Area socioeconomic status and childhood injury morbidity in New South Wales, Australia

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Objective: To explore the relationship between child injury morbidity and socioeconomic status.

Design: A cross-sectional analysis of routinely collected hospital separation data for unintentional injury for the period 1999/2000–2004/2005.

Setting: All statistical local areas of New South Wales (NSW), Australia

Subjects: 110 549 unintentional injury-related hospital separations for NSW children aged 0–14 years.

Main outcome measure: Adjusted incidence rate ratios (IRRs) for hospital separations for unintentional injury (for all injury and by individual injury mechanisms) by quintile of socioeconomic disadvantage for children aged 0–14 years.

Results: There was no clear relationship between socioeconomic status and injury when all injury mechanisms were combined. However, children in the more disadvantaged quintiles were more likely to be hospitalized than children in the least disadvantaged quintile for the following injury mechanisms: motor cycle (point estimates for IRRs across the socioeconomic status quintiles ranged from 2.95 to 4.02 relative to the least disadvantaged quintile), motor-vehicle occupant (IRR range 1.33–2.27), pedestrian (IRR range 1.43–2.54 for ages 0–4 years), pedal cyclist (IRR range 1.30–1.50), fire and burns (IRR range 1.37–2.00), and poisoning (IRR range 1.32–1.91). Similarly, hospital separation rates for foreign body, other transport, and pedestrian (aged 5–9 years) injuries were also greater, but the differences were not statistically significant across all quintiles. These injury mechanisms accounted for about 25% of the hospital separations.

Conclusions: The relationship between relative socioeconomic disadvantage and injury risk in NSW children is strongest for transport-related injuries, fires and burns, and poisoning. Interventions that address these specific injury mechanisms may help to reduce the disparity between high and lower socioeconomic groups.

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Injury is the leading cause of child mortality in Australia and in most industrial countries. Like many other causes of death, fatal injuries occur differentially in relation to socioeconomic status (SES). Recent Australian research has identified a clear variation in injury-related childhood mortality by socioeconomic position.¹ For the period 1998–2000, age-standardized death rates from injury for Australian children increased with socioeconomic disadvantage. Boys in the most disadvantaged quintile were 3.4 times as likely to die from an external cause as those in the least disadvantaged quintile, and girls in the most disadvantaged quintile were 2.6 times as likely to die as those in the least disadvantaged quintile.¹ International research has also identified socioeconomic variation in death rates from injury in children,^{2–5} and indications are that this differential is widening.⁶

Mortality, however, represents only a small proportion of the overall burden of injury; a significant contribution results from non-fatal injuries.⁷ International evidence for socioeconomic gradients in injury morbidity is less consistent than for injury mortality, with some studies reporting an increase in rates with decreasing SES^{8–10} but others finding either no statistically significant relationship^{11–13} or the converse association.^{14, 15} Some of the discrepancy may be accounted for by the analysis of injuries of differing severity, different mechanisms of injury, and various measures of SES.¹⁶

Surprisingly, little work on socioeconomic variation and injury morbidity has been undertaken for Australian children. In 1993, Jolly *et al*¹⁷ found a threefold increase in the relative risk of injury presentations to emergency departments in Brisbane and Melbourne for children from the lowest income group compared with the highest income group. Conversely, Lam¹⁸ found no association between SES and hospitalization in

New South Wales (NSW), although this work was restricted to sports-related injuries in children and adolescents. Other groups that have been identified as being at increased risk are rural and Indigenous children, where presumably social disadvantage and poverty are contributory factors.¹⁹ However, to our knowledge, other recent analyses of the relationship between SES and injury morbidity in Australian children have not been published, despite the fact that a clear understanding of injury inequality is essential for targeting injury prevention interventions and resources.

NSW is the most populous state in Australia with just over 6.8 million residents.²⁰ Approximately 71% of the NSW population live in metropolitan areas, 21% in inner regional areas, and 8% in outer regional and remote areas.²⁰ This paper presents an exploration of the relationship between area-related SES and different injury mechanisms for children, using routinely collected data on hospital separations for NSW child residents.

METHODS

Data were obtained on all hospital separations of children aged 0–14 years from NSW hospitals for unintentional injury occurring during the period 1999/2000–2004/2005. To ensure the inclusion of all admissions for children resident in NSW, such as admissions for children for whom the closest or most appropriate hospital is in another state, interstate hospitalizations of NSW children were also included. Separations were identified from the NSW Inpatient Statistics Collection, a

Abbreviations: ABS, Australian Bureau of Statistics; IRR, incidence rate ratio; IRSD, index of relative socioeconomic disadvantage; SES, socioeconomic status; SLA, statistical local area

routinely collected census of all separations from NSW public and private hospitals. Separations were coded according to ICD-10-AM (version 1 for 1999/2000, version 2 for 2000/2001–2001/2002, version 3 for 2002/2003–2003/2004, and version 4 for 2004/2005). Separations were selected if they met the following criteria:

- The patient was a resident of NSW
- Injury or poisoning was the principal diagnosis (ICD-10-AM range S00–T98)
- The first external cause of morbidity was assigned (ICD-10-AM range V01–X59, Y10–Y34, Y90–Y98).

A separation occurs when a patient dies, is discharged, is transferred to another hospital, or changes status (called “type change separations” such as a change from acute to rehabilitation care).²¹ Separations relating to transfers and type change separations were excluded in an attempt to eliminate “multiple counts”, which occur when a patient has more than one episode of care for a given injury. Demographic information extracted from the separations database included age and gender of child and statistical local area (SLA) of residence.

The Australian Bureau of Statistics (ABS) divides NSW into SLAs for dissemination and collection of statistics. Currently, there are 199 SLAs in NSW, with populations ranging from less than 5000 to over 100 000; the median population of SLAs is just over 21 000.²² Cases for each SLA were aggregated by the total number of unintentional injury separations and by selected mechanisms of injury.

As the data were collected by financial year (July–June), we used end-of-year (mid-point) population estimates for each SLA provided by the NSW Department of Health. These estimates are derived from ABS mid-year population estimates of each SLA to determine the population denominator.²¹ The SLAs were ranked into quintiles based on the index of relative socioeconomic disadvantage (IRSD), an index of SES produced by the ABS. The IRSD is derived from attributes such as income, education, employment, occupation, and variables that measure aspects of disadvantage (eg, number of bedrooms in home, rental versus home ownership) as well as variables that are associated with disadvantage (eg, the proportion of Indigenous persons, single-parent families).²³

Statistical analysis

Statistical analysis was performed using SAS version 8.2. Hospital separation rates were calculated per 100 000 head of population aged 0–14 years and age-adjusted by 5-year age group using the 2001 Australian population as standard.²¹ The SLAs were categorized by their IRSD score into five groups (quintiles of relative socioeconomic disadvantage) such that each quintile contained about 20% of the total population of NSW. Negative binomial regression analyses²⁴ were used to determine incidence rate ratios (IRRs) for hospital separation rates by quintile of socioeconomic disadvantage (SES quintile). The main explanatory variable was the SES quintile of the SLA, with 5-year age group and sex included as covariates. In addition, interaction terms between the covariates were included when significant.

RESULTS

There were 110 603 hospitalizations for unintentional injury for children aged 0–14 years during the period 1999/2000–2004/2005. There was no SLA registered for 53 records, and no sex registered for one record; our analyses are restricted to the remaining 110 549 hospitalizations. Table 1 shows the various injury mechanisms by overall number of separations and age-adjusted separation rates by SES quintile. The greatest number of hospitalizations were for falls (other than playground), which accounted for over one third of hospital separations.

Table 2 shows IRRs relative to the least disadvantaged quintile, adjusted for age and sex, for injury mechanisms by SES quintile. For the following mechanisms, the interaction between sex and age group was significant: falls, struck by/against, playground falls, pedal cycle, cut/pierce, poisoning, foreign bodies, fire and burns, other transport, motor cycle, other unintentional and all injury. The interaction between age group and SES quintile was significant only for pedestrian-related injuries, and the interaction between sex and SES quintile was significant only for motor-vehicle occupant-related injuries.

Although there was no clear relationship between SES and injury when all injury mechanisms were combined, this was not the case for certain individual injury mechanisms. Children in the more disadvantaged quintiles were more likely to be hospitalized than children in the least disadvantaged quintile

Table 1 Total number of separations and age-adjusted separation rates per 100 000 children aged <15 years by injury mechanism and quintile of socioeconomic disadvantage (1999/2000–2004/2005)*

Mechanism of injury (ICD-10AM codes for external cause)	Total separations (% of total)	Age-adjusted separation rate	Age-adjusted separation rates by socioeconomic quintile				
			Most disadvantaged	2nd	3rd	4th	Least disadvantaged
Falls other than playground (W00–W08, W10–W19)	38989 (35.3)	486.8	435.9	536.6	470.0	491.0	498.6
Struck/by against (W20–W23, W50–W52)	12181 (11.0)	152.0	136.4	173.4	131.9	160.8	155.5
Playground falls (W09)	9738 (8.8)	121.9	98.7	126.3	134.9	125.5	126.5
Pedal cycle (transport) (V10–V19)	7018 (6.3)	87.7	87.1	110.5	93.5	88.7	66.6
Cut/pierce (W25–W29, W45)	5293 (4.8)	66.1	56.9	71.8	64.2	66.4	71.5
Poisoning (X40–X49)	4568 (4.1)	56.8	60.3	75.7	52.3	53.0	39.6
Foreign bodies (W44)	3709 (3.4)	46.2	49.0	49.9	46.9	44.2	40.4
Fire and burns (X00–X19)	3689 (3.3)	45.9	57.3	58.5	41.6	40.1	29.3
Motorcycle (V20–V29)	2629 (2.4)	32.8	33.9	37.7	46.1	34.0	11.3
Motor vehicle occupant (V30–V79)	2230 (2.0)	27.9	31.6	26.9	24.8	26.9	17.2
Pedestrian (V01–V09)	1828 (1.7)	22.8	26.3	26.0	23.3	20.9	16.8
Other transport (V80–V99)	2944 (2.7)	36.8	31.5	41.5	40.9	39.9	29.7
Other unintentional injury (W24, W30–W43, W46–W49, W53–W99, X20–X39, X50–X59, Y10–Y34, Y90–Y98)	15733 (14.2)	196.3	175.0	209.7	187.2	195.1	215.2
All unintentional injury (V01–X59, Y10–Y34, Y90–Y98)	110549	1380.1	1279.9	1544.5	1357.5	1386.5	1318.3

*Age-adjusted to the 2001 Australian standard population.

Table 2 Adjusted incidence rate ratios for hospital separations by injury mechanism and quintile of socioeconomic disadvantage for children aged less than 15 years*

Injury mechanism	IRR† (95% CI)	p Value
Falls other than playground‡		
Most disadvantaged quintile	0.87 (0.82 to 0.92)	<0.0001
2nd	1.08 (1.02 to 1.14)	0.0094
3rd	0.94 (0.88 to 0.99)	0.0283
4th	0.98 (0.92 to 1.04)	0.4590
Least disadvantaged quintile	1.00	
Struck by/against injuries‡		
Most disadvantaged quintile	0.88 (0.81 to 0.95)	0.0010
2nd	1.12 (1.04 to 1.21)	0.0022
3rd	0.84 (0.78 to 0.91)	<0.0001
4th	1.04 (0.96 to 1.12)	0.3478
Least disadvantaged quintile	1.00	
Playground falls‡		
Most disadvantaged quintile	0.78 (0.73 to 0.83)	<0.0001
2nd	1.00 (0.94 to 1.06)	0.9821
3rd	1.07 (1.00 to 1.14)	0.0436
4th	0.99 (0.93 to 1.06)	0.8265
Least disadvantaged quintile	1.00	
Pedal cycle‡		
Most disadvantaged quintile	1.30 (1.20 to 1.41)	<0.0001
2nd	1.50 (1.39 to 1.63)	<0.0001
3rd	1.40 (1.29 to 1.52)	<0.0001
4th	1.33 (1.22 to 1.44)	<0.0001
Least disadvantaged quintile	1.00	
Cut/pierce‡		
Most disadvantaged quintile	0.79 (0.74 to 0.85)	<0.0001
2nd	1.00 (0.94 to 1.06)	0.9540
3rd	0.90 (0.84 to 0.96)	0.0009
4th	0.93 (0.87 to 0.99)	0.0173
Least disadvantaged quintile	1.00	
Poisoning‡		
Most disadvantaged quintile	1.52 (1.38 to 1.68)	<0.0001
2nd	1.91 (1.73 to 2.10)	<0.0001
3rd	1.32 (1.21 to 1.49)	<0.0001
4th	1.34 (1.21 to 1.49)	<0.0001
Least disadvantaged quintile	1.00	
Foreign bodies‡		
Most disadvantaged quintile	1.21 (1.09 to 1.34)	0.0004
2nd	1.23 (1.11 to 1.37)	<0.0001
3rd	1.16 (1.04 to 1.29)	0.0079
4th	1.09 (0.98 to 1.21)	0.1221
Least disadvantaged quintile	1.00	
Fire and burns‡		
Most disadvantaged quintile	1.95 (1.69 to 2.26)	<0.0001
2nd	2.00 (1.73 to 2.31)	<0.0001
3rd	1.42 (1.21 to 1.66)	<0.0001
4th	1.37 (1.17 to 1.60)	<0.0001
Least disadvantaged quintile	1.00	
Motor cycle‡		
Most disadvantaged quintile	2.95 (2.48 to 3.50)	<0.0001
2nd	3.29 (2.77 to 3.90)	<0.0001
3rd	4.02 (3.40 to 4.76)	<0.0001
4th	2.96 (2.49 to 3.52)	<0.0001
Least disadvantaged quintile	1.00	
Motor-vehicle occupant		
Males		
Most disadvantaged quintile	1.84 (1.55 to 2.17)	<0.0001
2nd	2.27 (1.93 to 2.66)	<0.0001
3rd	1.56 (1.30 to 1.86)	<0.0001
4th	1.44 (1.20 to 1.72)	<0.0001
Least disadvantaged quintile	1.00	
Females		
Most disadvantaged quintile	1.80 (1.50 to 2.15)	<0.0001
2nd	1.96 (1.65 to 2.33)	<0.0001
3rd	1.33 (1.08 to 1.62)	0.0059
4th	1.73 (1.44 to 2.08)	<0.0001
Least disadvantaged quintile	1.00	
Pedestrian		
0–4 years		
Most disadvantaged quintile	2.54 (1.88 to 3.44)	<.0001
2nd	2.17 (1.59 to 2.95)	<.0001
3rd	2.06 (1.50 to 2.83)	<.0001
4th	1.43 (1.03 to 2.00)	0.0343
Least disadvantaged quintile	1.00	

Table 2 Continued

Injury mechanism	IRR† (95% CI)	p Value
5–9 years		
Most disadvantaged quintile	1.46 (1.12 to 1.90)	0.0047
2nd	1.49 (1.15 to 1.94)	0.0028
3rd	1.28 (0.97 to 1.69)	0.0786
4th	1.24 (0.94 to 1.63)	0.1298
Least disadvantaged quintile	1.00	
10–14 years		
Most disadvantaged quintile	1.11 (0.86 to 1.43)	0.4368
2nd	1.25 (0.98 to 1.61)	0.0766
3rd	1.11 (0.85 to 1.44)	0.4492
4th	1.14 (0.88 to 1.48)	0.3050
Least disadvantaged quintile	1.00	
Other transport‡		
Most disadvantaged quintile	1.07 (0.94 to 1.21)	0.3283
2nd	1.40 (1.24 to 1.58)	<0.0001
3rd	1.38 (1.22 to 1.56)	<0.0001
4th	1.35 (1.19 to 1.52)	<0.0001
Least disadvantaged quintile	1.00	
Other unintentional injuries‡		
Most disadvantaged quintile	0.81 (0.75 to 0.88)	<0.0001
2nd	0.99 (0.91 to 1.07)	0.7324
3rd	0.88 (0.81 to 0.95)	0.0022
4th	0.91 (0.84 to 0.99)	0.0254
Least disadvantaged quintile	1.00	
All injury‡		
Most disadvantaged quintile	0.97 (0.92 to 1.02)	0.1788
2nd	1.17 (1.12 to 1.23)	<0.0001
3rd	1.02 (0.98 to 1.08)	0.3286
4th	1.05 (1.00 to 1.10)	0.0557
Least disadvantaged quintile	1.00	

IRR, incidence rate ratio.

*Adjusted for age and sex.

†The least disadvantaged quintile used as the reference category for each variable.

‡Model includes interaction between sex and age group.

for the following injury mechanisms: motor cycle (point estimates for IRRs across the SES quintiles ranging from 2.95 to 4.02 relative to the least disadvantaged quintile), motor-vehicle occupant (IRR range 1.33–2.27), pedestrian (IRR range 1.43–2.54 for ages 0–4 years), pedal cyclist (IRR range 1.30–1.50), fire and burns (IRR range 1.37–2.00), and poisoning (IRR range 1.32–1.91). In addition, children aged 5–9 years from the two most disadvantaged quintiles were more likely to be hospitalized for pedestrian injury than children from the least disadvantaged quintile (IRR range 1.46–1.49). Hospital separation rates for foreign body and other transport mechanisms were also greater for children from the more disadvantage quintiles, but the difference was not statistically significant across all quintiles. These injury mechanisms together accounted for about 25% of hospital separations.

Conversely, children in the more disadvantaged groups were less likely to sustain injuries from “other” unintentional injury mechanisms, although the difference was not statistically significant across all quintiles. The remaining injury mechanisms (falls, playground falls, cut/pierce, and struck by/against) showed an inconsistent relationship across the SES quintiles.

DISCUSSION

Evidence for a socioeconomic gradient in injury morbidity in childhood has been inconsistent in the international literature. This is probably due in part to specific methodological differences between studies—for example, the type and severity of injury—and conditions specific to the country being examined, such as the nature of, and access to, healthcare systems.⁸ The strength of the study presented here is that it is a large population-based study and represents all hospitalizations for child injury in both the public and the private hospital system in NSW. Differential access to hospital care on the basis of SES is therefore unlikely in our study, because data from

both the public and private systems have been included and because all Australian children have access to free public hospital inpatient care under the universal health insurance system. Although it is possible that the threshold for admission to hospital varies by SES, work overseas suggests that this is unlikely to explain the gradient in risk.¹⁰ Further, if this were so, we would expect to see an increase in risk with increasing disadvantage across all injury types, which did not occur.

The major finding in our study is the existence of socioeconomic gradients for some mechanisms of childhood injury. However, the presence and size of the risk differential varies according to injury mechanism. We found the strength of the relationship between relative socioeconomic disadvantage and injury risk to be strongest for transport-related injuries, fire and burn injuries, and poisoning.

Socioeconomic gradients for transport-related injuries, fire and burn injuries, and poisoning have been identified in other studies. For example, a study in Sweden found that the injury risks of pedestrians and bicyclists were 20–30% higher in children of unskilled and skilled workers than in those of intermediate and high level salaried employees.⁹ In Athens, an almost twofold excess existed for pedestrian injuries among children residing in the less wealthy towns compared with those in wealthier ones.²⁵ In England, the rates for pedestrian injuries (rate ratio (RR) 3.65), burns and scalds (RR 3.49), poisonings (RR 2.98), and pedal cycles (RR 1.61) were significantly higher in geographic wards with the highest deprivation scores than in those with the lowest.¹⁰ On the other hand, fall-related injuries, which we identified as the most common cause of hospitalization in this age group, did not show a consistent relationship with SES. Our results support those of a Swedish study, which found a negligible difference in fall risk between socioeconomic groups among pre-school-children and no statistical association for children aged 5–9 or

10–14 years,²⁶ and a study from Toronto indicating that SES was not a risk factor for severe injury associated with falls from playground equipment.²⁷ However, Hippisley-Cox *et al*¹⁰ found increasing admission rates for fall injury with increasing deprivation scores, although the gradient was not nearly as steep as those found for other injury mechanisms studied (pedestrian injuries, poisonings, burns and scalds).

The causal mechanisms underlying the social patterning of injuries remain poorly understood,²⁸ and this makes tackling injury inequalities difficult. Factors such as lone parenting,^{29–30} young maternal age,^{4–31} low maternal education, and large family size⁴ have all been suggested to increase a child's risk of injury. Other studies indicate a difference in parental risk perception and sense of responsibility for child safety between affluent and deprived areas.³² Work in Mexico has indicated differences in parental knowledge and the practice of childhood safety.³³ This was particularly noticeable in the area of transport safety and for those activities that required a safety-related device such as a car seat, seat belt, helmet, or smoke detector. Differences in exposure to risk may explain higher injury rates. For example, Roberts *et al*³⁴ found that children from families without a car (a marker of material disadvantage) crossed more streets than children with a car. Neighborhood or area factors may also reflect differential exposure of children to various hazards such as high traffic flow, poor housing design, and lack of safe areas for play.^{28–35} However, the extent to which the differential in injury risk can be attributed to exposure or behavior remains unclear.²⁸ We were unable to assess the role of these factors in our study, as the necessary data were unavailable in the routine data collection used. Further, the IRSD, as a derived variable combining various factors associated with disadvantage, sheds little additional light on which particular aspects of social disadvantage may be important with regard to injury risk.

It is likely that many of the individual or household characteristics that influence the social patterning of injury will not be readily addressed without broad social policy change.³⁰ Educational interventions may be effective in modifying some risk, but these are unlikely to work in isolation.³⁶ Initiatives at the community level to modify hazardous environments or reduce the number of exposures to hazards may be effective in reducing inequalities.³⁶ Like other health inequalities, the relative importance of individual and area characteristics as risk factors for child injury is unclear, and further studies are needed. Recent research using multi-level modeling has attempted to separate out the risks and found that area factors independently influence injury risk over and above individual and family factors,^{37–39} thus providing support for area-based policies.³⁷ Other work suggests that the influence of area may be stronger for injuries of greater severity (those requiring hospital admission) than for injuries resulting in accident and emergency or primary care attendances.⁴⁰

There are some limitations in this study which must be considered when interpreting our results. Firstly, injuries were attributed to the area of residence of the child, but may have occurred in another location with a different level of disadvantage, and by inference different social and environmental risk factors. Secondly, this is an ecological study and, as such, may be subject to ecological fallacy.⁴¹ As socioeconomic data were not available at an individual level, conclusions about individual deprivation and injury morbidity must be viewed with caution. Further, SLAs do not represent socioeconomically homogeneous areas. Smaller areas, such as collector districts, would have been preferable, but health data at this level are currently unavailable. Other Australian research has shown that misclassification of individuals to SES groups on the basis of larger areas (such as post codes) has underestimated the true

relationship between SES and health-related measures and that the use of smaller spatial areas such as census districts reduces this misclassification.⁴² Use of SLAs in our study may therefore have masked larger gradients in injury morbidity, but the fact that, despite this, we were able to demonstrate differences adds weight to their existence. Finally, the effect of distance from hospital on injury presentations has been raised by overseas research. The results are conflicting, with some reporting decreasing presentation rates with increasing distance³⁸ and others finding no significant relationship³⁷ or no significant relationship for injuries resulting in fractures.⁴³ As we were unable to adjust for distance of residence from hospital, we do not know how this may have affected our results. However, we can expect that, by restricting injuries to those serious enough to require hospitalization, any potential influence of distance on presentation would be reduced.

Implications for prevention

There is growing global support for the influence of SES on injury morbidity. Our findings suggest that interventions that address the specific injury mechanisms that disproportionately affect children from disadvantaged groups may help to “narrow the gap” between high and lower socioeconomic groups.⁴⁴ These interventions could be concentrated in disadvantaged or deprived neighborhoods with even greater effect. Although our research looked only at the impact of area level disadvantage, other research has indicated that household characteristics (which include child and family characteristics and family safety practices) also predict injury morbidity, thus it is likely that interventions directed at area and household levels are needed.⁴⁰ Although there is some evidence to support interventions aimed at reducing injuries in socially disadvantaged children, many potentially valuable interventions are yet to be evaluated.²⁸

At the same time, the importance of continuing intervention strategies for the wider community must not be forgotten. After all, our study found that about 75% of the hospital separations were accounted for by injury mechanisms that did not appear to be associated with any socioeconomic gradient. Thus an injury prevention strategy that combines both population and high-risk approaches has the potential to reduce inequalities in health as well as impact on the burden of injury-related morbidity.³¹

To improve the targeting of interventions, we are producing child injury maps for the state of NSW. These maps will identify by injury mechanism the geographic location of residents who experience high injury rates. This will inform local government and health authorities of problem areas for which formal surveillance of risk factors and hazards may be warranted, followed by the identification, implementation, and evaluation of locally applicable injury prevention activities.

Key points

- The impact of area socioeconomic status on child injury morbidity in NSW (Australia) varies with injury mechanism.
- The relationship between relative disadvantage and injury risk is strongest for transport-related injuries, fires and burns, and poisoning.
- Interventions that concentrate on the specific injury mechanisms that disproportionately affect children from disadvantaged groups may help to reduce the disparity between high and lower socioeconomic groups.

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