Injury Surveillance in Trinidad: An Accident and Emergency Based Injury Surveillance System at the San Fernando General Hospital
S Ramroop³, MC Turner², R Bynoe¹, MJ Garner², R Clarke², D Krewski², M Francis³

ABSTRACT

Objective: Injuries are a significant cause of morbidity and mortality worldwide. Injuries disproportionately affect people living in low and middle income countries, including the Caribbean; however, little is known about the epidemiology of injuries in these areas. An Accident and Emergency (A&E) Department injury surveillance system was established at the San Fernando General Hospital, Trinidad and Tobago, to address this important data gap.

Methods: A detailed overview of the objectives, data collection methods, and inherent strengths and limitations of this surveillance system are presented, along with results of an analysis of data collected during the first three years of operations (from 2002 to 2004).

Results: Trained hospital staff collect a variety of injury/poisoning, demographic and clinical data on nearly 20,000 patients presenting each year with injury to the A&E Department. The total number of injuries in men was almost twice that in women. The majority of injuries were seen in those 25–44-years of age. Falls, other blunt force, stab/cut, traffic injury and poisoning represented the leading causes of injury. Nearly half of all the injuries occurred in the home, with the street/highway and work environments also accounting for an appreciable number of injuries. The majority of injuries were reported as unintentional.

Conclusion: Injuries represent an important population health and health services issue in South Trinidad. Data from the A&E Department injury surveillance system represent an important resource to inform evidence-based health policy decisions on injury prevention and public health resource allocation.

Vigilancia de las Lesiones en Trinidad: un Sistema de Vigilancia de Lesiones Basado en Emergencias y Accidentes en el Hospital General San Fernando
S Ramroop¹, MC Turner², R Bynoe¹, MJ Garner², R Clarke², D Krewski², M Francis³

RESUMEN

Objetivo: Las lesiones son una causa significativa de morbidad y mortalidad a nivel mundial. Las lesiones afectan de manera desproporcionada a la gente que vive en países de ingresos bajos y medios, incluyendo el Caribe. Sin embargo, poco se sabe acerca de la epidemiología de las lesiones en estas áreas. Con el propósito de cubrir esta laguna de importantes datos epidemiológicos, se estableció un sistema de vigilancia de lesiones en forma de Departamento de Accidentes y Emergencias (A&E), en el Hospital General San Fernando, en Trinidad y Tobago.

Métodos: Se presenta un resumen detallado de los objetivos, métodos de recopilación de datos, así como las fortalezas y limitaciones inherentes de este sistema de vigilancia, junto con los resultados de un análisis de los datos recogidos durante los primeros tres años de operaciones (desde 2002 al 2004).

Resultados: Personal entrenado del hospital recogió una variedad de datos de lesiones/envenenamientos, así como datos demográficos y clínicos de casi 20,000 pacientes que acudían con lesiones cada año al Departamento de A&E. El número total de lesiones en los hombres fue casi el
injuries are a significant cause of morbidity and mortality. It is estimated that over five million deaths each year are attributable to injuries worldwide, accounting for some 12% of the global burden of disease (1, 2). Among the leading causes of death and disability from injury are road traffic injuries, self-inflicted injuries and interpersonal violence and drowning (3). Injuries also represent a large burden to the healthcare system and society (2). Due to a wide range of social and environmental factors, injuries are seen to particularly affect low and middle income countries (1, 2).

In Trinidad and Tobago (4), deaths due to external causes represent the fourth leading cause of mortality, of which suicide/self-inflicted injury (27.4%), motor vehicle traffic accidents (23.9%), homicide (18.3%), and accidental drowning/submersion (9.0%) are among the leading contributors (5). Injuries represent an even larger proportion of deaths among younger individuals, with approximately 40% of deaths in those aged 15–24 years being injury-related (5). A greater proportion of individuals experienced non-fatal injuries, many of which result in permanent disability, depression or substance abuse (2).

Few data sources on incident injuries exist in Trinidad and Tobago to inform the injury prevention decision-making process. To address this important data gap, the Accident and Emergency (A&E) Department at the San Fernando General Hospital established an injury surveillance system in partnership with the Caribbean Epidemiology Centre (CAREC) and the Rotary Club of San Fernando South. Unique in its inception, the involvement and dedication of a variety of stakeholders, including non-governmental organization, local and national government and community groups, all played key roles in the successful implementation and ongoing operations of the system. Currently, this injury surveillance system remains the sole surveillance system of its kind in Trinidad and Tobago and one of few in the region (6).

The injury surveillance system was implemented in order to 1) characterize the number and nature of injuries presenting to the A&E Department of the San Fernando General Hospital, 2) provide data to inform decision-making related to injury prevention and resource allocation, 3) identify priority areas for intervention, 4) monitor and evaluate the effectiveness of prevention programmes over time and 5) serve as a pilot site for a national injury surveillance programme. This paper provides an overview of the establishment of the system and data collected during the first three years of operations (2002–2004). A detailed examination of the aetiology of specific injury subtypes will be presented elsewhere.

SUBJECTS AND METHODS
The San Fernando General Hospital is within the jurisdiction of the South West Regional Health Authority (SWRHA) with a catchment area of approximately 500 000 people that reaches from Couva and Tabaquite in the North to Icacos and Moruga in the South. The San Fernando General Hospital is a 660 bed publicly run teaching hospital, and is the main trauma centre for the South West Region. San Fernando is the second largest city in Trinidad.

A case is any patient presenting to the A&E Department with an injury (either an incident case or a repeat visit for a previous injury) as defined by the World Health Organization (7, 8). The case definition includes drownings, hypothermia, strangulation, decompression sickness, poisonings and neglect, but excludes chronic conditions such as carpal tunnel syndrome, chronic back pain, mental conditions, as well as food poisoning of an infectious origin. In the event of an individual sustaining multiple injuries, the injury that is most severe is captured by the surveillance system.

Data collection at the A&E Department began in February 2002. The South West Regional Health Authority Ethics Committee reviewed and approved the injury surveillance system’s operations. A description of the injury surveillance process is given in Fig 1. The patient may present to the A&E Department in one of two ways: 1) an ambulatory patient would present to the triaging nurse who identifies the injury, or 2) a non-ambulatory patient would proceed first to the resuscitation room for treatment, following which injury identification would occur. The one-page paper injury surveillance form is maintained as part of the patient file, and is completed in three parts by trained hospital staff. Hospital staff were trained using a ‘train the trainer’ format, and are provided with ongoing reinforcement on the purpose of the system, data collection methods and variable definitions, and
Non-ambulant patient presents to A&E Department
via ambulance/private transport

A&E Department

Patient is triaged by triage nurse

Resuscitation Room

Is this an injury?

Yes

Triage nurse records “Injury/Poisoning Information” on injury surveillance form

No

Patient proceeds to customer service representative where “Patient Record” information is completed on injury surveillance form

Patient is treated by physician, physician completes “Clinical Information” on injury surveillance form

Injury surveillance form and patient chart reviewed by data entry clerk and information entered into EpiInfo 6 database

Injury surveillance form transferred with patient chart to data entry clerk

Data transferred to Quality Department for analysis

Dissemination of reports to stakeholders

Injury surveillance form transferred with patient chart to Medical Records A&E Department

Triage nurse records “Injury/Poisoning Information” on injury surveillance form

RESULTS

Table 1 provides an overview of the epidemiology of injuries presenting to the A&E Department of the San Fernando General Hospital from February 2002 to December 2004. Records with missing gender (170) and reason for visit other than an incident injury (538) were excluded. Statistical analysis was conducted using SAS Version 9.1 (9).

A total of 58 523 incident injuries presented to the A&E Department from February 2002 to December 2004,
representation of injury generally appeared uniform over time, a slight increase in the number of injury visits to the A&E Department was observed in March, May and October, whereas February and April were associated with the least number of visits. Upon examination of injury presentation by day of the week (Fig 2b), a slight increase in the number of injuries was observed during the weekend (Saturday, Sunday and Monday).
DISCUSSION

Injuries represent an important source of morbidity and mortality in Trinidad. Although injuries are acknowledged as an important population health issue, little is currently known about the epidemiology of injuries in the region. The injury surveillance system has been in full operation for several years, with nearly 20,000 incident injuries captured by the surveillance system each year. The majority of injuries were seen to occur in males, particularly those between 25 and 44 years of age. Falls and injuries from other blunt force represented over half of all injuries. The most common location of injury was either the home or the street. However, injuries at work also represented an important place of injury in men. The majority of injuries presenting at the A&E Department were reported as unintentional, although over 10,000 intentional injuries presented over the analysis period.

The importance of violence and injuries as a health and economic burden in the Caribbean was recently recognized by the Caribbean Commission on Health and Development (10). From a population health perspective, adopting a broader view of injury aetiology, including possible roles for a range of risk factors (including social, environmental or behavioural) acting at multiple levels may be considered (11). Particular attention must also be paid to the ability of the health services to respond to injuries once they have occurred. Indeed, a large number of injured patients presented to the A&E Department but subsequently left without being seen by a physician. Although it is not possible to determine why such patients left based on the data collected here, it is likely however that a combination of factors, including waiting time, may have been involved.

Although certain similarities appear to exist between the profiles of injury in South West Trinidad and those occurring internationally, it is important to consider the unique profile of contributing factors and distinct health and social outcomes of injury in Trinidad. It is well recognized that males, particularly young males, experience greater rates of injury around the globe likely due in part to riskier behavioural patterns, perceptions and attitudes (12). Falls were also seen to represent an important mechanism of injury among a variety of different geographic and demographic populations (13–16). Further evaluation of the specific individual and societal level factors contributing to injuries in South West Trinidad will identify specific high priority areas to implement intervention strategies.

Another important source of injury data in the Caribbean is the multi-hospital Emergency Department surveillance system in Jamaica (17). Although an injury surveillance system was previously initiated in the Bahamas (18), operation of the system was not sustained. Other targeted studies have been conducted in Trinidad and Tobago and in the Caribbean to examine specific injuries or subpopulations (19–25). A detailed database on traffic collisions and injury is also maintained by the Traffic and Highway Patrol Unit of the Trinidad and Tobago Police Service (26). Establishing linkages between these two databases in Trinidad and Tobago may provide unique analytic opportunities for the study of traffic injuries, as well as providing a potential resource for cross-validation of data collected.

The surveillance system is located in the largest public hospital and the main trauma centre in the South West Region. The patient record form is completed by trained hospital staff, and a comprehensive set of demographic data and data related to the nature and circumstances of the injury is collected. A previous study examined the concordance of data on the original injury surveillance form to the information entered into the electronic database from the years 2002 to 2003 for 13 key variables and found very low error rates [from 0.0% to 4.0%] (27). More recently, injury surveillance data have been double entered into the electronic database to enhance data quality. Although a reasonable proportion of ‘missing’ or ‘unknown’ entries were found for the key demographic and injury-related variables presented here, higher values were found for certain other variables captured; this is likely due at least in part to repetition on other forms, difficulties in collection, high time pressures on staff or insufficient reinforcement and training (27).

Establishing and maintaining systems of this type can be associated with many challenges in both developed and developing countries (18). Although the San Fernando General Hospital is the main trauma centre for the South West Region, injured patients accessing treatment at other facilities are currently not captured by the surveillance system. Consequently, a number of population groups may be underrepresented. The injury profile may differ substantially by geographic location due to differences in socio-economic, industrial and environmental profiles of different Regions. For example, middle to upper income earners may be more likely to seek treatment, particularly for minor injuries, at one of five private facilities that exist within South West Trinidad. Patients with minor injuries may also seek treatment at one of 33 local Health Centres in the Region. Fatal injuries would not be captured by this system, although they would be included in tabulations of vital statistics. Occupational injuries in workers in the petroleum industry are treated at a semi-
private hospital in the South West Region. The South West is one of five Regional Health Authorities in the country.

Other limitations may relate to biases in reporting of data for certain variables. For example, intentional injuries may be under-reported. There may also exist challenges in data collection for children, the elderly, and patients with certain mental impairments. Although proxy respondents may be used for injury surveillance data collection, the extent of their use is limited.

In conclusion, data collected through the A&E Department injury surveillance system at the San Fernando General Hospital demonstrate the importance of injuries as a population health and health services issue in Trinidad and Tobago. Future expansion of the surveillance system to other parts of Trinidad and Tobago, along with linkages with other routinely collected data sources, would provide a more comprehensive view of injuries in the country. In parallel, exploring the expansion of injury surveillance programmes within the wider Caribbean should also be considered. Further research on the economic and social impact of injuries, the design and evaluation of multi-sectoral injury prevention initiatives, and monitoring trends in injury over time is also needed. Further examination of the aetiology of injuries in high priority populations in Trinidad, along with an evaluation of related perceptions and attitudes towards injury, will also aid in developing appropriate intervention strategies.

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REFERENCES