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Paper:

Battle, C., Evans, V. & Evans, P. (2016). Review of non-Welsh residents' unintentional injuries presenting to an Emergency Department in South Wales: A nine-year retrospective study. *Journal of Emergency Medicine, Trauma and Acute Care*, 2016(1), 2

<http://dx.doi.org/10.5339/jemtac.2016.2>

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JEMTAC

Journal of Emergency Medicine
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A PEER REVIEWED JOURNAL

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Research article

Review of non-Welsh residents' unintentional injuries presenting to an Emergency Department in South Wales: A nine-year retrospective study

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ABSTRACT

Background: Non-residents visiting an area often have limited local knowledge of the natural environmental conditions, exacerbating their risk of unintentional injuries. The aim of this study was to determine the impact of unintentional injuries of non-Welsh residents presenting to the Emergency Department of a regional trauma unit in South Wales.

Methods: A retrospective hospital database review was undertaken from 2006 to 2014. All patients presenting to the ED with a non-Welsh postcode, with a diagnosis of unintentional injury were included in the study. Data collected included age, sex, time of year of presentation, injury mechanism, body part injured and patient outcome. Descriptive data were recorded and analysed.

Results: From 2006 to 2014, overall attendance of non-Welsh residents to the ED was 4323. A total of 2961 (68%) patients were male, with a median age of 28 (IQR: 18–47). The most common time of year for non-Welsh resident presentations to the ED was the summer. A mechanical fall was the most commonly reported mechanism of injury. There was a significantly higher prevalence of mechanical falls and alleged assaults in the non-resident cohort, when compared to residents presenting with unintentional injuries (both $p < 0.001$).

Conclusions: This is the first study to investigate unintentional injuries of non-Welsh residents and their impact on an ED in the UK. Further prospective research is needed in order to investigate whether the introduction of new public health policies impact on ED services in tourist areas in the UK.

Keywords: Emergency department, unintentional injuries, non-resident, retrospective study

[http://dx.doi.org/
10.5339/jemtac.2016.2](http://dx.doi.org/10.5339/jemtac.2016.2)

Submitted: 26 October 2015
Accepted: 28 January 2016
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Cite this article as: Battle CE, Evans V, Evans PA. Review of non-Welsh residents' unintentional injuries presenting to an Emergency Department in South Wales: A nine-year retrospective study, *Journal of Emergency Medicine, Trauma & Acute Care* 2016;2 <http://dx.doi.org/10.5339/jemtac.2016.2>

INTRODUCTION

The demand for emergency health care is consistently increasing across the United Kingdom, with an overall rise of approximately 1.5–2% a year since 1966, when there were less than seven million attendees, compared with more than 20 million today.¹ There are numerous factors believed to compromise performance of the ED, including overcrowding and increased waiting times which occur as a result of the increased demand.^{2–4} In 2014, over 4.4 million people visited Swansea and the surrounding area.⁵ These visitors to Swansea included primarily early-retired couples, younger affluent professionals, and families with children.⁵ Non-residents visiting an area often have limited local knowledge of the natural environmental conditions, exacerbating their risk of unintentional injuries.⁶ Previous research has also highlighted the impact of alcohol and violence in young tourists.⁷

The first aim of this study was to determine the impact of non-Welsh residents on the ED of a large regional trauma centre in South Wales. The second aim was to investigate the prevalence and patterns of attendance, types of unintentional injuries and outcomes in non-Welsh residents presenting to the ED.

METHODS

A retrospective hospital database review was undertaken from 1st January 2006 to 31st December 2014. The hospital database was searched for all patients (of any age) presenting to the ED with a non-Welsh postcode, with a diagnosis coded as “unintentional injury”, with a sub-coding of trauma, burns, drowning/near drowning, and hypo/hyperthermia. Patients with a diagnosis of intentional injury or suicide/suicide attempt were excluded. First presentations to the ED only were included. Data collected included age, sex, time of year of presentation, injury mechanism, body part injured and patient outcome.

For analysis, each patient was categorised into the following injury mechanisms; mechanical fall (mechanical fall, fall from bike/skateboard/scooter/trampoline/horse, fall downstairs, fall climbing tree or playing in park), sporting injury (all sports included), work-related injury (any injury reported to occur in the work environment) alcohol-related injury (any injury reported to occur under the influence of alcohol), alleged assault (any injury caused by an alleged assault), road traffic accident (any combination of pedestrian/type of vehicle involvement), outdoor pursuits (including paragliding, hand-gliding, mountain-biking, coastering, rock-climbing, abseiling, hiking, army exercise, canoeing, drownings/near drownings and surfing injuries) and others (most commonly animal bites/stings/kicks, eye injuries, crush injuries, injuries due to falling objects, jamming a finger in a door, stubbed toe and injuries caused play-fighting or a child being swung by their arms). Descriptive data were recorded and analysed using Microsoft Excel (2010). Data was presented as numbers and percentages or medians and interquartile ranges (IQR) and comparisons made using Chi-square test.

The South West Wales Research Ethics Committee confirmed that approval was not required for this study.

RESULTS

From 2006 to 2014, overall attendance of non-Welsh residents to the ED was 4323, which represents approximately 0.5% of all ED attendances for that period. One patient was excluded as coded as a suicide attempt (original number of patients reported was 4324). A total of 2961 (68%) patients were male, with a median age of 28 (IQR: 18–47). [Figure 1a](#) demonstrates the number of presentations per year between 2006 and 2014.

[Figure 1b](#) demonstrates the total number of presentations to the ED of both residents and non-residents (2006 to 2014). It is evident that the rate of increase in presentations of the non-residents does not match that of the residents. There is a decrease in non-resident presentations between 2006 and 2014 from 0.72% to 0.43% of all ED presentations.

The most common time of year for non-Welsh resident presentations to the ED was the summer, with winter being the least common, for all the years studied ([Figure 2](#)).

[Table 1](#) demonstrates the types of injuries reported by this patient cohort between 2006 and 2014, compared with a control group of residents who presented in 2014. Assaults and alcohol-related injuries together accounted for 13% of all non-Welsh resident presentations.

The duration of management in the ED of the patient cohort is presented in [Figure 3](#). The most common time spent in the ED was between two to three hours.

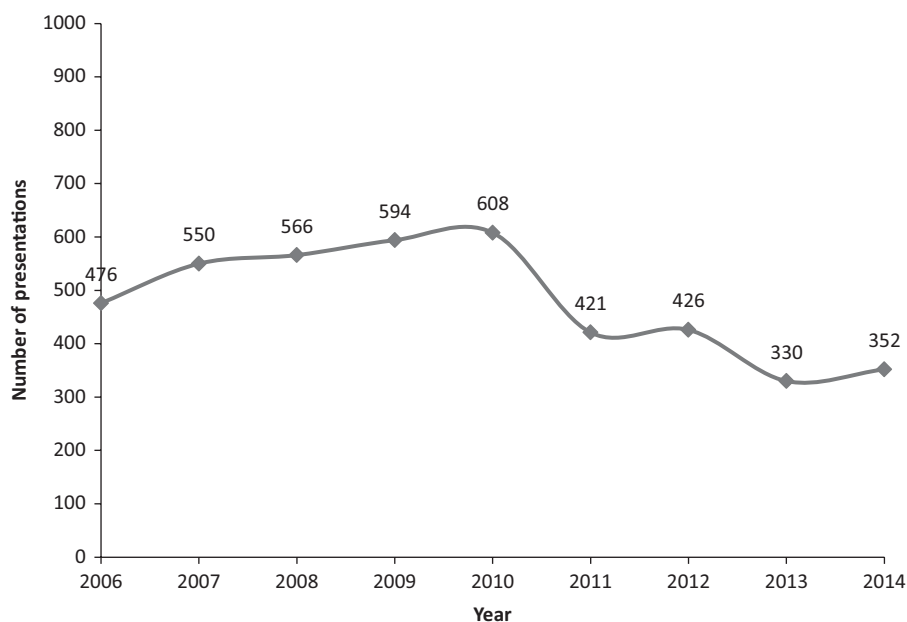


Figure 1a. Number of non-Welsh resident unintentional injuries presentations to an ED in South Wales (2006 – 2014).

The time of the day that the patient cohort presented to the ED is outlined in Figure 4, with the most common time being between 17:00 and 18:00.

The upper limb (n = 1826, 42%) was the most commonly injured body part, followed by the leg (n = 1781, 41%), the head (n = 1448, 33%), and the spine/thorax (n = 343, 8%). There were only three deaths within the ED recorded in the study period, all due to drowning. Table 2 highlights the follow-up arrangements for the non-Welsh residents.

DISCUSSION

Morrison Hospital in Swansea is the regional trauma centre for South West Wales, which has approximately 90,000 presentations to the ED per year and serves a population of approximately

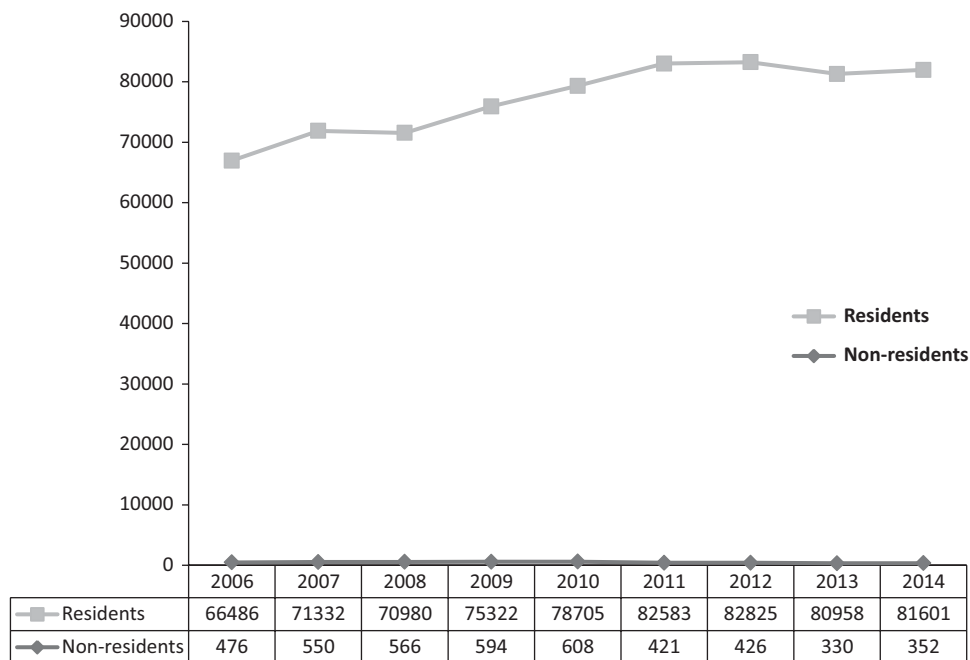


Figure 1b. Total number of presentations to an ED in South Wales for residents and non-residents (2006 to 2014).

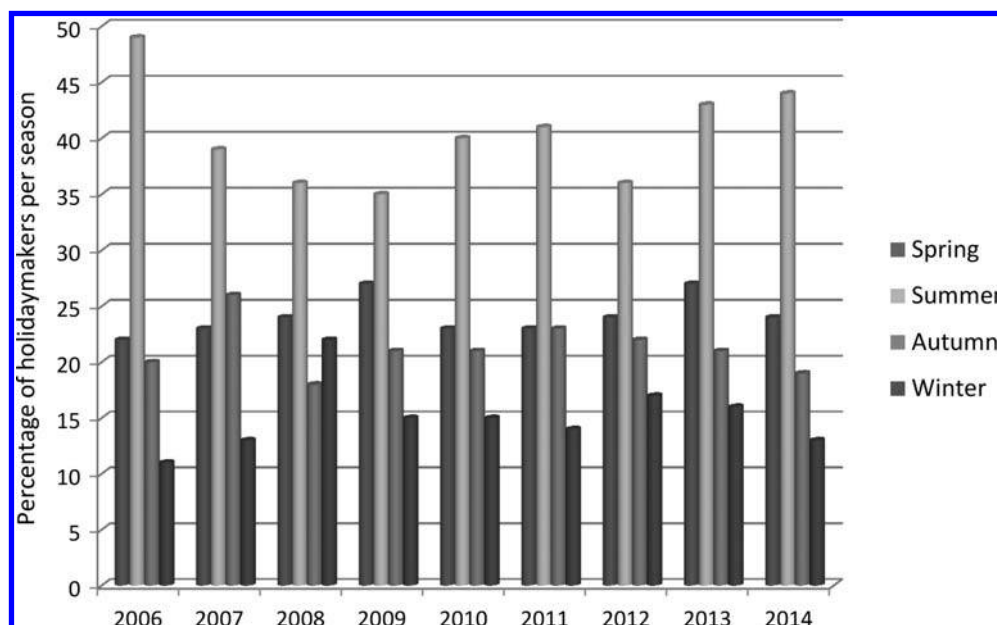
Table 1. Types of non-Welsh resident, unintentional injuries presenting to an ED in South Wales (2006–2014), compared to a resident cohort.

Type of injury	Non-residents (n = 4323) n (%)	Resident cohort in 2014 (n = 21,296) n (%)	p-value
Mechanical fall	1945 (45%)	8518 (40%)	0.001
Sporting injury	648 (15%)	3194 (15%)	0.989
Work-related injury	216 (5%)	1704 (8%)	0.001
Alcohol-related injury	303 (7%)	2343 (11%)	0.001
Alleged assault	259 (6%)	426 (2%)	0.001
Road traffic accident	130 (3%)	852 (4%)	0.002
Outdoor pursuits	130 (3%)	639 (3%)	0.982
Others	692 (16%)	3620 (17%)	0.117

450,000. Non-Welsh residents to Swansea represent approximately 0.5% of these presentations per year, presenting only a minor workload for the ED. The types of unintentional injuries differed between the non-residents over the study period (2006–2014) when compared to a control group of residents who presented with unintentional injuries in 2014. There was a significantly higher prevalence of falls and alleged assaults in the non-resident cohort compared with the residents. Conversely, there was a significantly higher prevalence of work-related, alcohol-related and road traffic accident injuries in the resident cohort, compared with the non-residents.

It could be suggested that the demand of non-residents on the ED may increase in future as the tourist industry continues to expand annually⁵ and more non-Welsh residents visit South Wales. However, between 2006 and 2014, the number of presentations did not rise as expected. An increase was evident every year from 2006 to 2010, but these numbers decreased over the following four years, possibly suggesting an improvement in local initiatives and public health policies. This suggestion may be supported by the fact that the percentage of non-resident presentations to the ED in this study was lower than that in a similar Cornish study (approximately 0.5% versus 7% of all ED presentations).⁸ The Cornish study included all causes for ED attendance however, and not just unintentional injuries as in this study, so comparisons may not be accurate.⁸

The area surrounding Swansea includes two National Parks and an extensive coastline, contributing to the prevalence of falls when hiking, in addition to outdoor pursuit and surfing injuries. The overall low number of unintentional injuries when participating in outdoor activities could reflect effective public health measures already present in the area. These may include the availability of good quality

**Figure 2. Number of non-Welsh resident presentations to an ED in South Wales per season (2006–2014).**

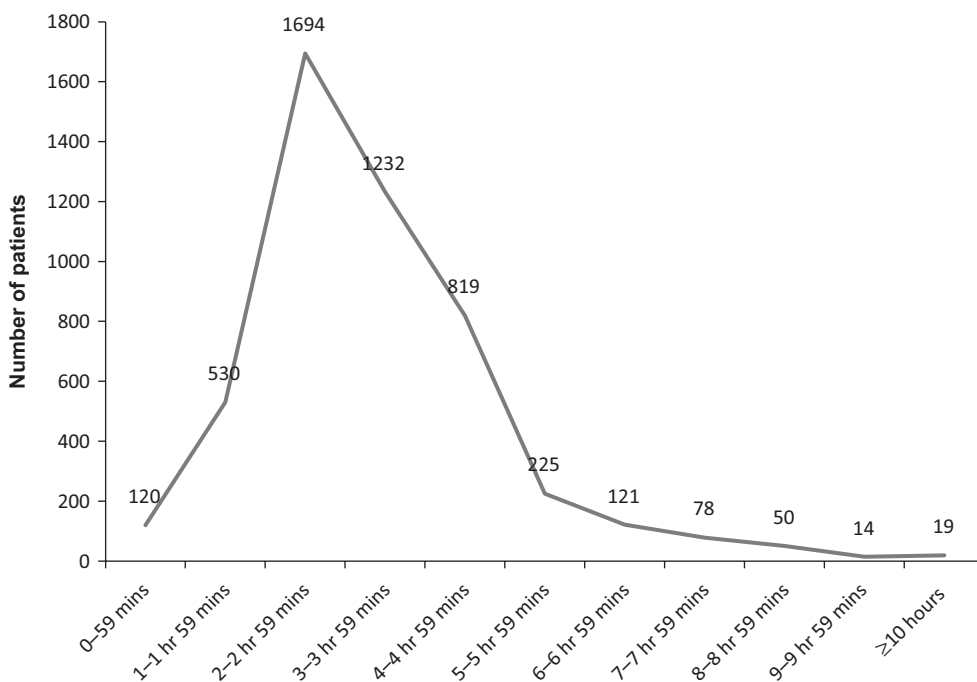


Figure 3. Duration of management in an ED in South Wales (2006–2014).

walking guides, well maintained and sign-posted footpaths, and clear and informative outdoor safety signs/boards.

Previous research has reported that localities that contain popular nightlife areas often find their healthcare resources stretched due to alcohol and assaults.⁷ The results of this study demonstrate an overall low prevalence of alcohol-related and assault injuries which may reflect the success of a number of recent public health measures, such as the Safer Swansea Partnership in which the police, council, fire, health and probation services, along with many other organisations and charities, work together to address community safety issues. This study supports previous research that has demonstrated that the weather influences attendance at the ED due to injury.⁹ This may be due to the fact however that the warm weather associated with the summer attracts more non-Welsh residents to South Wales and as a result, attendance at the ED increases at this time of year.

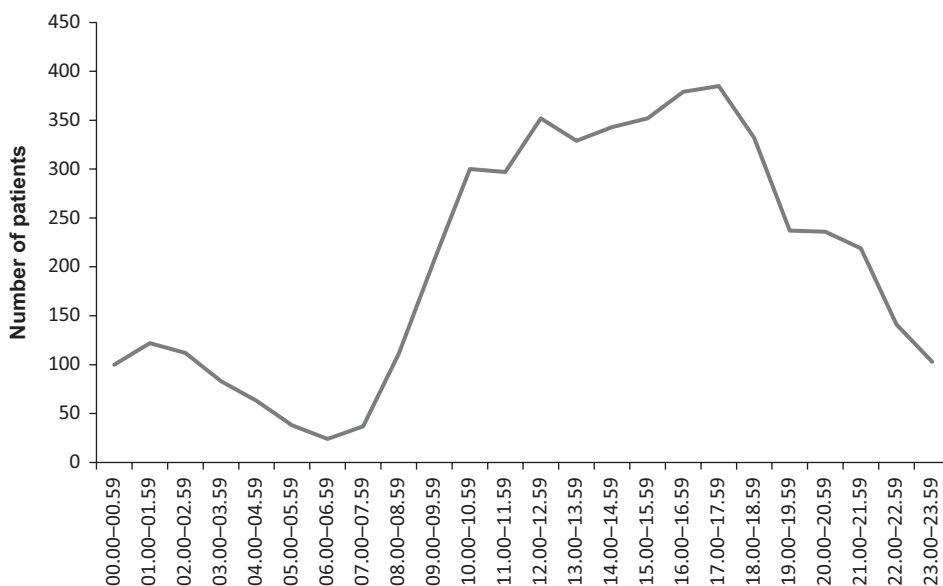


Figure 4. Time of presentation to an ED in South Wales (2006–2014).

Table 2. Non-Welsh residents' follow-up arrangements following unintentional injuries, presenting to an ED in South Wales (2006–2014).

Follow-up arrangement	N (%)
Referred to outpatient clinic	670 (15)
Referred to GP	1005 (23)
Planned follow-up at ED	364 (8)
Admitted to hospital same Trust	466 (11)
Self-discharged from ED	126 (3)
No planned follow-up	1443 (33)
Transferred to different Trust	138 (3)
Referred to another healthcare professional	108 (2)
Died in the ED	3 (0.1)

The effect of non-Welsh resident presentations to the ED on workload was reported in this study. It has been demonstrated that during the summer months, the demand for ED services rises in the non-Welsh resident cohort. This is in contrast to the resident cohort, in which the winter months see the most substantial demand on the ED services.¹⁰ It was highlighted that the most common time of day that patients presented to the ED was between the hours of 10:00 and 19:00. In a previous study conducted in Hong Kong, the most common hours were reported to be 07:00 and midnight, although this may reflect differences in healthcare systems.¹¹ This study also reported that the majority of patients were managed in the ED over a two to three-hour period, which would achieve the UK NHS target of all patients being treated within four hours of presenting to the ED. The percentage of patients seen within the four-hour target in this study is similar to that reported in previous studies.^{12,13} The median age of the non-Welsh residents presenting to the ED in this study was 28 years. In a previous study investigating the impact of sporting injuries on ED demand, the highest proportion of visits was evident in the 5–14 year old age group.¹⁴ Sporting injuries accounted for one fifth of all visits due to injuries in the United States in 1997–1998.¹⁴ This study also reported that sporting injuries made up almost one fifth of all injuries presenting to the ED.

This is the first study to investigate the impact of non-Welsh residents' unintentional injuries on an ED in Wales, so comparison with previous research is not possible. Cornwall County Council in 2004 attempted to identify whether tourism had an adverse impact on health in the County.⁸ The report concluded that current NHS funding regimes compound pressures on the health sector, as they do not reflect the additional activity of tourism on health services. In order to overcome some of these issues, the report suggested that many of the demands upon health services could be reduced by encouraging non-Welsh residents to think about health needs before they travel and by ensuring that information is available that directs them to the most appropriate service.⁸ These conclusions appear to be generalisable to the impact of tourism in South West Wales.

The main limitations of this study are due to the retrospective design, including the single-centre design. It is possible that there was a degree of selection bias as errors may have occurred in the collation of the list of patients from the hospital database and similarly by the doctors completing the coding form in the ED.

CONCLUSION

This is the first study to investigate unintentional injuries of non-Welsh residents and their impact on an ED in the UK. Non-Welsh residents to Swansea represent approximately 0.5% of these presentations per year, presenting only a minor workload for the ED. Mechanical falls were the most prevalent unintentional injury, with the majority of patients discharged with no planned follow-up. Further prospective research is needed in order to investigate whether the introduction of new public health policies impact on ED services in tourist areas in the UK.

Competing interests

There are no competing interests to declare for any authors.

Funding sources

There were no funding sources to declare.

Authors' contributions

All authors contributed to the conception and design of the study. All authors analysed the data. CB drafted the manuscript and VE and PE revised it critically for content. All authors have given final approval to the manuscript version submitted for publication. All authors read and approved the final manuscript.

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