Ambulance triage and treatment zones at major rugby events in Wellington, New Zealand: a sobering experience

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Abstract

Aims A prospective analysis was undertaken of the workload of prehospital triage and treatment facilities established in Wellington for the 2011 and 2012 International Rugby Sevens, and the Rugby World Cup 2011 (RWC). The introduction of an alcohol intoxication pathway, the impact of the initiative on ambulance and Emergency Department (ED) workload, and its cost effectiveness were assessed.

Methods A log of patients seen and their diagnoses and treatment was maintained. An alcohol questionnaire was completed when applicable. Patients intoxicated with alcohol were managed in accordance with a flowchart designed for paramedic use. Costs and savings were calculated.

Results Half the patients were New Zealanders. The average age was 25 years with a slight female preponderance (52.9% female). 30% were students. Alcohol was a contributory or causative factor for the patient’s attendance in 80-90% of cases. Approximately 60% of the 121 patients seen at the last two events would have had to be transferred to the ED in the absence of the treatment centre. Cost savings for the ambulance service and ED for the RWC and 2012 Sevens are estimated to be NZ$70,000. No adverse clinical event was identified.

Conclusions With minimal supervision, event medics and paramedics can safely care for the majority of patients attending large rugby events in New Zealand, easing the pressure on ambulances and the ED, and generating significant cost savings for those services.

Mass gatherings (which may be defined as congregations of more than 1000 persons\(^1\)) are less common in New Zealand than other parts of the world but in 2011 and 2012, Wellington hosted the quarter finals of the Rugby World Cup 2011 (RWC) as well as the New Zealand rounds of the International Rugby Board’s Sevens tournament. Although the medical literature contains papers on healthcare planning for rock concerts, carnivals, sporting and other large events,\(^1-7\) the only report we have found relating to healthcare issues at major rugby competitions relates to injuries sustained by competitors.\(^8\)

These rugby events have attracted a large number of sports fans and revellers to the capital and many required medical attention for minor injuries or illness which were most frequently associated with excessive consumption of alcohol. The Sevens tournament in particular has developed a reputation for fancy dress competitions and revelry.

In preparation for these rugby events, prehospital treatment and triage facilities were established in an attempt to ease the strain on the Wellington Free Ambulance Service.
and the city’s ED. This paper reports on the initiative which aimed to improve safety for rugby fans and reduce the burden on health services during these major events.

Methods

During the Wellington Sevens tournament on 4th and 5th February 2011, triage and treatment facilities (safe zones) were piloted by Wellington Free Ambulance at Westpac Stadium situated adjacent to the city during the day and in the central hospitality zone in the evening. The latter contained a small resuscitation area, camp-beds and a cushioned mat for intoxicated patients, and a table and chairs for the management of ambulatory patients.

The facility remained open overnight until 0500 hours and was staffed by event medics (first-aiders) and paramedics, supported by one Emergency Department doctor. The arrangement was repeated at the Rugby World Cup quarter final weekend of 8th and 9th October 2011 and during the International Sevens weekend of 3rd and 4th February 2012.

Potential patients either presented to the safe zone or were identified by police and radio-equipped patrols of event medics who transported them by carry chair or stretcher. There were no established exclusion criteria. On arrival, they were assessed and treated by the event medics and paramedics.

For the RWC quarter final weekend and the 2011 and 2012 Sevens weekends, patients could be referred to the on-site doctor as necessary. Decisions were taken regarding the need for transfer of the patient to the ED but profound intoxication with alcohol was not an automatic indication for hospital transfer.

A log of patients seen and treatment given was maintained and a standard ambulance patient report form (PRF) was completed.

An intoxication treatment pathway (Fig. 1) was developed in advance of the 2011 Sevens where it was tested. The form was designed for use by event medics and paramedics without on-site medical support. Feedback was received regarding the effectiveness of the pathway and the ability of medics to apply it.

In response to the experience gained from the 2011 Sevens, a similar facility was set up every Friday and Saturday night in the city’s hospitality zone prior to the RWC and during RWC pool matches. This “Safer Cities” service was funded by Wellington City Council (WCC), the Accident Compensation Corporation (ACC) and Wellington Free Ambulance (WFA), and was staffed by a small number of event medics and paramedics with no on-site medical support. It prompted the development of a questionnaire (Fig. 2) intended to collect information on the drinking habits of those attending the centre.

This questionnaire was designed following input from various groups (WCC, ACC, WFA, NZ Police, NZ Alcohol Advisory Council) and was employed at subsequent RWC events and the 2012 Sevens. It was used in conjunction with an alcohol advice pack supplied to intoxicated patients or their escorts on departure.

The effectiveness of the service was assessed by incorporating into the Safer Cities Form a statement asking paramedics whether in the absence of the centre, they believed that the patient would have had to be transferred by emergency ambulance to the ED. This question was answered by recording “Yes”, “Likely”, “unlikely” or “No” on the safer cities form (Fig. 2). Each case was discussed with an experienced paramedic to ensure that the need for patient transfer to ED in the absence of a safe zone was correctly judged. Measuring ED avoidance in this way was considered superior to assessing any impact within the ED as background attendances for conditions unrelated to the rugby event would be difficult to quantify, especially in view of the temporary increase in the local population.
Figure 1. Alcohol intoxication pathway

Management of Intoxicated Patients During Public Events

This assessment must be supervised by an ILS paramedic or above.

If Pt is intoxicated and has a history of trauma, significant falls, recent significant illness, e.g. MI, surgery, or tolerating an oropharyngeal airway

No to all of above

Assessment:
- Are Pts vitals within the following range:
  - PR: >55 and <120
  - BP: >90 systolic
  - Sats: >94% on room air or O2
  - Resp rate: >10 or <25/min
  - Temp: >34 or <38C
  - GCS: M4/V3/E1 (>GCS 8)
  - Pupils: Equal and reactive (Nystagmus ok)
  - Pain: <3/10
  - BSL: >3.5 or <20 mmol/L
- Clear of known or suspected drug involvement

Yes to any of above: begin treatment and request transport

No to any: pt is of clinical concern, begin treatment and request transport

Yes to all:

Offer a monitored bed

Treat presenting symptoms + 30 minute obs documented inc BSL
- 1000mls 0.9% NaCl IV infusion
- 50 - 100mls 10% Dextrose

TRANSFER TO ED

If patient not recovering with time, or baselines fall outside the above limits, transfer to ED (ILS Clinical judgment appropriate)
Intoxicated Discharge Flowchart

Conscious GCS 15/15

Baselines completed and within normal limits

Co-ordinated Movement
Able to walk unaided and not in any danger of falling/injury to self

If all criteria ok – advise discharge

If all criteria not met – advise staying or consider transfer to ED

Patients who are being discharged must sign a non-transport sticker before leaving.

Patients declining advice and electing to self-discharge must be asked to sign a non-transport sticker.

If possible discharge to friends or family
Complete CAGE assessment and offer patient alcohol care pack

If event closing and patient has not recovered adequately, transfer to ED
## Safer Cities Incident Data Capture Form

**Incident number:**  
**Date:**  
**Arrival time:**  

**Event:**  

**Surname:**  
**First name:**  

**Date of birth:**  
**Gender:**  
**Age:**  
**Ethnicity:**  
**Occupation:**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Arrival time</th>
<th>Surname</th>
<th>First name</th>
<th>Date of birth</th>
<th>Gender</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Has patient been drinking alcohol?**  
**Time started:**  
**No. of Drinks**

**Time of last drink:**  
**Place of last drink:**

**Has the patient taken any other drugs tonight?**  
**Yes / No**

**If the patient has not been drinking, have they consumed any alcohol in the last 24 hours?**  
**Yes / No**

**Nature of incident:**

**Time of injury:**  
**Treated on site?**  
**Y/N**  
**ACC number:**

**Diagnosis:**

**Treatment:**

**Is alcohol the cause of this incident? (circle one)**  
**Yes / No / Probably**

**Has patient been transported to ED for alcohol related issues prior?**  
**Yes / No / Unknown**  
**No of times**

**Has a 'brief intervention' been conducted with the patient?**  
**Yes / No**

**Was the patient transported for further care?**  
**Yes / No**  
**Where to?**  
**How?**

**If not transported by WFA, was the patient advised to seek medical advice?**  
**Y/N**  
**Referral to:**

**If this 'safer cities' site had been unavailable and the patient had been attended by an EAS ambulance, would they have been transported to hospital?**  
**(circle one)**  
**Yes / Likely / Unlikely / No**

**Departure time:**  
**Has a PRF been written (by events staff)?**  
**Y/N**
Results

Wellington International Sevens 2011—The initial findings of this study, documented at the 2011 Wellington Sevens, are summarised in Table 1. The average age of patients seen was 25 years. Significantly more patients attended the stadium area than the hospitality zone which functioned for a shorter period of time.

Of the total of 73 patients treated, 27 were thought to be dehydrated in association with the hot weather and alcohol consumption and were given intravenous saline. Three also received intravenous glucose. Only 19 of 73 (26%) patients needed to be transported to the ED, achieving a significant reduction in the number of patients who would have been transferred there by ambulance staff in the absence of a triage facility.

It is noteworthy that all injured patients seen in the hospitality zone had presented with wounds sustained on broken glass, mainly involving the feet. Many revellers went barefoot in response to the warm temperature and the desire to remove fancy dress. This was unfortunate as some areas were covered by broken drinking glass.

Patients with glass injury were not directed immediately to the ED but after careful inspection, cleaning, and dressing of their wounds, they were instructed to attend a local ED or general practitioner during normal hours the next working day for clinical review and radiology to exclude retained glass.

Table 1. Wellington International Sevens 2011

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stadium Area</th>
<th>Hospitality Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of service (hours)</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Patients seen &amp; treated</td>
<td>63</td>
<td>10</td>
</tr>
<tr>
<td>Intravenous fluid required</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>Intravenous glucose given</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Patients transported to the ED</td>
<td>16/63 (25%)</td>
<td>3/10 (30%)</td>
</tr>
<tr>
<td>Glass injuries</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

Rugby World Cup 2011—A number of RWC pool matches were held in Wellington but the busiest weekend was that of 8th-9th October when four test matches were held at the stadium. Patient details are summarised in Table 2.

On the two quarter final days, a total of 35 patients were seen in the triage and treatment facility in the hospitality zone. Sixty percent were male and the average age was 29. Most were New Zealanders and none had attended the match.

The average treatment time was 57 mins and the most common diagnoses were alcohol-related in 28 (80%), with intoxication being the primary diagnosis in 16 (46%). All except one of the intoxicated patients were rehydrated with intravenous saline to which glucose was added in most cases. 100ml of 10% dextrose was given if the blood glucose was less than 10mmol/L.
Alcohol-related injuries occurred in 10 attendees (29%). Only six (17%) of patients required direct referral to the ED and all but one were transported by ambulance. One patient was transported because the facility had to close at 0500 hours. Event medic and paramedic staff considered that two-thirds of the patients seen would have, or were likely to have been transferred to the ED by emergency ambulance if no safe zone had been available.

Wellington International Sevens 2012—The findings made at the 2012 Wellington Sevens are also summarised in Table 2. The average age of patients seen was 25 years at the stadium during the day but slightly younger patients were seen in the hospitality zone in the evenings. As at the 2011 Sevens, significantly more patients attended the stadium area than the hospitality zone which functioned for one night only.

<table>
<thead>
<tr>
<th>RWC 2011</th>
<th>2012 SEVENS</th>
<th>Stadium</th>
<th>Hosp. Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>35</td>
<td>64</td>
<td>22</td>
</tr>
<tr>
<td>Male:Female (% male)</td>
<td>21:14 (60%)</td>
<td>25:39 (39%)</td>
<td>11:11 (50%)</td>
</tr>
<tr>
<td>Age (average)</td>
<td>17-68 (29)</td>
<td>17-65 (25.9)</td>
<td>15-31 (20.35)</td>
</tr>
<tr>
<td>Nationality:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealander</td>
<td>16 (45.7%)</td>
<td>New Zealander</td>
<td>38 (59.4%)</td>
</tr>
<tr>
<td>International</td>
<td>13 (37.1%)</td>
<td>UK</td>
<td>17 (26.6%)</td>
</tr>
<tr>
<td>Not Recorded</td>
<td>6 (17.1%)</td>
<td>European</td>
<td>3 (4.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maori</td>
<td>3 (4.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pacific</td>
<td>2 (3.1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td>Occupation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>11 (31.4%)</td>
<td>Employed</td>
<td>19 (29.7%)</td>
</tr>
<tr>
<td>Students</td>
<td>11 (31.4%)</td>
<td>Students</td>
<td>17 (26.6%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2 (5.7%)</td>
<td>Not Recorded</td>
<td>28 (43.8%)</td>
</tr>
<tr>
<td>Not Recorded</td>
<td>11 (31.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment times (average)</td>
<td>9 m–3h 5m (57 mins)</td>
<td>2m–4h15 (1h 1min)</td>
<td>19 m–1h15m (54 mins)</td>
</tr>
<tr>
<td>Alcohol involved</td>
<td>28 (80%)</td>
<td>54 (84.3%)</td>
<td>20 (90.1%)</td>
</tr>
<tr>
<td>Diagnoses*:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intoxication</td>
<td>16 (45.7%)</td>
<td>Intoxication</td>
<td>46 (71.9%)</td>
</tr>
<tr>
<td>Trauma</td>
<td>10 (28.6%)</td>
<td>Trauma</td>
<td>23 (35.9%)</td>
</tr>
<tr>
<td>Assault</td>
<td>2 (5.7%)</td>
<td>Assault</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td>Medical</td>
<td>8 (22.9%)</td>
<td>Medical</td>
<td>5 (7.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glass injuries</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td>Given IV fluid</td>
<td>15 (42.9%)</td>
<td>11 (17.2%)</td>
<td>6 (27.3%)</td>
</tr>
<tr>
<td>Given IV glucose</td>
<td>14 (40%)</td>
<td>11 (17.2%)</td>
<td>6 (27.3%)</td>
</tr>
<tr>
<td>Direct ED Transfer</td>
<td>6 (17.1%)</td>
<td>5 (7.8%)</td>
<td>0</td>
</tr>
<tr>
<td>To ED if no facility:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 (31.4%)</td>
<td>Yes</td>
<td>20 (31.2%)</td>
</tr>
<tr>
<td>Likely</td>
<td>12 (34.3%)</td>
<td>Likely</td>
<td>13 (20.3%)</td>
</tr>
<tr>
<td>Unlikely</td>
<td>10 (28.6%)</td>
<td>Unlikely</td>
<td>22 (34.3%)</td>
</tr>
<tr>
<td>No</td>
<td>2 (5.7%)</td>
<td>No</td>
<td>9 (14.1%)</td>
</tr>
</tbody>
</table>

(*Some patients had more than one diagnosis, e.g. intoxication and head injury)

Of the total of 86 patients treated, 17 were sufficiently intoxicated and dehydrated by the warm weather to require intravenous saline, supplemented with a small dose of intravenous dextrose. Only five of 86 patients (5.8%) needed to be transported to the
ED, a further reduction on the figures for 2011. Paramedics determined that 47 of the 86 patients (54.7%) would have, or were likely to have required direct transfer to the ED in the absence of a safe zone.

In 2012, six injuries were sustained on broken glass (7% of patients), all but one in the hospitality zone. This was an improvement on the previous year. Once again, these patients were not directed immediately to the ED but after careful inspection, cleaning and dressing of their wounds, were instructed to attend a local ED or general practitioner during normal hours the next working day for clinical review and radiology to exclude retained glass.

Shivering had been frequently observed in patients who received intravenous fluid at ambient temperature at the RWC, despite the use of double blankets. At the 2012 Sevens, bags of intravenous crystalloid were therefore warmed briefly in a microwave and stored in a temperature-monitored insulated box prior to administration. This course of action resulted in a marked reduction in shivering or complaints from patients of feeling cold.

Cost implications—Table 3 summarises the balance of expenditure and savings associated with the RWC and 2012 initiatives. In principle, the cost of consumables to the ambulance service can be balanced against a corresponding reduction in the cost of ED consumables.

The hire charge for temporary facilities at the stadium and hospitality zones (exhibition trucks), together with staff allowances and salaries for non-volunteer staff, are easily offset by the cost of ambulance provision for patients who would otherwise have been transferred to the ED, combined with their ED treatment costs. Although some patients with minor conditions or injuries would have been treated at a lower cost than that of ED per-capita funding, others would have required transfer to the short-stay ward, generating a higher cost.

The relevant costs are:
- Safe zone exhibition trucks: NZ$ 1,000/day
- Processing of emergency ambulance call: NZ$ 35
- Emergency ambulance transfer to the ED: NZ$ 613.64
- ED care (less than 6 hours) funded at: NZ$355 per person

Table 3. Costings

<table>
<thead>
<tr>
<th>Expenditure (NZD)</th>
<th>Savings (NZD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RWC 2011</strong></td>
<td></td>
</tr>
<tr>
<td>Temporary facility</td>
<td>2,000</td>
</tr>
<tr>
<td>Salaries (non-volunteer staff)</td>
<td>2,028.88</td>
</tr>
<tr>
<td>Staff allowances</td>
<td>330</td>
</tr>
<tr>
<td>Emergency call processing</td>
<td>23 x 35</td>
</tr>
<tr>
<td>Ambulance transfers to ED</td>
<td>23 x 613.64</td>
</tr>
<tr>
<td>Consumables</td>
<td>balance</td>
</tr>
<tr>
<td>ED costs (ambulatory patients)</td>
<td>23 x 355</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>4,358.88</td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td>23,103.72</td>
</tr>
</tbody>
</table>
Discussion

The establishment of safe zones (sometimes referred to as sobering-up centres) for intoxicated individuals is not a new concept but there are very few reports from within New Zealand. No report of such facilities at major rugby events has been found, despite the culture of post-match drinking associated with rugby.

Judicial systems in many countries have called for facilities to be established to deal with public intoxication but to automatically delegate such responsibility to the police may introduce clinical risk. In New Zealand, the Ministry of Health highlighted potential health issues prior to the Rugby World Cup and these included alcohol consumption and alcohol-related ED presentations.

The police, ambulance service and emergency departments are traditionally responsible for managing those at risk from alcohol intoxication but safe zones in which individuals can be monitored whilst they sober up have potential advantages which include:

- A secure environment supervised by a healthcare professional
- Avoidance of unnecessary ambulance transport for further care
- Reduced demand on emergency services including ambulances, paramedics and the ED, allowing hospital staff to focus on more serious clinical emergencies.

Whilst data for the workload encountered in the safe zones at the 2011 International Sevens is limited, our subsequent findings indicate that those requiring clinical attention at these large rugby events were likely to be New Zealanders in their twenties with a slight female preponderance (64 females out of 121; 52.9%). Between 22% and 32% of attendees were students. Older persons were also affected by alcohol but seemed to be more risk-averse and tolerant of its effect.

During the RWC when there were many overseas visitors, only 37% of patients resided outside the Pacific region and during the 2012 Sevens, only 26 of 86 (30.2%) were from overseas. One observation was that overseas groups, although intoxicated, seemed to be more mutually supportive and looked after their members.

Alcohol was believed to be a contributory or causative factor in the patient’s attendance at the safe zone in 80-90% of instances. The average treatment time was...
approximately 1 hour but some patients were discharged after a few minutes whilst the maximum duration of treatment was over 4 hours. We consider it a good use of resources to keep these patients in a safe, clinically supervised environment away from the ED whilst they recover from profound intoxication.

Shivering and low tympanic temperatures were common findings amongst patients at the first two events. This susceptibility was attributed to the vasodilatory action of ethanol combined with environmental exposure but the use of warmed intravenous fluids seemed to correct the problem. Other reports focus on the complications resulting from high ambient temperatures.¹⁵,⁶,¹¹

Patients intoxicated with alcohol have been successfully triaged by ambulance staff of intermediate grade¹² but other groups have had less success using paramedics.¹³,¹⁴ Our alcohol pathway facilitated triage and with supervision, it was rapidly adopted by event medics (first aiders) without difficulty, allowing them to determine which patients could be managed in the safe zone and which required transfer to the ED.

The feedback from paramedics has been very positive and the pathway is largely responsible for the clinical gains that have resulted from this initiative. Whilst there is no evidence that intravenous fluids or dextrose accelerates the elimination of alcohol,¹⁵-¹⁷ dehydration from repeated vomiting or the diuretic effect of alcohol is common.¹⁸

Most patients appeared to benefit from this therapy and regain independent mobility within a reasonable timeframe, allowing them to be discharged to the care of friends or relatives and be fit for transport home. No adverse event or feedback was reported by the ambulance service, the ED or the hospital.

Alcohol intoxication predisposes to injury.¹⁹ A range of minor injuries was encountered with glass being a frequent cause of wounds at the 2011 Sevens. Since that time it is pleasing to note that the number of injuries sustained on glass has declined. This is attributed to the use of more plastic substitutes, particularly in the hospitality zone.

Eleven of 35 patients (31.4%) were transferred to the ED at the RWC and 10 of 86 (11.6%) at the 2012 Sevens. Safe zone staff considered that in the absence of their facility, the patient would have or was likely to have been transferred by ambulance to Wellington ED in 23 of 35 cases (65.7%) at the RWC or in 47 of 86 cases (54.7%) at the 2012 Sevens, respectively 12 and 39 more patients than would otherwise have been hospitalised.

Some patients with minor conditions or injuries would have by-passed the safe zone and attended the ED independently but this could not have been prevented. The more modest ED avoidance rate at the RWC compared to the Sevens may be linked to stronger mutual support amongst overseas rugby supporters.

The above figures should be considered in the context of an average daily ED attendance of 142 patients over the weekend of the RWC and 156 over the weekend of the 2012 Sevens. Patients who would have been transferred to the ED would have occupied space in one of 29 cubicles and required nursing care.
The typical cost of treating such a patient who can be discharged from the ED within 6 hours is NZ$355 but for any patient staying longer than this (and requiring admission to the short-stay unit), the cost is NZ$690.

Costs associated with the provision of standard hospital care to those intoxicated with alcohol are significant. Substantial economies for both the ambulance service and the hospital resulted from the establishment of our facility which provided convenient and safe care for patients attending the RWC, International Sevens and associated social events.

Overall savings exceeded NZ$18,000 for the RWC and NZ$33,500 for the 2012 Sevens. Future charges for hire of facilities will be less since permanent accommodation has now been made available for use at weekends in the hospitality zone.

One limitation in the data collection was that nationality and other historical information was sometimes unavailable as a result of the patient’s alcoholic state. Information was then obtained from accompanying relatives or friends whenever possible. We were unable to clearly identify impairment from the ingestion of recreational drugs although a handful of patients were suspected of this, or the consumption of spiked drinks.

Drug abuse has been more of a problem at pop music or similar events. Another limitation was that although patients not requiring transfer to the ED expressed a clear intention to go home or to other supervised accommodation when they were discharged to friends or family, it is not known if any changed their mind and attended hospital.

At both the RWC and Sevens, a base providing simple first aid was also active at the stadium but this is a standard arrangement for events and the workload quoted in this study relates purely to activity requiring safe zone intervention.

In conclusion, the establishment of safe zones for major rugby events in Wellington satisfied the aims of producing a secure environment supervised by healthcare professionals, reducing unnecessary ambulance transport, and easing the demands on emergency services, allowing hospital staff to focus on more serious clinical emergencies.

The experience has promoted continuing discussions between WFA, ACC, alcohol advisory groups, NZ Police and licencees in the hospitality industry aimed at identifying locations where excessive alcohol consumption and its adverse effects arise. In the meantime, the Safer Cities service described above continues to function every weekend in central Wellington.

**Conclusion**

The establishment of safe zones at major rugby events in Wellington during 2011 and 2012 provided an effective and protected environment for the treatment of patients suffering from alcohol intoxication as well as minor injury or illness. It reduced the workload for the ambulance service and the ED, and generated cost savings for these services.
Competing interests: Nil.

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