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

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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

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Ireland (p=0.003), GAA All-Ireland semi- and quarter-finals (p=0.016 & p=0.016) were predictors of patient admission rates.

Conclusion:

This 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 despite the implementation of the European Working Time Directive.

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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

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

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

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

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

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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.

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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.

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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

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

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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

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World Series in the US.[13-14] They also reported a significant increase in psychiatric presentations, particularly in female patients.

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

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

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

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

One of the main strengths of our study was the consecutive assessment of daily records over a period of 5-years with the inclusion of new presentations only. However, our retrospective study was limited regarding the actual aetiology and mechanism of injuries sustained by each individual attending the ED. Some authors have reported the effect of certain aetiological factors, particularly those ED attendances which were not directly related to a personal involvement in a sporting activity.[7, 15, 17-19] Sivarajasingam *et al* (2004) described a positive association between physical assaults and rugby international games.[15] Further evidence to support the association between alcohol and sporting related violence has been described by Mattick (1998) and O'Donnell *et al* (2002) from their experience of the 1998 and 2002 Soccer World Cups respectively.[7,17] O'Donnell *et al* (2002) reported that the majority of ED attendances were related to minor trauma secondary to physical assault sustained during the activity of television viewing either at home or in a licensed (alcohol) premises in Galway during the 2002 Soccer World Cup. Over 50% of their ED attendances were associated with alcohol ingestion. However, they stated that the actual workload impact to the ED from such attendances was minimal.[17] Unfortunately due to the nature of our data collection it was not possible to record the reason for ED attendance or the type of admission. We would recommend the consideration of such attendance aetiologies in any future study to determine the relationship between direct and indirect sporting related consultations in the ED and the specialty of subsequent admissions.

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

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

The main objective of this study was to investigate the effect of major sporting events on the ED attendance rates and to assess whether the actual sport itself correlates with emergency workloads. While sporting events did not correlate with ED attendance rates we have found 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. These results would not indicate a change in ED staffing or service provision and it is likely that the effect of sporting effects on the admission rate would not be sufficient to suggest a change in service provision on inpatient units.

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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.

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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.

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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.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest. We certify that we have participated sufficiently in the work of this paper. We have reviewed the final version of the manuscript and approve it for publication. To the best of our knowledge and belief, this manuscript has not been published in whole or in part nor is it being considered for publication elsewhere.

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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

Multinominal 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.

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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

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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

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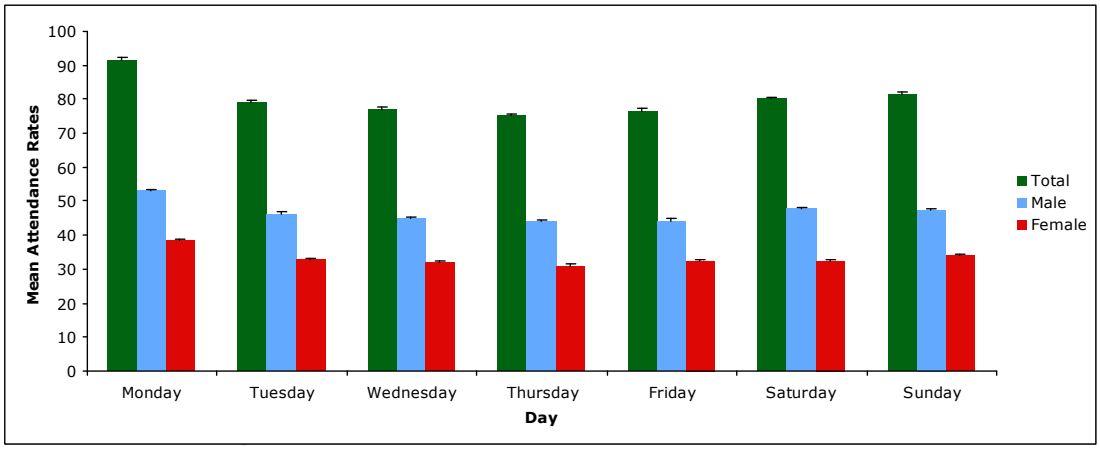

Figure 1

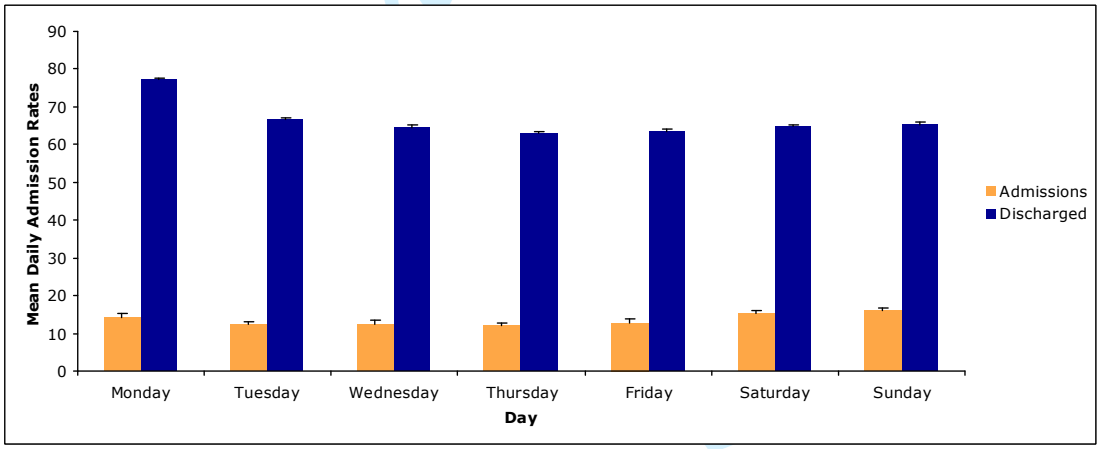

Figure 2

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

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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

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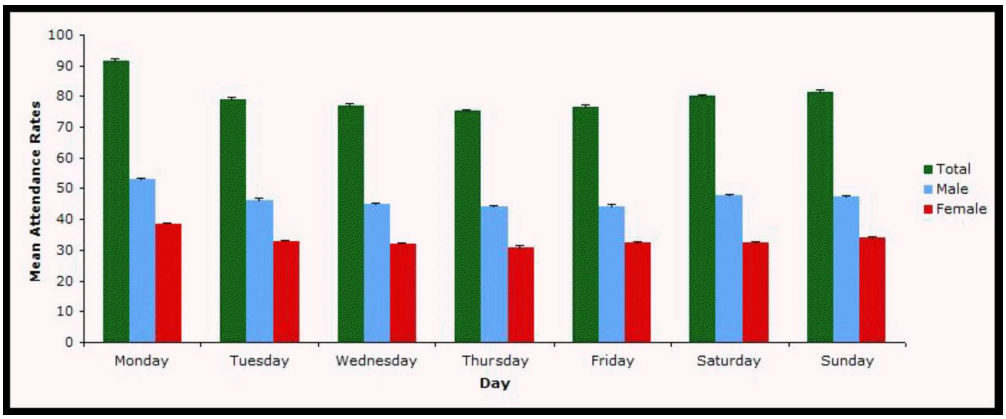

Mean daily total attendance rates to the emergency department for total, male and female patients.
146x59mm (300 x 300 DPI)

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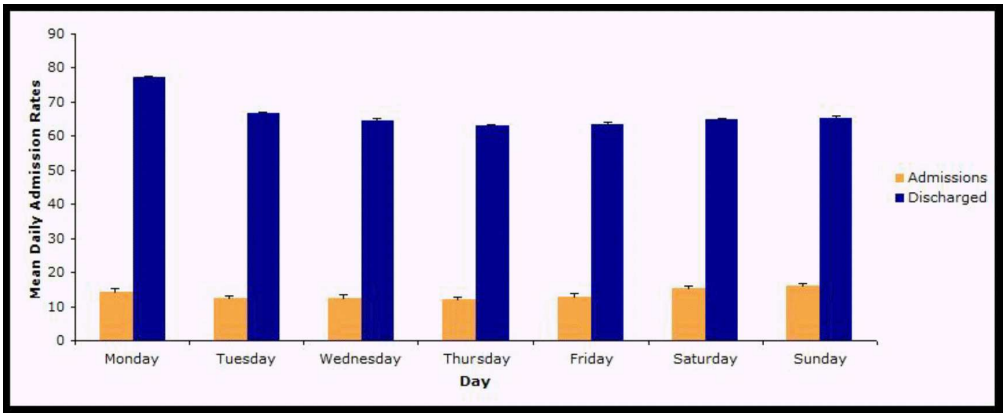

Mean daily admission and discharge rates from the emergency department.
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