Queensland Injury Surveillance Unit

INJURY BULLETIN

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QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent three distinct areas of Queensland.

QISU publications and data are available on request for research, prevention and education activities.

HOSPITALS:
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Small wheel devices: a safety challenge for 2002

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Summary

- 3014 small wheel device injuries were recorded by QISU in the four years 1998 to 2001.
- Injuries were most often seen in children aged 10-14 years.
- Skateboarders accounted for 44% of the injuries seen.
- A fracture to the forearm or wrist was the commonest injury: 51% of inline-skaters had fractures, 41% of roller-skaters, 32% of skateboarders and 26% of scooter users.
- 15% of small wheel device users required admission to hospital for treatment.
- A quarter of all injuries occurred on the road.
- Wearing suitable protective equipment, skating in safe areas away from the road and using a device that is age appropriate will all help prevent further injuries.

Introduction

Small wheel recreational devices are popular with young Australians. A non-powered lightweight scooter (the microscooter) is the latest way to get around and skateboarding and inline-skating (rollerblading) can no longer be considered passing fads. All of these devices are based on the use of small low friction wheels and have similar riding mechanics. This bulletin examines the injuries sustained by riders of skateboards, inline-skates, roller-skates and non-powered scooters presenting to QISU participating hospitals. We compare the causes and patterns of injury in each group. Strategies for injury prevention are outlined at the end of the report.

Results

For the four years 1998 to 2001 there were 3014 injury presentations associated with the use of small wheel devices to participating hospital EDs. Within the same period there were 4889 presentations for bicycle related injuries. For all types of device, injury was commonest in the 10 to 14 year old age group comprising 6% of all injuries in this age group, compared to 8% for bicycle related injuries.

Skateboard Injuries

Skateboarders accounted for the largest number of injuries seen (1329/3014 – 44%). As with the other groups, the 10-14 age group was the

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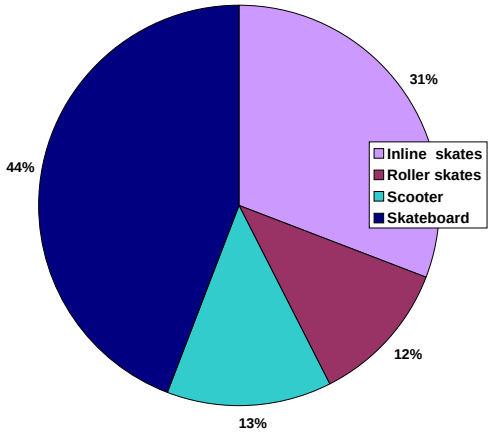

Figure 1 QISU Emergency Department presentations, by type of wheeled device, 1998-2001

most prone to injury. However, there was a striking sex difference in injury rates with young males accounting for over 80% of those injured in all age groups. The commonest skateboard injury was a fracture or dislocation of the upper limb (32%). Next was an upper limb sprain (16%), lower limb sprain (12%), open wound of the head or face (6%), lower limb fracture (6%) and a head injury (5%). One hundred and eighty-five patients (14%) required hospital admission after the injury.

Inline-skate injuries

Around a third of the injuries seen were to inline-skaters. Although inline-skating attracts the broadest age range, a third of injuries were to children less than ten years old, and more boys were injured than girls. More than half of the injuries involved fractures of an upper limb. Of these 80% were forearm fractures and 12% wrist fractures. The next commonest injuries were an upper limb sprain (16%), a lower limb sprain (4%), open wound of the head or face (4%) and head injury (3%). One hundred and ninety-nine patients (21%) were admitted to hospital after the injury.

Roller-skate Injuries

Since the arrival of the inline-skate roller-skates have become less prevalent, the number of injuries declining by 36% over the study period. There were however 355 roller-skates injuries in the study period (12% of small wheeled device injuries). Roller-skates are most popular with younger girls and the majority of injuries were in this group (60%). The injury pattern was very similar to inline-skates; upper limb fracture (41%) , upper limb sprain (23%), lower limb sprain (6%) open wound of the head and face (6%) and head injury (3%). Thirty-eight patients (11%) required hospital admission after the injury.

Scooter injuries

Scooter injuries accounted for (13%) of the small wheel injuries. The microscooter became widely available around the middle of 2000 and it is since then that the number of injuries associated with scooter use has risen. Males accounted for almost 60% of injuries, 35% occurred in the 5-9 year old age group and 33 children under 5 were injured on scooters. The most common scooter injury was again an upper limb fracture (26%), followed by an open wound to the head or face (9%), a sprain of an upper limb (8%), lower limb sprain (6%) and head injury (5%). Forty-one patients (10%) required admission to hospital.

Discussion

All small wheel devices require smooth surfaces and riders are more likely to lose control on an uneven or wet surface. Because of this riders may use the roads and pathways. As well as the obvious dangers of sharing these areas with pedestrians and other vehicles there are other hazards such as kerbs and potholes to negotiate. While most injuries occurred at home, it is a concern that significant numbers were recorded as happening on urban roads for three of the groups: scooters (24%), skateboards (21%) , inline-skates (16%) while for roller-skates only 3% of the injuries occurred on a road. It is interesting to note that Queensland road rules require that wheeled recreational devices and toys must not travel on a road with a dividing line or median strip.

The majority of injuries in all groups are caused by falls onto hard surfaces. Common injury factors are inadequate braking skills, riders not skating within their ability and an absence of safety gear. Novice users and young children are most at risk and con-

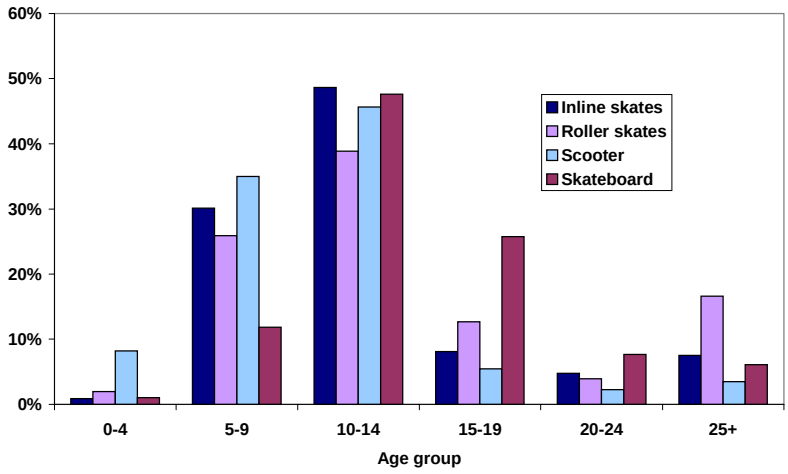

Figure 2 QISU Emergency Department presentations, by age and type of wheeled device, 1998-2001

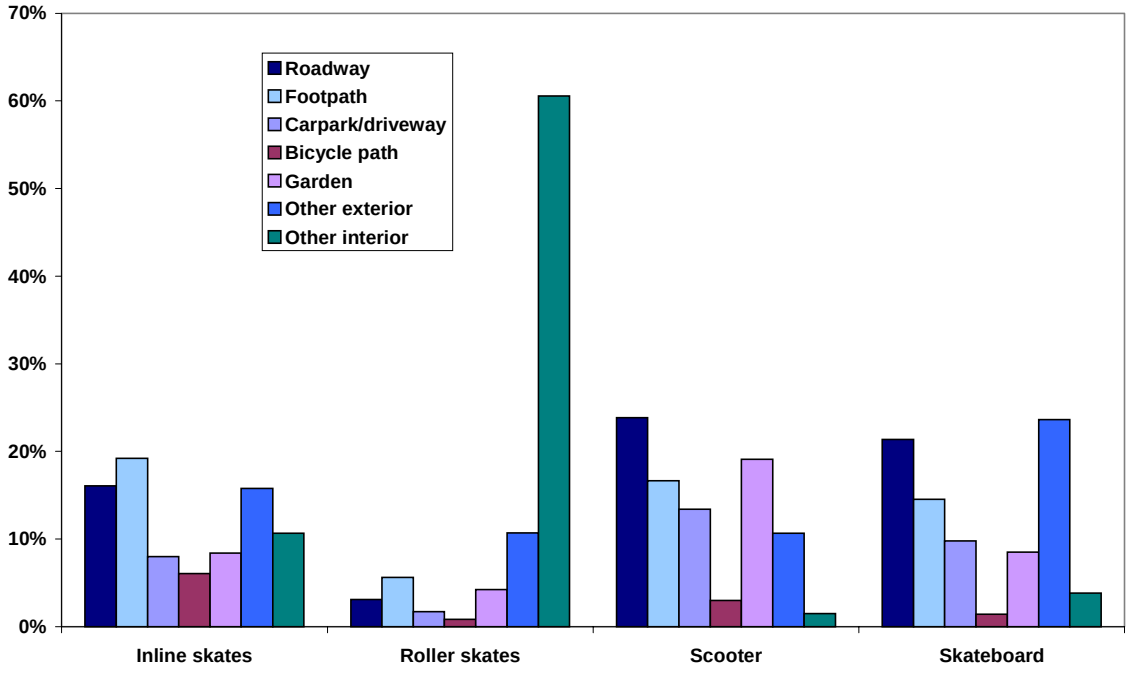

Figure 3 QISU Emergency Department presentations, by location and type of wheeled device, 1998-2001

stitute a high proportion of injuries. Younger children are at higher risk of injury as their judgement of their own skills and strength is poor. Also they lack the capacity to judge pedestrian or motor traffic. Physically their neuromuscular system is not well developed and their centre of gravity is higher than that of older children and adults. Consequently they are more likely to fall and when they do, they are less able to protect themselves from injury.

Although the most common injury for all devices was an upper limb fracture the relative frequency of this injury varied markedly between devices, with the skating devices (inline and roller-skates) having a higher percentage of upper limb fractures (51% and 41%) than skateboards and scooters (32% and 26%). Conversely skateboard and scooter users suffered more lower limb fractures (6% vs 3%).

Skateboards

Skateboard related injuries account for the largest group in our series. Other studies that have looked at relative participant to injury rates have found that skateboarders have the highest injury rate when compared with scooters, inline-skates and bicycles [1]. Skateboarders also have more serious injuries and are more likely to have head injuries [2]. In North America the commonest skateboard injury requiring hospitalisation is a head injury [3]. There are a number of possible reasons for this. Skateboarders tend to be older (adolescent) males who skate in more dangerous locations (eg streets), are more likely to engage in stunt skating and often skate without helmets. Although the rate of head injury is lower than other types of skating injuries, head injuries are the most severe and can lead to long-term disabilities. Most deaths that occur are due to head injuries, often sustained in collisions with cars, as was the case in a recent Brisbane skateboarding fatality. This emphasises that a helmet is the single most important piece of safety equipment for all skaters. In similar situations with cyclists, helmets have been shown to reduce the risk of brain injury by around 90%.

Inline-skates

Inline-skating is primarily a recreational activity but is also used in fitness training and by some as a mode of transport. As with skateboarding it is now also a competitive “extreme” sport. The continued popularity of inline-skating provides a growing number of novice inline-skaters each year and this group appears to be at greatest risk of injury. A number of inline-skaters were struck by cars and one young inline-skater died when struck by a motorcycle. In our series more inline-skaters were admitted to hospital than any other group. This is usually due to fractures of the forearm, wrist and elbow, sustained after a fall onto outstretched hands. The effectiveness of protective gear for inline-skating is well established [4,5]. Research has shown that wrist guards can reduce wrist injuries by 87%, elbow pads reduce elbow injuries by 82%, and knee pads can reduce knee injuries by 32% [5]. Full protective equipment for inline-skating should include a helmet, wrist guards, gloves, knee and elbow pads and protective clothing (long sleeves and long pants). For optimum control the inline-skates should also be a comfortable, firm fit.

Roller-skates

In contrast to the other groups, roller-skate injuries very rarely occurred on the roads (3%) and mostly occurred in specific recreational areas. This may explain why despite a similar injury pattern to inline-skates, roller-skate injuries were less severe and they had half the hospital admission rate (11% vs 21% for inline-skaters).

Scooters

The new Microscooters have become widespread since mid 2000. There are a number of similar products. Most are made of lightweight aluminium, with small low-friction wheels similar to those on in-line skates. They weigh around 3kg and fold-up for easy portability and storage. The rise in the number of injuries we have seen is directly related to the increased popularity of these new scooters. Of the 403 scooter related injuries in our series, 91% occurred in the last 18 months of the study period. The increase in scooter related injuries in this period appears to have been compensated by a corresponding decline in inline-skate and bicycle related injuries, a similar pattern to that observed in North America. Scooter riders also appear to have less safety awareness than other types of riders. A study from NSW showed that children were less likely to use safety equipment with scooters than with skateboards, inline-skates or bicycles[6]. They found only 3% of children with scooter related injuries were wearing safety equipment at the time of injury, despite 86% owning some form of safety equipment. In America where there are over 4000 scooter related injuries per month, the US Consumer Product Safety Commission estimates that two-thirds of these might have been prevented or reduced in severity by protective equipment [7]. The braking system for scooters works by pressing a metal wheel arch onto the rear wheel. This is adequate for normal speeds on flat surfaces but as scooters acquire much greater speeds going downhill, this mechanism may not stop the scooter quickly enough. Poorly made models should be avoided as a number of injuries have been caused by sharp edges on the deck of the scooter and others have occurred where fingers have been caught in pinch points when folding the scooter.

Conclusions

Falls from small wheeled recreational devices account for a substantial number of ED presentations and overall 15% required hospital admission. This compares with an admission rate of 14% for cyclists over the same period. Injuries are most common in 10-14 year olds. However there are some differences in injury patterns and severity between the different devices. Upper limb fractures are commonly seen, particularly in inline and roller skaters, and injuries sustained while inline-skating and skateboarding are most likely to lead to hospital admission. Severe head injuries are a particular problem. Many of these injuries could be avoided if users do not skate on public roads, proper protective gear is worn and the device is age appropriate.

Safety Recommendations

Protective gear does make a significant difference.

All skaters should wear a helmet. The helmet should be a bicycle or multisport helmet that complies with the appropriate Australian Standard. The helmet should be a good fit. A good test is to push gently with the heel of the hand against the front of the helmet. If it moves around easily then it is too loose.

Wrist guards, gloves, knee and elbow pads should be used by skateboarders, inline-skaters and roller-skaters. Children using scooters should use knee and elbow pads. Fully enclosed footwear should be worn by all riders.

Young children and new users should learn the basics of skating, stopping and speed control in supervised settings. This means away from traffic, steep slopes and pedestrians, and not skating too close together. Lessons are particularly recommended for novice inline-skaters.

Don't ride at night – skaters cannot be seen, and cannot see obstacles or other skaters.

Hire shops should require the hiring of the appropriate safety equipment with any of these devices.

The device should be the right size and appropriate for the child's stage of development. Children younger than 5 years should not ride skateboards and those between 6 and 10 years of age should be closely supervised while skateboarding. Children younger than 8 years should not ride scooters without close adult supervision.

Local government has the capacity to engage with communities to provide safe skating areas such as skate parks, multi-purpose paths (shared with cyclists) and skate-friendly ramps.

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