenomenon when considering ED attendances to DGHs, particularly if a large sports ground is located nearby. Our ED has a local stadium, located approximately 1.5 miles from the hospital, which has a capacity of 20,000 and hosts some of the Regional Soccer and Gaelic football championship finals. Reis *et al* (2005) identified an inverse linear dose-response relationship between event magnitude (characterised by television viewing figures) and decreased utilisation of the ED, i.e. the highest rated games were associated with a decrease in ED attendances and the lowest rated

1
2
3 games (those in which the local team was losing and facing likely elimination) were
4 associated with higher ED volumes.⁵ These results suggested that engagement with
5 televised broadcasts of major events may be one of the factors a patient considers
6 when deciding to seek emergency care. In contrast, Pérez-Ciordia *et al* (2003)
7 identified that televised soccer games were associated with a greater utilisation of
8 emergency care services in the Spanish population.⁶ This may be explained not only
9 by the potential for increased injuries and illnesses secondary to the local population
10 attending the event and watching it in local public places but also due to the influx of
11 visitors to the event from outside the local area.
12
13
14
15
16
17
18
19
20

21 During the 1998 Soccer World Cup, Mattick (1999) identified a significant increase in
22 attendance rates and workload in an Edinburgh ED during the opening game between
23 Brazil and Scotland. Such an increase may be secondary to either alcohol related
24 medical co-morbidities or injuries sustained as a consequence of assault or other
25 alcohol related violence. Staffing levels in their ED were then increased for
26 subsequent games involving Scotland. However, the initially demonstrated increase in
27 attendance rates was not replicated for the remaining games in the tournament
28 involving Scotland.⁷ This study highlights insight into potential difficulties with
29 service provision and variances that may be attributed to sporting events, and it is
30 stressed that service provision decisions should not be dictated by one-off
31 observations and therefore a longer term study is required.
32
33
34
35
36
37
38
39
40
41

42 To ensure that necessary staffing levels and facilities are available, it is necessary for
43 all hospitals to analyse their patient workload to prospectively prepare and plan for
44 such local, regional and national sporting events and their emergency sequelae. A
45 greater emphasis on such workload planning and service provision will now occur
46 from August 2009 for all hospitals, particularly smaller DGHs, due to ramifications
47 from the mandatory implementation of the 48-hour working week and further
48 directives defined by the European Working Time Directive (EWTD).⁸
49
50
51
52
53
54
55

56 Daisy Hill Hospital located in Newry City (population 27,430 - 2001 census) also
57 covers an extended rural population, often with impaired infrastructure, to a total of
58 87,058 people (projected total 97,000 in 2013). The department is one of two EDs in
59 the Southern Health and Social Care Trust, which covers an estimated 334,000 local
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

people.⁹ Our ED is located approximately 40 miles from the country's only tertiary referral trauma centre. For comparison, in 2008/9 our ED had 33421 attendances, the trust's other ED had 70015, while the Regional Trauma Centre had 67371 attendances.¹⁰

Although the current literature remains unclear, there is evidence to suggest that major live or televised sporting events could have an effect on ED workload and such reports indicate a need for improved staff planning despite the restrictions of the EWTD.³⁻⁷ The main objective of this study was to investigate the effect of major sporting events on the ED attendance rates. The outcome of the ED patient attendance was then assessed to determine the effects of subsequent patient admissions on ward-based workload.

METHODS

A retrospective analysis of the number of ED attendances to a DGH and subsequent admissions over a 24-hour period was completed. Each admission time period was defined as the period between 00.00 and 23:59. Data was collected from the hospital's emergency record books from April 2002 to July 2007, including the number of attendances, patient demographics, clinical complaint and outcome for each 24-hour period. Patients attending specialist or review clinics in the ED were excluded.

An analysis of sporting events was then compiled to include live local, regional and national events as well as world-wide televised sporting broadcasts. Major local events were defined as those events which could encompass attendance rates greater than 10,000 such as county-based Gaelic Athletic Association (GAA) events from the All-Ireland Football Championships. National events were defined according to the major sport including European or World Cup Soccer games involving Ireland, GAA All-Ireland Finals (including the quarter-finals, semi-final and finals) and Rugby Six Nations or World Cup events. Major live televised events were described as those shown on prime time terrestrial or satellite television. These figures were then compared with control nights where there was no evidence of a major local, national or televised sporting event.

Data entry was completed on a specially designed Excel database. Descriptive statistics for baseline variables such as patient demographics, attendance rates and clinical outcome were calculated as the mean and standard error of the mean (SEM) or the median and interquartile ranges (IQR). Statistical analysis was performed using the SPSS statistical package (Version 12 SPSS[®] inc. Chicago, USA). Independent or paired samples t-tests were used to determine differences between independent or paired variables. Pearson's correlation was used to identify if a relationship existed between ED workload and patient admission rates according to the presence of a major sporting event. Multinomial logistic regression was then performed to determine if certain sporting events could be described as a predictor for patient attendance or hospital admission. All statistical tests were 2-sided and differences were considered significant if the p-value was <0.05.

RESULTS

Emergency Department Attendance and Admission Rates

137668 (80445 male) patients attended the ED between April 2002 and July 2007. The median attendance rate per day was 80 patients (IQR 71.0-88.0). A significantly higher proportion of male patients attended compared to females (mean attendances per day: 46.8 vs. 33.3, $p < 0.001$) (**Figure 1**). The mean admission rate was 13.6 patients per day through the study period (**Figure 2**). The mean attendance rates and total admissions were significantly higher on Mondays, Saturdays and Sundays compared to the other days of the week ($p < 0.01$).

Sporting Event Analysis

Sporting events during the study period included; Soccer: 4 FA Cup and 1 World Cup (WC) finals; Rugby: 47 Six Nations, 25 Six Nations games involving Ireland, 1 WC Final, 2 WC semi-finals, 2 WC quarter-finals and 4 WC games involving Ireland; and Gaelic Football (GAA): 5 All-Ireland finals, 11 semi-finals, 11 quarter-finals and 5 provincial finals.

Patient episodes vs. Sporting event

There was no correlation identified between any sporting events and total ED attendance ($r < 0.03$, $p > 0.20$). Further separate subgroup analysis according to daily patient totals and the day of the week also demonstrated no correlation between any of these sporting events and total emergency department attendance. However, there was a significantly higher patient admission rate during the soccer FA Cup final (20.8 vs. 13.6, $p = 0.001$), rugby Six Nations (16.0 vs. 13.6, $p = 0.001$) and games involving Ireland (World Cup: 19.3 vs. 13.6, $p = 0.01$ and Six-Nations: 16.3 vs. 13.6, $p = 0.003$) and for GAA All-Ireland semi-final (17.0 vs. 13.6, $p = 0.01$) and quarter-final games (17.0 vs. 13.6, $p = 0.01$). There was no difference identified in total attendance or non-admission rates from the emergency department for sporting events throughout the study period (**Table 1**).

Multinomial logistic regression analysis demonstrated that FA Cup final ($p = 0.001$), Rugby Six Nations ($p = 0.019$), Rugby WC games involving Ireland ($p = 0.003$), GAA

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

All-Ireland semi- and quarter-finals ($p=0.016$ & $p=0.016$) were predictors of patient admission rates (**Table 2**).

For Peer Review Only

DISCUSSION

Although controversial and indeed difficult to effectively determine, we attempted to assess whether live or televised sporting events created a “domino effect” on ED workload in our DGH. Previous research by Farrell *et al* (2005) have reported that ED attendance rates and subsequent surgical admission rates to a regional paediatric department were not affected by media coverage of soccer events.¹¹ They suggested that such events do not significantly alter workload and thus negate any amendment to workforce provision in a tertiary referral paediatric centre. Our study concurs with Farrell *et al* (2005) where we identified no correlation between sporting events and total ED attendance ($p>0.20$).

However, it remains unclear whether the occurrence of certain sporting events may actually predict total patient admission rates. Multinomial logistic regression demonstrated that FA Cup final, Rugby Six Nations, Rugby WC games involving Ireland, GAA All-Ireland semi- and quarter-finals were predictors of patient admission rates ($p<0.019$). Although the total number of ED attendances was not significantly affected by major sporting events, we demonstrated that there was an increase in the total number of admissions from such attendances during sporting events which indirectly suggested an increase in overall ED workload (**Table 1**). A subsequent increase in ward staff duties, with concurrent patient bed requirements, may therefore be attributed to such sporting events.

In our study, a significantly higher proportion of daily ED attendances were male ($p<0.001$). Murphy *et al* (2003) also assessed gender demographics during a review of ED attendances and orthopaedic workload in a Dublin hospital during the 2002 World Cup, which involved the home nation, Ireland (who played 4 matches, reaching the final 16 teams in the tournament).¹² They noted that the ratio of male to female presentations was 2:1 compared to 1:2 in control years, and that significantly more patients were admitted, referred to orthopaedic and minor trauma clinics and also to general practitioner surgeries during the study period compared to the control period. In contrast, Cheng *et al* (2005) identified an inverse gender relationship with a decrease in male and corresponding increase in female usage of the ED during a retrospective review of televised major league baseball competing for the Millennium

1
2
3 World Series in the US.¹³⁻¹⁴ They also reported a significant increase in psychiatric
4 presentations, particularly in female patients.
5
6
7

8
9 Murphy *et al* (2003) postulated that major televised sports, particularly when the
10 home nation was involved, had a significant impact on acute hospital services with
11 corresponding increases in ED workload, hospital services and inpatient bed
12 capacity.¹² They suggested that future service provision should not only consider
13 admission demographics but also subsequent referral patterns to evaluate additional
14 potential service demand. While the findings of our study were somewhat in
15 agreement, with certain sporting events predicting patient admission rates, the results
16 do not suggest or indicate a need for ED staffing or service provision amendments. It
17 is also thought that the effect of these sporting events on admission rates would not be
18 of sufficient magnitude to suggest a change in shift pattern or service provision on
19 inpatient units, despite the implementation of the European Working Time Directive.
20
21
22
23
24
25
26
27
28
29

30 We recognise that our ED has a median attendance rate of 80 patients per day which
31 may be a relatively low number of patients per day in comparison to other EDs in the
32 country. However, our ED functions as more than a minor injuries unit providing a
33 24-hour service for emergencies and major trauma from a rural area with poor
34 infrastructure, extending a 30-mile radius, for which it is the closest hospital. It is
35 covered by acute surgical, medical and radiological services.
36
37
38
39
40
41

42 The mean attendance rates and total admissions were significantly higher on Saturday,
43 Sunday and Monday compared to the other days of the week ($p < 0.01$).
44 Sivarajasingam *et al* (2004) also demonstrated a similar trend with a consistently
45 increased weekend workload during a 5-year review of a Cardiff ED workload in the
46 UK.¹⁵ However, their study suggested that a large proportion of their patients received
47 treatment following violence with a positive association between physical assaults and
48 rugby international games. This contrasts to our study whereby no correlation was
49 identified between any of the sporting events and total emergency department
50 attendance. Cooke *et al* (1999) assessed the effect of the *Euro 1996* International
51 Soccer Competition in the UK on emergency departments in the 3-weeks prior to,
52 during and following the tournament.¹⁶ They also identified no significant correlation
53 between the sporting event and ED attendance rates, irrespective of home nation
54
55
56
57
58
59
60

1
2
3 involvement and suggested that additional health service management and staffing
4 measures do not require implementation for such events. Similar to our study they
5 also observed that the day of the week remained an independent predictor of patient
6 variation where Sundays and Mondays were associated with an increased work load.
7
8
9

10
11
12 One of the main strengths of our study was the consecutive assessment of daily
13 records over a period of 5-years with the inclusion of new presentations only.
14 However, our retrospective study was limited regarding the actual aetiology and
15 mechanism of injuries sustained by each individual attending the ED. Some authors
16 have reported the effect of certain aetiological factors, particularly those ED
17 attendances which were not directly related to a personal involvement in a sporting
18 activity.^{7, 15, 17-19} Sivarajasingam *et al* (2004) described a positive association between
19 physical assaults and rugby international games.¹⁵ Further evidence to support the
20 association between alcohol and sporting related violence has been described by
21 Mattick (1998) and O'Donnell *et al* (2002) from their experience of the 1998 and
22 2002 Soccer World Cups respectively.^{7, 17} O'Donnell *et al* (2002) reported that the
23 majority of ED attendances were related to minor trauma secondary to physical
24 assault sustained during the activity of television viewing either at home or in a
25 licensed (alcohol) premises in Galway during the 2002 Soccer World Cup. Over 50%
26 of their ED attendances were associated with alcohol ingestion. However, they stated
27 that the actual workload impact to the ED from such attendances was minimal.¹⁷
28 Unfortunately due to the nature of our data collection it was not possible to record the
29 reason for ED attendance or the type of admission. We would recommend the
30 consideration of such attendance aetiologies in any future study to determine the
31 relationship between direct and indirect sporting related consultations in the ED and
32 the specialty of subsequent admissions.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49

50
51 A further limitation of our study was the inability to accurately determine the timing
52 of each patient's ED attendance or subsequent admission within the 24-hour period.
53 Other authors appear to have had similar difficulties with Moody *et al* (2007)
54 performing a retrospective analysis of the volume and timing of ED attendances
55 during an 18-hour window during the Rugby World Cup Final 2003 between New
56 South Wales in Australia and the West Midlands in the UK.¹⁹ The study time window
57 was then compared with a control period of 18-hours for daily attendances in the
58
59
60

1
2
3 preceding 3 years. They identified a reduction in UK ED attendance rates in the hours
4 immediately surrounding the final followed by a subsequent increase in the 12 hours
5 after the game whereas in Australia, a similar reduction in attendance was identified
6 only in the hours leading up to the final. However, such rates quickly returned to
7 normal after the final with no further alteration in attendance rates thereafter. Moody
8 *et al* (2007) further hypothesised that the difference between the two countries could
9 be related to several reasons, one being postponement of illness presentation until
10 after the match (so as not to be inconvenienced by missing it) and the second being
11 violence and/or alcohol related injuries following celebrations.
12
13
14
15
16
17
18
19
20

21 The main objective of this study was to investigate the effect of major sporting events
22 on the ED attendance rates and to assess whether the actual sport itself correlates with
23 emergency workloads. While sporting events did not correlate with ED attendance
24 rates we have found that FA Cup final, Rugby Six Nations, Rugby WC games
25 involving Ireland, GAA All-Ireland semi- and quarter-finals were predictors of patient
26 admission rates. These results would not indicate a change in ED staffing or service
27 provision and it is likely that the effect of sporting effects on the admission rate would
28 not be sufficient to suggest a change in service provision on inpatient units.
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

CONCLUSION

Our study suggests that live or televised sporting events do not significantly affect ED attendances to a DGH. However, some events appeared to be predictors of patient admission rates. Although it may be beneficial to consider the effect of sporting events on service stratification during these periods, the overall effect is probably minimal and should not create a major concern for future service provision. We suggest that this relationship may well be present and even augmented in larger EDs in the region, particularly in larger cities with larger sporting venues.

REFERNCES

1. ITV 2003. Rugby World Cup 2003. Available at http://625.uk.com/tv_logos/itv_03.htm. Accessed on 28th August 2009.
2. Media Live. Ireland's Top Media Resource. Media Analysis. Available at <http://www.medialive2.com/media-analysis/>. Accessed on 28th August 2009
3. Miró O, Sánchez M, Borrás A, Millá J. Football, television and the emergency services. *Med Clin (Barc)* 2000; **114**(14): 538-539.
4. Reich NT, Moscati R, Jehle D, Ciotoli M. The Impact of a Major Televised Sporting Event on Emergency Department Census. *J Emerg Med* 1994; **12**(1): 15-17.
5. Reis BY, Brownstein JS, Mandl KD. Running outside the baseline: Impact of the 2004 Major League Baseball Postseason on Emergency Department use. *Ann Emerg Med.* 2005; **46**(4): 386-87.
6. Pérez-Ciordia I, Fabo FC, Nicolay FZ, Antonanzas MB, de Guerenu RSD, Grima, FG. Profile of the Emergency demand and influence of televised soccer games on an extra-hospital center in the Tafalla health care district. *Rev Esp Salud Pública.* 2003; **77**(6): 735-747.
7. Mattick AP. The Football World Cup 1998: An analysis of Related Attendances to an Accident and Emergency Department. *Scot Med J.* 1999; **44**(3): 75-76.
8. The Department of Health. European Working Time Directive. Accessed at http://www.dh.gov.uk/en/Managingyourorganisation/Humanresourcesandtraining/Modernisingworkforceplanninghome/Europeanworkingtimedirective/DH_415. Accessed on 29th July 2009.
9. NI Planning Service: District Proposal for Newry City. Accessed at <http://www.nisranew.nisra.gov.uk/Census/pdf/Key%20Statistics%20ReportTables.pdf> Accessed on 19th December 2009.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

10. Hospital Statistics. 1 April 2008 – 31 March 2009. Department of Health, Social Services and Public Safety. Accessed at http://www.dhsspsni.gov.uk/volume_1_programme_of_care2pdf.pdf. Accessed on 19th December 2009.

11. Farrell S, Doherty GM, McCallion WA. Do Major Televised Events Affect Pediatric Emergency Department Attendances or Delay Presentaton of Surgical Conditions? *Pediatr Emerg Care*. 2005; **21**(5): 306-8.

12. Murphy SM, Myers E, Kingston R, Connolly P, McElwain JP. Ireland in the World Cup: Trauma and Orthopaedic Workloads. *Ir Med J*. 2003; **96**(4): 119-20.

13. Cheng D, Yokobi-shvlli R, Fernandez J. Major sport championship influence on ED gender census. *Am J Emerg Med*. 2005; **23**(2): 240-1.

14. Cheng D, Yokobi-shvlli R, Fernandez J. Major sport championship influence on ED sex census. *Am J Emerg Med*. 2005; **23**(3): 408-9.

15. Sivarajasingam V, Corcoran J, Jones D, Ware A, Shepherd J. Relations between violence, calendar events and ambient conditions. *Injury*. 2004; **35**(5): 467-73.

16. Cooke MW, Allan TF, Wilson S. A major sporting event does not necessarily mean an increased workload for accident and emergency departments. Euro96 Group of Accident and Emergency Departments. *Br J Sports Med*. 1999; **33**(5):333-5.

17. O'Donnell J, Mattick AP, Mehta R. The Football World Cup 2002 Analysis of related attendances in an Irish Emergency Department. *Ir Med J*. 2003; **96**(3):90-1.

18. Sivarajasingam V, Moore S, Shepherd JP. Winning, losing, and violence. *Inj Prev* 2005; **11**: 69-70.

19. Moody WE, Hendry RG, Muscatello D. Were attendances to accident and emergency departments in England and Australia influenced by the Rugby World Cup Final 2003? *Eur J Emerg Med*. 2007; **14**(2): 68-71.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For Peer Review Only

1
2
3 **ACKNOWLEDGEMENTS**
4

5
6
7 The authors acknowledge Mr Michael McCann, Consultant in Emergency Medicine
8 for permission to review charts in the emergency department of Daisy Hill Hospital.
9

10
11
12
13 **CONFLICT OF INTEREST STATEMENT**
14

15
16
17 The authors declare no conflicts of interest. We certify that we have participated
18 sufficiently in the work of this paper. We have reviewed the final version of the
19 manuscript and approve it for publication. To the best of our knowledge and belief,
20 this manuscript has not been published in whole or in part nor is it being considered
21 for publication elsewhere.
22
23
24
25
26

27
28 No research funding or external financial support has been provided for this study.
29
30

31
32 **COPYRIGHT STATEMENT**
33

34
35
36
37 The Corresponding Author has the right to grant on behalf of all authors and does
38 grant on behalf of all authors, an exclusive licence (or non exclusive for government
39 employees) on a worldwide basis to the journal's publishing group to permit this
40 article (if accepted) to be published.
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

FIGURE LEGENDS**Table 1**

Assessment of mean patient attendance, admission and non-admission rates from the emergency department according to the presence or absence of the sporting event (mean, SEM and p-value).

Table 2

Multinomial logistic regression analysis for patient attendance, admission and non-admission rates according to the individual sporting events.

Figure 1

Mean daily total attendance rates to the emergency department for total, male and female patients.

Figure 2

Mean daily admission and discharge rates from the emergency department.

SPORT	EVENT	TOTAL ATTENDANCES			TOTAL PATIENT ADMISSIONS			TOTAL PATIENTS NOT ADMITTED		
		Event	No Event	p-value	Event	No Event	p-value	Event	No Event	p-value
Soccer	FA Cup Final (n=4)	88.5 (6.9)	80.0 (0.3)	0.20	20.8 (1.9)	13.6 (0.1)	0.001	67.8 (5.4)	66.4 (0.3)	0.83
	World Cup Final (n=1)	83.0 (-)	80.0 (0.3)	0.82	13.0 (-)	13.6 (0.1)	0.89	70.0 (-)	66.4 (0.3)	0.77
Rugby	World Cup Games involving Ireland (n=4)	87.8 (6.4)	80.0 (0.3)	0.24	19.3 (2.4)	13.6 (0.1)	0.01	68.5 (4.9)	66.4 (0.3)	0.74
	World Cup Quarter-Final (n=2)	77.5 (6.5)	80.0 (0.3)	0.78	12.5 (0.5)	13.6 (0.1)	0.72	65.0 (7.0)	66.4 (0.3)	0.87
	World Cup Semi-Final (n=1)	67.0 (3.0)	80.0 (0.3)	0.16	15.0 (3.0)	13.6 (0.1)	0.66	66.4 (0.3)	52.0 (.1)	0.10
	World Cup Final (n=1)	73.0 (-)	80.0 (0.3)	0.59	10.0 (-)	13.6 (0.1)	0.41	63.0 (-)	66.4 (0.3)	0.78
	6 Nations (n=47)	81.2 (1.6)	80.0 (0.3)	0.57	16.0 (0.7)	13.6 (0.1)	0.001	9.6 (1.4)	12.5 (0.3)	0.48
	6 Nations involving Ireland (n=25)	82.0 (1.8)	80.0 (0.3)	0.47	16.3 (1.0)	13.6 (0.1)	0.003	65.7 (1.5)	66.4 (0.3)	0.78
Gaelic (GAA)	All Ireland Provincial (n=5)	87.6 (0.8)	80.0 (0.3)	0.20	15.0 (2.0)	13.6 (0.1)	0.49	72.6 (7.1)	66.4 (0.3)	0.26
	All Ireland Quarter Final (n=11)	82.5 (2.6)	80.0 (0.3)	0.53	17.0 (1.6)	13.6 (0.1)	0.01	65.5 (1.7)	66.4 (0.3)	0.82
	All Ireland Semi-Final (n=11)	84.0 (2.3)	80.0 (0.3)	0.32	17.0 (1.4)	13.6 (0.1)	0.01	67.0 (2.1)	66.4 (0.3)	0.87
	All Ireland Final (n=5)	73.8 (5.1)	80.1 (0.3)	0.29	12.6 (1.0)	13.6 (0.1)	0.60	61.2 (5.8)	66.4 (0.3)	0.34

Table 1

SPORT	EVENT	TOTAL ATTENDANCES	TOTAL PATIENT ADMISSIONS	TOTAL PATIENTS NOT ADMITTED
Soccer	FA Cup Final (n=4)	0.20	0.001	0.84
	World Cup Final (n=1)	0.82	0.91	0.78
Rugby	World Cup Games involving Ireland (n=4)	0.17	0.003	0.68
	World Cup Quarter-Final (n=2)	0.46	0.18	0.76
	World Cup Semi-Final (n=1)	0.16	0.63	0.10
	World Cup Final (n=1)	0.60	0.42	0.78
	6 Nations (n=47)	0.94	0.019	0.45
	6 Nations involving Ireland (n=25)	0.65	0.69	0.73
Gaelic (GAA)	All Ireland Provincial (n=5)	0.20	0.45	0.27
	All Ireland Quarter Final (n=11)	0.58	0.016	0.79
	All Ireland Semi-Final (n=11)	0.34	0.016	0.87
	All Ireland Final (n=5)	0.29	0.65	0.34

Table 2

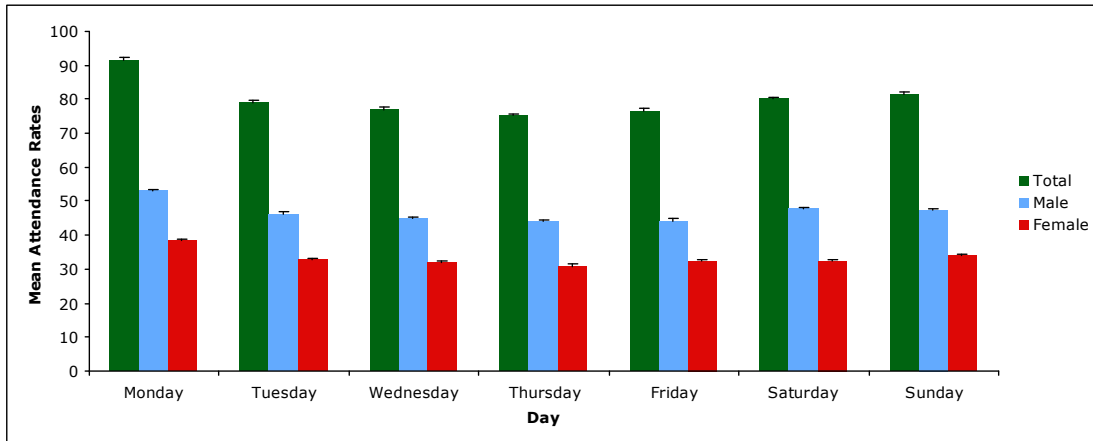


Figure 1

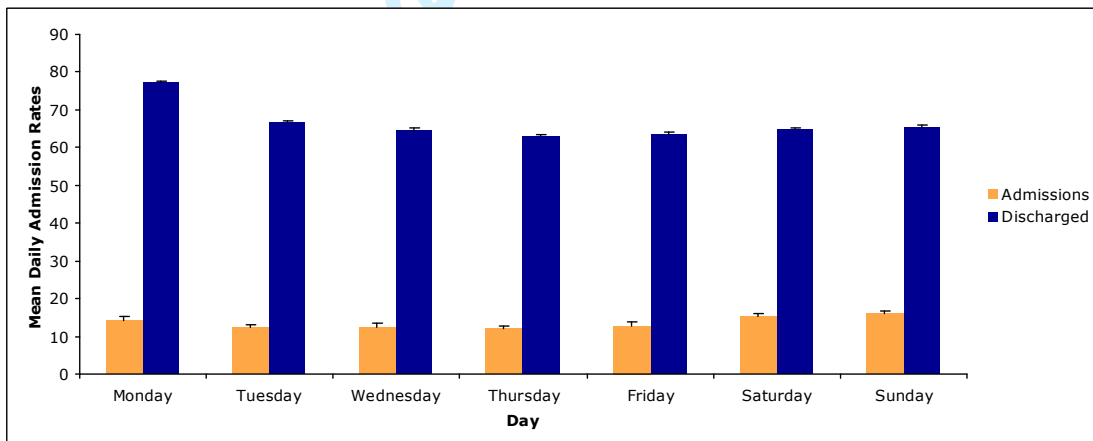
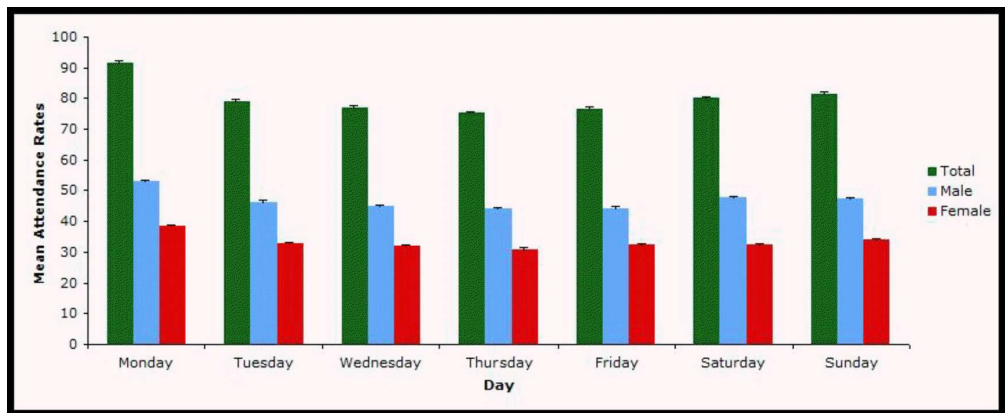


Figure 2

SPORT	EVENT	TOTAL ATTENDANCES			TOTAL PATIENT ADMISSIONS			TOTAL PATIENTS NOT ADMITTED		
		Event	No Event	p-value	Event	No Event	p-value	Event	No Event	p-value
Soccer	FA Cup Final (n=4)	88.5 (6.9)	80.0 (0.3)	0.20	20.8 (1.9)	13.6 (0.1)	0.001	67.8 (5.4)	66.4 (0.3)	0.83
	World Cup Final (n=1)	83.0 (-)	80.0 (0.3)	0.82	13.0 (-)	13.6 (0.1)	0.89	70.0 (-)	66.4 (0.3)	0.77
Rugby	World Cup Games involving Ireland (n=4)	87.8 (6.4)	80.0 (0.3)	0.24	19.3 (2.4)	13.6 (0.1)	0.01	68.5 (4.9)	66.4 (0.3)	0.74
	World Cup Quarter-Final (n=2)	77.5 (6.5)	80.0 (0.3)	0.78	12.5 (0.5)	13.6 (0.1)	0.72	65.0 (7.0)	66.4 (0.3)	0.87
	World Cup Semi-Final (n=1)	67.0 (3.0)	80.0 (0.3)	0.16	15.0 (3.0)	13.6 (0.1)	0.66	66.4 (0.3)	52.0 (.1)	0.10
	World Cup Final (n=1)	73.0 (-)	80.0 (0.3)	0.59	10.0 (-)	13.6 (0.1)	0.41	63.0 (-)	66.4 (0.3)	0.78
	6 Nations (n=47)	81.2 (1.6)	80.0 (0.3)	0.57	16.0 (0.7)	13.6 (0.1)	0.001	9.6 (1.4)	12.5 (0.3)	0.48
	6 Nations involving Ireland (n=25)	82.0 (1.8)	80.0 (0.3)	0.47	16.3 (1.0)	13.6 (0.1)	0.003	65.7 (1.5)	66.4 (0.3)	0.78
Gaelic (GAA)	All Ireland Provincial (n=5)	87.6 (0.8)	80.0 (0.3)	0.20	15.0 (2.0)	13.6 (0.1)	0.49	72.6 (7.1)	66.4 (0.3)	0.26
	All Ireland Quarter Final (n=11)	82.5 (2.6)	80.0 (0.3)	0.53	17.0 (1.6)	13.6 (0.1)	0.01	65.5 (1.7)	66.4 (0.3)	0.82
	All Ireland Semi-Final (n=11)	84.0 (2.3)	80.0 (0.3)	0.32	17.0 (1.4)	13.6 (0.1)	0.01	67.0 (2.1)	66.4 (0.3)	0.87
	All Ireland Final (n=5)	73.8 (5.1)	80.1 (0.3)	0.29	12.6 (1.0)	13.6 (0.1)	0.60	61.2 (5.8)	66.4 (0.3)	0.34

SPORT	EVENT	TOTAL ATTENDANCES	TOTAL PATIENT ADMISSIONS	TOTAL PATIENTS NOT ADMITTED
Soccer	FA Cup Final (n=4)	0.20	0.001	0.84
	World Cup Final (n=1)	0.82	0.91	0.78
Rugby	World Cup Games involving Ireland (n=4)	0.17	0.003	0.68
	World Cup Quarter-Final (n=2)	0.46	0.18	0.76
	World Cup Semi-Final (n=1)	0.16	0.63	0.10
	World Cup Final (n=1)	0.60	0.42	0.78
	6 Nations (n=47)	0.94	0.019	0.45
	6 Nations involving Ireland (n=25)	0.65	0.69	0.73
Gaelic (GAA)	All Ireland Provincial (n=5)	0.20	0.45	0.27
	All Ireland Quarter Final (n=11)	0.58	0.016	0.79
	All Ireland Semi-Final (n=11)	0.34	0.016	0.87
	All Ireland Final (n=5)	0.29	0.65	0.34

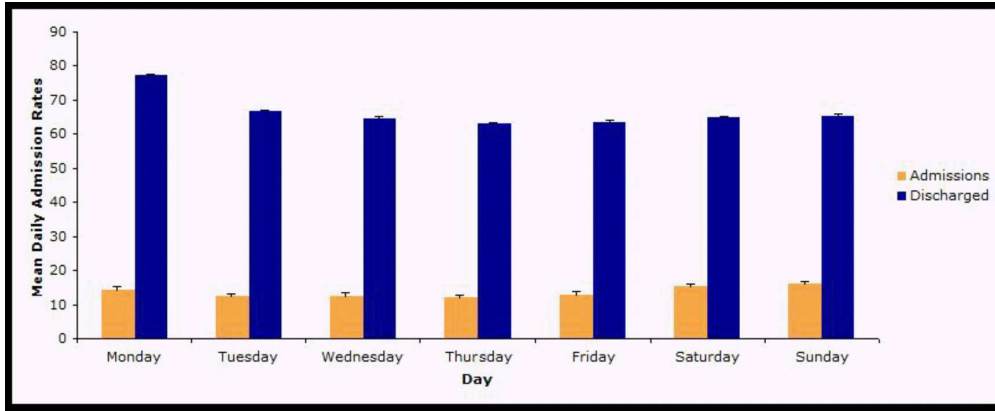
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Mean daily total attendance rates to the emergency department for total, male and female patients.
146x59mm (300 x 300 DPI)

Peer Review Only

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Mean daily admission and discharge rates from the emergency department.
146x59mm (300 x 300 DPI)

Peer Review Only