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What is the potential of trauma registry data to be used for road traffic injury surveillance and informing road safety policy?☆

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ABSTRACT

Introduction: Information from hospital trauma registries is increasingly being used to support injury surveillance efforts. This research examines the potential of using trauma registry data for road traffic injury surveillance for different types of road users in terms of both the information collected and how representative trauma data are compared to two population-based road traffic injury data collections. *Methods:* The three data collections were assessed against recommended variables to be collected for injury surveillance purposes and the representativeness of the distribution of road traffic-related injury data from the trauma registry was compared to hospital admission and road traffic authority data collections. *Results:* Data from the trauma registry was largely not representative of the distribution of age groups or activities compared to the two population-based collections, but was representative for gender for some road user groups to at least one population-based data collection. *Conclusions:* Trauma data could be used to supplement information from population-based data collections to inform road safety efforts. *Impact on Industry:* Road safety policy makers should be aware of the potential and the limitations of using trauma registry data for road traffic injury surveillance.

1. Introduction

Around one-quarter of injuries experienced worldwide are road traffic-related (Peden, McGee, & Sharma, 2002) and in 2002 these injuries accounted for an estimated 38.7 million disability adjusted life years globally (World Health Organization [WHO], 2004). In Australia, there are around 1,460 deaths (6.9 per 100,000; Department of Infrastructure Transport Regional Development and Local Government, 2009) and 52,000 individuals hospitalized (251 per 100,000 population; Henley & Harrison, 2009) each year following a road traffic-related injury. While Australia has the capacity to perform routine injury mortality and hospitalized morbidity surveillance activities, road traffic injury surveillance capabilities across countries vary. In some countries, a great deal of information may be available for surveillance of road traffic injuries, such as the linked crash outcomes data evaluation systems (CODES) in the United States (National Highway Traffic Safety Authority, 1996) used to examine road traffic-related injuries, while in other countries road traffic injury information may be obtained from hospital records, police reports, or newspaper clippings (Rahman, Andersson, & Svanstrom, 2000), which contain only limited information about the traffic incident and how it occurred.

One type of data collection that is increasingly being used for injury surveillance purposes are trauma registries (Forst, Hryhorczuk, & Jaros, 1999; Johnson & Moore, 1997; Kobusingye & Lett, 2000; Layde, Stueland, & Nordstrom, 1996; Pollock & McClain, 1989). Trauma registries primarily collect data on individuals who have been severely injured (Nwomeh, Lowell, Kable, Haley, & Ameh, 2006). They predominantly record information on medical care within hospitals and are used to measure the quality of trauma care (Lloyd & Graitcer, 1989). In some instances, trauma registries may also record information that would be useful for injury surveillance purposes (Pollock & McClain, 1989). A significant advantage of using trauma registry data for injury surveillance is that the criterion for entry into the registry is usually well-defined being based on a recognized injury mechanism, physiologic parameters, or injury severity classification. More conventional data collections used for road traffic injury surveillance often have poorly defined entry criteria, for example the number of

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Table 1
Information recommended for injury surveillance by the World Health Organization[1] available in the SGPH trauma register, the NSW APDC, and TADS.

Variables[2]	SGPH	APDC	TADS
Demographics			
Gender	✓	✓	✓
Age group	✓	✓	✓
Indigenous origin	X	✓	X
Circumstances of the incident			
Activity	✓	✓	X
Place of occurrence	✓	✓	✓
Mechanism of injury	✓	✓	✓
Intent	✓	✓	X
Date and time of injury	✓	X	✓
External cause	X	✓	X
Alcohol a factor	✓	X	✓
Other drugs a factor	✓	X	X
Causal factors (eg. hazardous features, natural lighting, weather, speed, fatigue)	X	X	✓
Preventive factors (eg. seat belt, airbag, helmet)	✓	X	✓
Injury outcome			
Nature of injury	✓	✓	X
Injury severity	✓	X	X

[1] World Health Organization. *Injury Surveillance Guidelines.* Geneva: WHO, 2001.
[2] Differences in classification schemes used to code place of occurrence, intent and nature of injury and poorly coded data for preventive factors, alcohol and other drugs precluded comparison.

vehicle crash-related injuries reported in police crash data collections may vary greatly with the severity of the vehicle crash and/or any associated injuries (Lopez, Rosman, Jelinek, Wilkes, & Sprivulis, 2000). Trauma registries may therefore be a useful source of data for road traffic injury surveillance as they are likely to contain more homogeneous data.

Unfortunately, however, little is known about the potential of a trauma registry to provide information for road traffic-related injury surveillance of different types of road users compared to other population-based data collections more commonly used for road traffic-related injury surveillance. If trauma registry information is to be used for road traffic injury surveillance, researchers and policy makers need to know how using information from a trauma registry will influence the types of individuals and traffic incidents reported as this will affect the understanding of both the magnitude of the issue and why road traffic-related injuries occur.

In Australia, road traffic injury surveillance is routinely conducted using information recorded by road safety authorities (usually obtained from police records; Roads and Traffic Authority NSW, 2009) and/or from hospital admissions (Henley & Harrison, 2009), emergency department (ED) presentations (Watson & Ozanne-Smith, 2000), or a combination of these data collections (Boufous & Williamson, 2006; Cercarelli, Rosman, & Ryan, 1996; Lopez et al., 2000; Rosman, 2001; Rosman & Knuiman, 1994). The potential use of information from a trauma registry as an indicator of population-based road traffic injury surveillance has not been fully explored. This paper aims to examine the potential of a trauma registry for road traffic injury surveillance for different types of road users in terms of both the information collected that could be used for injury surveillance purposes and how representative the distribution of key characteristics used for surveillance from trauma data are compared to two population-based road traffic injury data collections, such as hospital admission and road safety authority collections.

Table 2
Number of road traffic-related injuries for the SGPH trauma register, the NSW APDC, and TADS, percent, NSW, 2002 to 2008.

	SGPH		APDC				TADS	
	All crashes[1]		All crashes[1]		Traffic-only[2]		Traffic-only[2]	
	n	%	n	%	n	%	n	%
Pedestrians	751	13.6	8,802	10.1	6,405	10.7	15,874	9.5
Pedal cyclists	454	8.20	17,609	20.2	8,683	14.5	8,100	4.9
Motor cyclists	659	11.9	24,290	27.9	12,489	20.8	15,239	9.1
Car occupants[3]	3,671	66.3	36,367	41.8	32,423	54.0	127,835	76.5
Total	5,535	100	87,068	100	60,000	100	167,048	100

[1] MVCs that occurred either on a public (ie. traffic) or non-public (ie. non-traffic) roadway.
[2] MVCs that occurred on a public roadway (ie. traffic).
[3] SGPH data in 'car occupants' refer to occupants of all vehicles.

2. Methods and materials

A retrospective review of data from the St George Public Hospital (SGPH) trauma registry, the New South Wales (NSW) Admitted Patients Data Collection (APDC), and the NSW Road and Traffic Authority's (RTA) Traffic Accident Database System (TADS) during January 1, 2002 to December 31, 2008 was conducted. Each data collection was assessed against the information recommended to be collected for injury surveillance purposes by the World Health Organization (WHO, 2001) and representativeness of the distribution of road traffic-related injury data from the SGPH trauma registry for different types of road users was examined in terms of demographics and circumstances of the injury incident compared to the APDC and TADS.

2.1. St George public hospital trauma registry

The SGPH is a 600-bed acute care tertiary referral facility. Since 1987, the SGPH has served as the major trauma referral hospital for the south eastern area of Sydney, Australia, a geographic zone of approximately 1.5 million inhabitants. The SGPH ED is the fourth busiest in NSW, averaging over 59,000 patient visits per year since 2004. Of these, an average of nearly 1,000 trauma patients are admitted annually, 250 of which have an Injury Severity Score greater than 15 (ISS>15).

Data are collected on all trauma presentations and stored in a purpose built data registry, maintained since 1991. This information is obtained from a number of sources, including ambulance running sheets, patient medical records, clinical ward rounds, and patient interviews. Information collected include: demographic details, injury severity, injury description and body region, total hospital, and intensive care length of stay. Road traffic-related trauma presentations in the SGPH trauma registry were identified if the mechanism recorded indicated that the incident involved either a motor vehicle crash or a motorcycle, pedal cycle, or pedestrian collision.

2.2. NSW admitted patients data collection

NSW hospitalization data include information on inpatient separations from NSW public and private hospitals, private day procedures, and public psychiatric hospitals. Included are data on episodes of care in hospital that end with the discharge, transfer, or death of the patient, or when the service category for the admitted patient changes. Information collected includes patient demographics, circumstances of the incident, diagnoses, and clinical procedures. The hospitalization data were coded using the International Classification of Disease, 10th Revision, Australian Modified (ICD-10-AM; National Centre for Classification in Health, 2004). The data also include hospitalizations of NSW residents that occur in another state or territory in Australia. At the time of writing, these data were not available for post-July 2007 or all of 2008, but were estimated to comprise 911 road traffic-related hospitalizations, based on the average of the past four years.

Road traffic-related hospitalizations of NSW residents in the APDC were identified using the following criteria: (a) the hospitalization was for a patient who was a resident of NSW; (b) the principal diagnosis was coded as 'injury, poisoning and certain other consequences