**Adults cycling on the footpath: What do the data show?**

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ABSTRACT

Recent increases in cycling have led to many media articles highlighting concerns about interactions between cyclists and pedestrians on footpaths and off-road paths. Under the Australian Road Rules, adults are not allowed to ride on footpaths unless accompanying a child 12 years of age or younger. However, this rule does not apply in Queensland. This paper reviews international studies that examine the safety of footpath cycling for both cyclists and pedestrians, and relevant Australian crash and injury data. The results of a survey of more than 2,500 Queensland adult cyclists are presented in terms of the frequency of footpath cycling, the characteristics of those cyclists and the characteristics of self-reported footpath crashes. A third of the respondents reported riding on the footpath and, of those, about two-thirds did so reluctantly. Riding on the footpath was more common for utilitarian trips and for new riders, although the average distance ridden on footpaths was greater for experienced riders. About 5% of distance ridden and a similar percentage of self-reported crashes occurred on footpaths. These data are discussed in terms of the Safe Systems principle of separating road users with vastly different levels of kinetic energy. The paper concludes that footpaths are important facilities for both inexperienced and experienced riders and for utilitarian riding, especially in locations riders consider do not provide a safe system for cycling.

Keywords: Cycling safety, Safe System, crash risk, cycling infrastructure

## Introduction

One of the underlying principles of the Safe Systems approach to road safety is that of separating road users with vastly different levels of kinetic energy. The Vision Zero philosophy, on which the Safe Systems approach is based, states that vulnerable road users should not be exposed to motorised vehicles at speeds exceeding 30 km/h (*1*). Cycling on the footpath is one way of separating cyclists from traffic but it is prohibited in most Australian jurisdictions for adults except when accompanying a child of 12 years of age or younger. In Queensland, Tasmania and the Australian Capital Territory it is legal for adults to ride a bicycle on the footpath. The prohibition against cycling on the footpath appears to be based on concerns about dangers to cyclists associated with motor vehicle crashes at driveways and intersections and cyclists posing a threat to pedestrians on footpaths. This paper examines what is known about the safety of footpath cycling, both in Australia and internationally.

A review of the mostly North American literature on transportation infrastructure and cyclist safety (*2*) concluded that for mid-block locations "sidewalks [footpaths] and multi-use trails pose the highest risk, major roads are more hazardous than minor roads, and the presence of bicycle facilities (e.g. on-road bike routes, on-road marked bike lanes, and off-road bike paths) was associated with the lowest risk" (p.47). Many of the studies reviewed reported that the risk associated with footpath cycling was between 1.8 and 16 times that of on-road riding. However, all of the cited studies examined self-reported crashes which were dominated by non-injury crashes. The pattern appears to be different for more serious crashes. A US study which compared the riding locations of cyclists presenting at hospital emergency departments with uninjured controls found the relative risk of riding on footpaths compared with neighbourhood streets was 1.0 for adults and 0.6 for children (*3*). Another study which examined police reported bicycle-motor vehicle crashes at intersections (including driveways) in Palo Alto, California, found that the elevated risk of footpath crashes was almost exclusively related to cycling against the direction of traffic (RR=1.9), with no elevated risk for cycling in the same direction as traffic (RR=0.9) (*4*). Thus, it may be that footpath cycling is more likely to result in crashes than riding on the road, but that the resultant crashes are much less serious.

The most substantial Australian research into the safety of footpath cycling took place in Victoria in the late 1980s (where footpath cycling by adults was and remains illegal) (*5*-*7*). It began with an observational study of cyclist exposure patterns on arterial and non-arterial roads and footpaths, the results of which were compared with Police-reported casualty crash data to estimate crash risks (*5*). For riders aged under 11 (for whom this behaviour was legal), almost half of the riding occurred on the footpath, compared to about 20% of riding by those aged 18 and over. The estimated risk of a Police reported casualty crash per billion seconds of cycling was higher on the road than on the footpath for riders of all ages and ranged from 1.5 for children on non-arterials to 6.8 for adults on non-arterials. The risks of riding on the footpath were approximately double for children and adolescents as for adults. Based on a Victorian telephone survey asking about cycling behaviour if footpath cycling was legalised (*6*), it was concluded that a minimum reduction of approximately 160 crash involvements of current cyclists per year could occur if footpath cycling was legalised. However, the report cautioned that the actual effect

on numbers of Police-reported crashes would be lower due to under-reporting of crashes and that it was difficult to estimate the extent to which legalising footpath cycling might attract current non-cyclists to cycling, thus diluting any crash reductions.

There is little published data available regarding the effects of footpath cycling on pedestrian safety. The observational study reported earlier (*5*) also collected data on the number of pedestrians passed by cyclists on footpaths. Most of the pedestrians passed were on footpaths beside arterial roads and in shopping centres and most of the cyclists passing pedestrians were adolescents. In a related study (*7*) hospital records for admitted patients and those treated in emergency departments at eight hospitals in Victoria were examined. The study identified only two pedestrians who were injured as a result of a collision with a cyclist on a footpath (and two potential additional cases where actual location could not be determined) during the period 1 April to 20 December 1987. The study concluded that "pedestrian casualties resulting from collisions with cyclists on the footpath are a relatively very small problem" (p.5) but cautioned that it could not measure the number of pedestrians whose injury was too slight to require hospital treatment or the reduction in amenity to pedestrians caused by concerns about potential collisions with cyclists.

Australia-wide hospital separations data for land transport accidents (*8*) provides limited but more recent information on injuries associated with footpath cycling. In the financial year 2006-07, 103 (2.3%) hospitalised pedal cyclists were coded as injured on "footpath next to road", compared with 105 on a cycleway, 2,248 on a roadway, and 1,548 with unspecified place of occurrence. In the same year, 27 pedal cyclists were hospitalised for a total of 59 days as a result of a traffic accident where the counterpart in the collision was a pedestrian or animal (whether on the footpath or on the road). This corresponds to 0.5% of hospitalised cyclists and 0.4% of cyclist bed-days from traffic accidents. There were 42 pedestrians hospitalised for a total of 230 bed-days as a result of a traffic accident where the counterpart was a pedal cyclist (whether on the footpath or on the road). This corresponds to 2.8% of hospitalised pedestrians and 1.0% of pedestrian bed-days from traffic accidents. Data from the Queensland Trauma Registry from 2005 to 2009 (*9*) showed that of the 2,300 cyclists admitted to hospital or died in hospital, only 22 (1.0%) were coded as having collided with a pedestrian or animal.

Given the lack of recent or detailed information about the extent, characteristics and safety of footpath cycling, this paper presents results from a survey of Queensland cyclists that provides some useful current data that can be used to better understand footpath cycling and to assess how well footpath cycling fits with Safe System principles.

## Method

### *Survey Development and Recruitment*

The information reported here was collected as part of a larger survey of the riding patterns, safety behaviours, risk perceptions and injury experiences of Queensland cyclists which ran from October 2009 to the end of March 2010. The survey questions were based on national and international sources (*10-12*). Participants were recruited through advertising, media coverage, posting on cycling forums,

distribution of promotional flyers and word of mouth. The questionnaire package (both online and hardcopy) included a cover letter and the questionnaire, and the hardcopy also included a reply-paid envelope. Participants who provided contact details to the research team were entered into a monthly prize draw for cycling accessories. Participants were required to be Queensland residents, and to have ridden a bicycle in the past 12 months. The project was approved by the Queensland University of Technology Human Research Ethics Committee.

***Relevant Items and Coding***

Participants were asked whether they usually ride on footpaths, bicycle paths, urban roads, rural roads, velodromes, BMX tracks, skate parks, off-road/trails (single track, fire trails, unsealed roads) and other locations. For each option, they were asked to select whether "I choose to ride here", "I ride here reluctantly", or "I do not ride here". They were also asked how many days per week and the distance per week they usually ride in that type of location. The facilities that are available for use by riders are likely to vary according to whether they ride in the city or in rural or remote locations. For this reason, the Rural, Remote and Metropolitan Areas (RRMA) classification system was used to classify the postcodes of residence of the respondents (*13*). There are seven RRMA categories based on population: two for metropolitan zones, three for rural zones and two for remote zones.

Purpose of riding and level of experience were also expected to affect where riding occurred. Participants were asked "In a normal week, what proportion of your cycling is for the following reasons?" The options provided were: shopping, travel as a student to school/TAFE/university, commuting, travel to public transport, social/recreation, health/fitness and training, and organised racing. For each option, the participant marked a scale from 1 "very little or none" to 7 "most or all". If shopping, travel as a student, commuting or travel to public transport was rated highest, the respondent was categorised as a utilitarian rider. If social/recreation was rated highest, the respondent was categorised as a social rider. If health/fitness and training, or organised racing was rated highest, the respondent was categorised as a fitness rider. In the case of ties between commuting and health/fitness, the respondent was categorised as a utilitarian rider because it was assumed that the trip to work was the major influence on where riding occurred and that health/fitness was a side benefit. In the case of ties between health/fitness and training and racing, the rider was categorised as a fitness rider. This differs somewhat from the approach taken in earlier research (*14*) where utilitarian travel was defined based on the destination of individual trips.

To measure rider experience, participants were asked to indicate in which of the previous five years (2005-2009) they were regular riders. Those reporting riding regularly in only 2008 and/or 2009 were classified as "new" riders. Riders who had ridden in all five years (2005-2009) were classified as "continuing" riders. Respondents who had ridden any other combinations of years were classified as "other". Regular riding was not defined in the question, but later analyses showed that about 85% of respondents rode two or more days in an average week.

Riders were asked "How many times in the past 2 years have you been injured as a result of a crash (e.g. being hit by a car or falling off your bicycle)?". Detailed

questions were asked about the most serious injury reported. No information was collected regarding the severity of injury to anyone else in the crash.

## Results

### *Characteristics of Respondents*

A total of 2,630 online survey responses were received of which 2,543 were complete. Data from 28 respondents aged 6-17 were excluded from further analysis. An additional 17 hard-copy survey responses were valid and complete, resulting in a total sample size of 2,532. The average age of respondents was 42.6 years and 73.3% were male. The respondents comprised 20.6% new riders, 53.4% continuing riders and 26.0% other riders. In terms of purpose of riding, 37.2% of respondents were utilitarian riders, 15.6% were social riders and 47.0% were fitness riders.

### *Riding Locations*

Table 1 shows that 33.9% of respondents reported riding on footpaths, of whom about two-thirds ride there reluctantly. About a third of riders who ride on urban roads also report doing so reluctantly. Most of the riding in other locations occurs by choice.

**TABLE 1 Percentage of Riders Who Ride in Particular Locations and Frequency and Distance Ridden and Motivation**

| Location | % who ride here | % choose to ride here | % ride here reluctantly | Mean days per week | Mean kms per week |
|---|---|---|---|---|---|
| Footpath | 33.9 | 11.0 | 22.9 | 2.67 | 9.87 |
| Bicycle path | 65.7 | 55.2 | 10.5 | 3.25 | 37.94 |
| Urban roads | 92.6 | 61.9 | 29.1 | 3.89 | 96.93 |
| Rural roads | 37.0 | 32.9 | 4.1 | 2.43 | 89.07 |
| Velodrome | 5.1 | 4.9 | 0.2 | 0.60 | 16.53 |
| BMX track | 1.5 | 1.3 | 0.1 | 0.24 | 1.20 |
| Skate park | 0.9 | 0.8 | 0.1 | 0.14 | 0.75 |
| Off-road/dirt | 28.0 | 26.7 | 1.3 | 1.38 | 30.93 |
| Other | 2.6 | 2.4 | 0.2 | 0.84 | 32.35 |

New riders were more likely to ride on the footpath than continuing or other riders (see Table 2). A larger proportion of the distance ridden by new riders was on footpaths (6.5%) than for continuing (3.9%) or other (4.5%) riders (see Table 3). However, in terms of the mean distance travelled per week, continuing riders actually rode further on footpaths (3.73 kms) than new riders (3.22 kms) or other riders (3.10 kms). The analysis of riding location and choice found strong differences according to riding purpose. Utilitarian riders were the most likely to ride on the footpath, followed by social and then fitness riders (see Table 4). Regardless of trip purpose, about two-thirds of all riders who rode on the footpath reported doing so reluctantly.

**TABLE 2 Percentages of New, Continuing and Other Riders Who Ride in Particular Locations**

| Location | % who ride here | | | % who choose to ride | | | % who ride reluctantly | | |
|---|---|---|---|---|---|---|---|---|---|
| | New | Continuing | Other | New | Continuing | Other | New | Continuing | Other |
| Footpath | 39.5 | 32.1 | 33.1 | 17.4 | 9.3 | 9.3 | 22.0 | 22.8 | 23.8 |
| Bicycle path | 68.6 | 65.2 | 64.5 | 61.9 | 53.1 | 54.2 | 6.7 | 12.1 | 10.3 |
| Urban roads | 89.5 | 92.8 | 91.0 | 54.0 | 66.8 | 58.7 | 35.4 | 26.0 | 32.3 |
| Rural roads | 26.2 | 42.4 | 64.7 | 22.2 | 38.0 | 31.1 | 4.0 | 4.4 | 3.6 |
| Velodrome | 3.8 | 6.7 | 3.2 | 3.6 | 6.4 | 3.0 | 0.2 | 0.2 | 0.2 |
| BMX track | 0.8 | 1.9 | 1.1 | 0.8 | 1.7 | 1.1 | 0.0 | 0.2 | 0.0 |
| Skate park | 0.2 | 1.3 | 0.9 | 0.2 | 1.0 | 0.9 | 0.0 | 0.2 | 0.0 |
| Off-road/dirt | 16.7 | 34.6 | 24.0 | 15.3 | 33.3 | 22.5 | 1.5 | 1.1 | 22.5 |
| Other | 0.8 | 3.4 | 2.4 | 0.6 | 3.3 | 2.1 | 0.2 | 0.1 | 0.3 |

**TABLE 3 Percentage of Total Distance Ridden That Occurs in Particular Locations for New, Continuing and Other Riders**

| Location | % total distance | | | Mean distance per week (kms) | | |
|---|---|---|---|---|---|---|
| | New | Continuing | Other | New | Continuing | Other |
| Footpath | 6.46 | 3.93 | 4.49 | 3.22 | 3.73 | 3.10 |
| Bicycle path | 29.83 | 19.43 | 21.65 | 25.35 | 25.46 | 20.40 |
| Urban roads | 48.63 | 52.63 | 53.94 | 65.85 | 99.03 | 84.21 |
| Rural roads | 10.49 | 15.34 | 13.85 | 19.43 | 34.80 | 27.19 |
| Off-road/dirt tracks | 3.96 | 6.87 | 5.35 | 4.13 | 10.50 | 6.58 |

**TABLE 4 Percentages of Utilitarian, Social and Fitness Riders Who Ride in Particular Locations**

| Location | % who ride here | | | % who choose to ride | | | % who ride reluctantly | | |
|---|---|---|---|---|---|---|---|---|---|
| | Utilitarian | Social | Fitness | Utilitarian | Social | Fitness | Utilitarian | Social | Fitness |
| Footpath | 51.3 | 37.4 | 19.0 | 17.5 | 13.4 | 5.0 | 33.8 | 24.0 | 14.0 |
| Bicycle path | 78.9 | 67.2 | 54.7 | 72.7 | 58.8 | 40.2 | 6.2 | 8.3 | 14.5 |
| Urban roads | 94.7 | 85.9 | 90.9 | 55.6 | 56.3 | 68.9 | 39.1 | 29.5 | 22.2 |
| Rural roads | 20.6 | 40.7 | 48.8 | 16.9 | 33.6 | 45.2 | 3.6 | 7.1 | 3.6 |
| Velodrome | 1.5 | 2.3 | 9.0 | 1.4 | 2.0 | 8.7 | 0.1 | 0.3 | 0.3 |
| BMX track | 1.1 | 2.0 | 1.6 | 1.0 | 2.0 | 1.4 | 0.1 | 0.0 | 0.2 |
| Skate park | 0.6 | 1.5 | 1.0 | 0.6 | 1.5 | 0.8 | 0.0 | 0.0 | 0.3 |
| Off-road/ dirt | 22.2 | 35.1 | 30.3 | 21.1 | 33.1 | 29.1 | 1.2 | 2.0 | 1.2 |
| Other | 1.8 | 1.5 | 3.5 | 1.5 | 1.3 | 3.5 | 0.3 | 0.3 | 0.0 |

### *Footpath crashes*

Of the respondents' most serious crash-related injuries in the last two years, 72 (5.8%) occurred on the footpath. The largest number of crashes occurred on urban roads without bicycle markings (38.7%), followed by off-road/trails (17.1%) and bike paths (14.3%). The characteristics of the crashes according to location are summarised in Table 5. Overall, 69.4% of footpath crashes were single-vehicle crashes (involving only the bicycle). This was higher than for bike paths and urban roads, but was similar to rural roads and lower than for off-road/trail crashes. Footpath crashes more commonly involved pedestrians (9.7%) than other locations, with the exception of bike paths (18.1%). In comparison with crashes in other locations, footpath crashes (like bike path and off-road crashes) resulted in less serious injuries than crashes on urban roads. Head injuries, concussion and internal injuries were less common in footpath crashes than crashes in other locations.

**Table 5. Characteristics of self-reported crashes relating in most serious injury in last two years according to crash location.**

| | Footpath | Bike Path | Urban Road bicycle markings | Urban Road no bicycle markings | Rural Road | Off-road/trail |
|---|---|---|---|---|---|---|
| Number of crashes | 72 | 178 | 141 | 481 | 94 | 213 |
| Percent of crashes | 5.8% | 14.3% | 11.4% | 38.7% | 7.6% | 17.1% |
| Medical treatment* | | | | | | |
| Ambulance transport | 5.6% | 7.4% | 18.0% | 18.0% | 14.0% | 2.8% |
| ER Treatment | 22.5% | 16.7% | 31.9% | 28.0% | 30.8% | 17.3% |
| Hospital admission | 11.1% | 4.0% | 10.0% | 11.3% | 11.0% | 6.7% |
| GP treatment | 23.6% | 30.3% | 40.7% | 38.3% | 39.8% | 25.0% |
| No formal treatment | 68.1% | 66.3% | 46.1% | 44.6% | 52.1% | 68.5% |
| Part of body injured* | | | | | | |
| Head (including face) | 8.3% | 12.9% | 19.1% | 18.9% | 19.1% | 13.6% |
| Neck | 5.6% | 7.3% | 14.2% | 10.0% | 7.4% | 8.0% |
| Chest | 8.3% | 7.3% | 7.1% | 8.1% | 18.1% | 13.6% |
| Abdomen, lower back/pelvis | 6.9% | 9.6% | 10.6% | 12.5% | 10.6% | 9.9% |
| Shoulder/arm/hand | 55.6% | 68.5% | 68.8% | 70.3% | 62.8% | 57.3% |
| Hip/upper leg | 29.2% | 41.6% | 48.2% | 46.6% | 44.7% | 33.8% |
| Lower leg/foot | 34.7% | 37.1% | 38.3% | 30.1% | 35.1% | 34.7% |
| Type of injury sustained* | | | | | | |
| Bruises | 54.2% | 67.4% | 66.7% | 70.3% | 62.8% | 57.7% |
| Lacerations/abrasions | 48.6% | 69.1% | 70.2% | 71.3% | 71.3% | 61.5% |
| Dislocation | 2.8% | 3.9% | 4.3% | 4.8% | 2.1% | 4.7% |
| Sprain/Strain | 29.2% | 27.5% | 31.9% | 25.6% | 25.5% | 23.0% |
| Concussion | 1.4% | 7.9% | 16.3% | 9.1% | 14.9% | 8.5% |
| Internal injury | 1.4% | 3.4% | 5.0% | 4.0% | 8.5% | 3.3% |
| Fractured/broken bones | 19.4% | 12.4% | 14.9% | 15.2% | 21.3% | 14.6% |
| Deep piercing injury | 2.8% | 1.7% | 5.0% | 2.9% | 5.3% | 4.2% |
| Cause of crash | | | | | | |
| Fatigue | 2.8% | 5.1% | 2.1% | 2.3% | 9.6% | 11.3% |
| Weather conditions | 8.3% | 14.6% | 7.1% | 10.4% | 18.1% | 3.3% |
| Poor surface conditions | 33.3% | 36.0% | 12.8% | 21.0% | 37.2% | 27.2% |
| Collided with another cyclist | 2.8% | 15.7% | 12.1% | 13.7% | 19.0% | 0.9% |
| Fall from bicycle | 48.6% | 40.4% | 15.6% | 34.1% | 35.1% | 62.4% |
| Avoiding another road user | 16.7% | 13.5% | 17.0% | 8.9% | 3.2% | 2.8% |
| Hitting an animal | 0.0% | 2.8% | 0.7% | 1.2% | 4.3% | 0.5% |
| Hitting a fixed object | 8.3% | 9.6% | 4.3% | 5.0% | 5.3% | 26.3% |
| Collision with a pedestrian | 2.8% | 6.2% | 0.7% | 1.0% | 1.1% | 0.0% |
| Struck by a car door | 0.0% | 1.1% | 5.7% | 5.2% | 0.0% | 0.0% |
| Struck by moving vehicle | 9.7% | 1.1% | 44.0% | 25.2% | 10.6% | 0.0% |
| Other | 7.0% | 7.6% | 9.2% | 6.0% | 3.3% | 3.7% |
| Involved in crash | | | | | | |
| Single vehicle crash | 69.4% | 58.8% | 22.7% | 42.2% | 62.8% | 98.1% |
| Multi-bicycle crash | 4.2% | 18.1% | 12.8% | 16.1% | 18.1% | 0.5% |
| Bicycle(s)-pedestrian(s) | 9.7% | 18.1% | 0.0% | 1.3% | 1.1% | 0.5% |
| Bicycle(s)-vehicle(s) | 13.9% | 3.4% | 63.1% | 38.4% | 11.7% | 0.9% |
| Bicycle and animal | 2.8% | 1.7% | 1.4% | 1.9% | 6.4% | 0.0% |
| Gender | | | | | | |
| Male | 75.0% | 77.7% | 75.5% | 78.7% | 76.1% | 86.2% |
| Female | 25.0% | 22.3% | 24.5% | 21.3% | 23.9% | 13.8% |
| Age | | | | | | |
| 18-24 | 8.3% | 4.5% | 6.4% | 4.2% | 9.8% | 5.7% |
| 25-29 | 11.1% | 10.7% | 12.8% | 8.2% | 2.2% | 9.4% |
| 30-39 | 27.8% | 31.6% | 29.1% | 27.4% | 18.5% | 40.1% |
| 40-49 | 23.6% | 26.6% | 24.8% | 31.8% | 28.3% | 32.1% |
| 50-59 | 18.1% | 19.8% | 21.3% | 20.5% | 32.6% | 10.8% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 60-69 | 8.3% | 4.5% | 5.0% | 6.5% | 7.6% | 1.9% |
| 70-79 | 2.8% | 2.3% | 0.7% | 1.5% | 1.1% | 0.0% |
| Experience | | | | | | |
| New rider | 27.8% | 23.0% | 19.1% | 19.6% | 23.7% | 14.1% |
| Continuing rider | 47.2% | 51.1% | 56.7% | 53.1% | 52.7% | 59.6% |
| Other | 25.0% | 25.8% | 24.1% | 27.3% | 23.7% | 26.3% |
| Purpose of riding | | | | | | |
| Utilitarian | 65.3% | 53.0% | 52.9% | 34.0% | 5.4% | 2.0% |
| Social | 11.1% | 13.0% | 0.0% | 10.2% | 10.8% | 52.6% |
| Health/Fitness | 20.9% | 33.9% | 42.1% | 53.6% | 72.4% | 41.8% |
| Other | 2.8% | 1.1% | 0.0% | 2.1% | 2.1% | 3.8% |
| Time of day | | | | | | |
| 0:00-5:59 | 2.8% | 2.2% | 2.1% | 4.8% | 3.2% | 1.4% |
| 6:00-11:59 | 47.2% | 50.0% | 70.9% | 61.5% | 61.7% | 52.6% |
| 12:59-17:59 | 26.4% | 32.6% | 17.7% | 22.2% | 21.3% | 32.9% |
| 18:00-23:59 | 18.1% | 8.4% | 3.5% | 7.3% | 2.1% | 6.1% |

*Multiple responses allowed

New riders comprised 27.8% of those injured in footpath crashes, which was greater than for other crash locations. However, the age and gender profile of riders in footpath crashes was similar to those in other locations. More than half of the footpath crashes occurred while commuting, which was similar for crashes on bike paths and urban roads with bike markings. While about half of the footpath crashes occurred between 6 am and midday, footpath crashes were somewhat more likely to occur between 6 pm and midnight (18.1%) than crashes in any other location (3.5% to 8.4%). The most commonly reported cause of footpath crashes was “fall from bicycle” (48.6%), followed by “poor surface conditions” (33.3%). These were also the top two causes of bike path, rural road and off-road/trail crashes, while “struck by moving vehicle” was cited as a cause of many urban road crashes.

## Discussion and conclusions

The survey of Queensland riders found that a third of the respondents reported riding on the footpath, with about two-thirds of them doing so reluctantly. New riders and utilitarian riders rode more on the footpath. The frequency, and particularly distance ridden, on the footpath was less than for urban roads and bicycle paths, suggesting that the footpath was used in locations where the urban road was considered unsafe or inconvenient (e.g. one-way streets), rather than being used for the entire trip. It was not surprising that new riders spent a larger proportion of their riding on footpaths than more experienced riders, but the interesting finding was that the mean distance ridden on footpaths per week was greater for experienced riders. This shows that, like bicycle paths, footpaths are an important facility for riders of all levels of experience.

The percentage of most serious crashes reported in the survey that occurred on the footpath was similar to the percentage of total distance ridden on the footpath, suggesting that riding on the footpath did not increase crash risk. Footpath crashes were less likely to require medical treatment than crashes on roadways which is consistent with the Safe Systems principles of separating vulnerable road users from motorised vehicle traffic. Almost 10% of footpath crashes did involve pedestrians, however, and the survey did not collect information about their injuries. Surprisingly, the percentage of crashes involving pedestrians on bike paths was double that on footpaths, suggesting that shared paths may be a greater challenge for cyclist-

pedestrian interactions than footpaths. The reluctance of cyclists to travel on the footpath may provide a clue here. Perhaps cyclists are more careful of pedestrians and travel more slowly on footpaths than on shared paths.

From a public health perspective, the opportunity to ride on the footpath may act to encourage cycling (particularly among new cyclists) because it is perceived to be less dangerous than riding on the road.

*Strength and limitations of the study*
A strength of the study is the high proportion of male participants (73%), which matches the representation of males in cycling in Australia. However, there are a number of limitations relating to the characteristics of participants and where the research was conducted.

Compared with population representative samples collected in Queensland, the survey respondents rode more often and longer than other cyclists (*15-16*). Thus they may not be reflective of the general cycling population. It may be beneficial for future research to actively target areas used for recreational cycling (suburban parks and bikeways), and less specialised bicycle retailers (including department stores) to increase the representation of recreational cyclists in surveys. The survey specifically excluded riders aged under 18 years. Child cyclists are an important focus for cycling safety research because almost 75% of all injured cyclists presenting to hospital emergency departments in Queensland are under 15 years of age (*17*). It may be that a considerable amount of riding on the footpath involves children. Future research is required to examine the riding, safety and injury patterns of child cyclists in Queensland and elsewhere.

Some caution needs to be taken in generalising the results from this survey to other cities and countries. Cyclists can only choose from among the facilities that are available. The amount of footpath riding may be higher in our study because it was conducted in a jurisdiction where this practice is legal for adults. Compared to other parts of the world, Queensland may have relatively poor facilities on urban roads and some of its bicycle paths provide useful alternatives to urban roads.

In conclusion, the available evidence suggests that riding on the footpath is associated with less serious injuries to cyclists than riding on the road and does not appear to cause many serious injuries to pedestrians. Footpaths are important facilities for both inexperienced and experienced riders and for utilitarian riding, especially in locations riders consider do not provide a safe system for cycling.

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