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**Background** Road trauma identified using hospital admission records and/or police-reported crashes are susceptible to changes in policy and resourcing. Divergence between the incidence of police and hospital-reported road trauma trends needs to be explored, as this may have an impact on the development and evaluation of road safety policy.

**Aim** To compare the temporal trends in police, hospital, and linked police-hospital records for non-fatal road trauma for road users by injury severity.

**Method** Temporal trends for road users were examined in: (i) hospital admission, (ii) police-reported crashes, and (iii) linked police-hospital records during 2001–2009 in New South Wales, Australia by injury severity. Injury severity was identified using the International Classification of Diseases Injury Severity Scores (ICISS).

**Results** Hospital records showed significantly increasing injury trends for motorcyclists and pedal cyclists (6.3% and 5.5%) and significantly decreasing trends for motor vehicle occupants and pedestrians (1.7% and 2.2%) per year. These trends were similar for linked hospital-police data, except for pedal cyclists. In police-reported crashes, there were significant decreases for pedal cycle, motor vehicle and pedestrian casualty rates (1.5%, 3.8% and 5.2%), and a significant increase for motorcyclists (1.8%) each year. Serious injury (ICISS greater than 0.965) showed less fluctuation in injury trends over time than more minor injuries.

**Significance** Differences in the annual percent change over time between hospital and police-reported crashes are evident which may influence policymaking. Motorcycle trauma were increasing 3.5-fold using hospital admissions compared to police-reported crashes, while pedal cyclists showed divergent trends between data collections.