ORIGINAL ARTICLE

Lower rates of emergency department injury visits among Latino children in the USA: no association with health insurance

T D Simon, C Bublitx Emsermann, L M Dickinson, S J Hambidge

Injury Prevention 2006;12:248–252. doi: 10.1136/ip.2006.011593

See end of article for authors' affiliations

Correspondence to:
Dr Tamara Simon, Division
of Pediatric Inpatient
Medicine, University of
Utah School of Medicine,
100N Medical Drive, Salt
Lake City, Utah 84113,
USA; tamara.simon@hsc.
utah.edu

Accepted 13 June 2006

Background and objective: Latino children have lower rates of injury visits to emergency departments (EDs) than non-Latino white and African American children. This study tests the hypothesis that this difference reflects health insurance status.

Design: Secondary analysis.

Patients/setting: Children under 19 years of age visiting EDs in the USA, sampled in the National Hospital Ambulatory Medical Care Survey of EDs (NHAMCS-ED) from 1997 to 2001.

Main outcome measures: Rates of ED injury visits; ED injury visit rates by race/ethnicity stratified by health insurance and adjusted for other covariates; subtypes of injury visits; and procedures and hospital admissions by race/ethnicity.

Results: Injuries accounted for >56 million, or 40.5%, of total ED visits among pediatric patients. Injury visits occurred at lower rates for Latino children (9.9 per 100 person years) than non-Latino white and African American children (16.2 and 18.3, respectively), although total ED visit rates were similar. Regardless of health insurance status, Latino children had lower rates of injury visits than non-Latino white and African American children. Latino children had lower rates of the three major subtypes of injury visits (sports, accidental falls, struck by/between objects). Latino children had similar rates of procedures and hospital admissions to non-Latino white children.

Conclusions: Irrespective of their insurance status, Latino children have lower rates of ED injury visits in the USA than non-Latino white children. Possible reasons for this difference include different healthcare seeking behavior or different injury patterns by race/ethnicity, but not differences in health insurance status or barriers to accessing ED care.

An estimated 20.6 million children are injured in the USA annually (at a rate of 25 per 100 children),¹ with outpatient costs totaling \$47.4 billion.² While research has improved our understanding of risk factors for childhood injuries, more information is needed about potential barriers or disparities in seeking health care among minority children.^{3–7}

Latino children have lower rates of emergency department (ED) and primary care injury visits than their non-Latino white counterparts in the USA.^{8–11} While Latino children have lower ED and primary care injury visit rates, they consistently experience a greater burden of serious and fatal injury, including hospital admissions¹² and death.^{1 12 13}

Possible explanations for lower injury visit rates among Latino children include: differences in health insurance status, barriers to health care, healthcare seeking behavior, or injury patterns compared with non-Latino white children, or combinations of these factors. Insurance coverage increases access to health care,¹⁴ and private health insurance coverage has been associated with both self reported injury and ED injury visits.^{10 11} Children without insurance coverage have lower rates of seeking care for injury.⁴ Latino children are more likely to be uninsured.¹⁵ One explanation for lower rates of ED injury visits among Latino children in the USA could be less insurance coverage. Alternately, Latino children may have different healthcare seeking behavior (that is, home care for minor injuries) or experience different injury patterns (fewer sports injuries), or both. These differences may be experienced by Latinos and by ethnic minority groups outside the USA.

Our goal was to explore the association of health insurance and Latino race/ethnicity with pediatric ED injury visits. Our primary hypothesis was that differences in health insurance coverage among different ethnic groups would explain lower ED injury visit rates among Latino children. A secondary hypothesis was that causes of injury visits would differ by race/ethnicity.

METHODS

We undertook a five-year cross sectional analysis from a nationally representative survey of EDs. The National Health Ambulatory Medical Care Survey (NHAMCS-ED) is designed to collect data on the utilization and provision of ambulatory care services in non-federal hospital EDs. The survey probability design, multistage estimation procedure, and implementation are described elsewhere.^{9 10 16 17} To derive representative national estimates, the NHAMCS uses a multistage estimation procedure with three basic components (inflation of the reciprocals of the sampling selection probabilities, adjustment for non-response, and a weighting ratio adjustment) which aims to produce essentially unbiased results.¹⁶ The survey instrument is a patient record form collecting standard data, which hospital staff are instructed to complete by specially trained interviewers.¹⁷ Because information is publicly available and de-identified, this study

Abbreviations: ED, emergency department; NCHS, National Center for Health Statistics; NHIS, National Health Interview Survey; NHAMCS-ED, National Hospital Ambulatory Medical Care Survey of Emergency Departments.

Table 1 Pediatric injury visit and total emergency department (ED) visit rates from 1997 to 2001 in the USA: basic demographics

	Injury visit	Total ED
Unweighted visits	13 496	33 654
Weighted visits (millions)	56 227	138 884
<i>Demographic factor:</i>		
<i>Race/ethnicity</i>		
Non-Latino white	16.2 (14.9 to 17.6)	35.9 (32.9 to 38.8)
African American	18.3 (15.5 to 21.1)	56.6 (47.6 to 65.6)
Latino	9.9 (7.8 to 12.0)	30.3 (23.2 to 37.4)
Asian	6.8 (3.5 to 10.0)	18.2 (10.2 to 26.1)
<i>Insurance</i>		
Private	11.7 (10.7 to 12.7)	24.4 (22.4 to 26.5)
Public	20.6 (18.5 to 22.6)	68.6 (61.4 to 75.9)
Self-pay	15.6 (14.0 to 17.2)	38.9 (35.0 to 42.9)
<i>Sex</i>		
Male	17.4 (16.1 to 18.7)	38.4 (35.5 to 41.4)
Female	12.5 (11.5 to 13.5)	35.7 (32.9 to 38.5)
<i>Age (years)</i>		
0–2	17.8 (16.2 to 19.5)	76.1 (69.1 to 83.1)
3–5	13.4 (12.3 to 14.7)	36.4 (33.4 to 39.4)
6–12	12.5 (11.5 to 13.5)	25.3 (23.3 to 27.3)
13–18	17.4 (16.1 to 18.8)	32.7 (30.2 to 35.1)

Values are visits per 100 person-years (95% confidence intervals).

is exempt from annual Colorado Multiple Institution Review Board review.

We defined pediatric patients as aged 18 years or younger. An injury visit was defined using the National Center for Health Statistics (NCHS) definition (if the physician checked a box next to the question, “Is this visit related to an injury?”). Data from the 1998 NHAMCS show that the injury box alone on the NHAMCS survey form had a sensitivity of 99.1% compared with use of more extensive CDC injury visit criteria.⁹

Race/ethnicity categories were classified as white (non-Latino), African American, Latino (not African American), Asian, and other. Similar to previous studies^{9,10} and NCHS policy,¹⁸ all blank entries in the ethnicity box (6181 of 33 654, or 18.4%) were imputed to be non-Latino. A subanalysis of other demographic variables in a previous study showed that patients with imputed ethnicity were more similar to non-Latino white than to Latino patients.⁹ We obtained comparable results for adjusted injury visits when patients with missing ethnicity were removed from the analyses. All other variables had less than 3% missing data. Source of payment categories included private, public (Medicare, Medicaid, and workers compensation (1.7% of those publicly insured)), self-pay (self-pay or no charge), and unknown (other, unknown, and blank). Additional patient, practice, and visit characteristics included sex, age, metropolitan location of ED, region of country, hospital admission, and procedures for all injury visits and non-injury visits. To examine the subtypes of pediatric injury visits, we examined both the external cause

codes (E-codes) and narrative text (available for 89% of visits).

The SUDAAN 9.0 statistical package¹⁹ was used for all analyses. Numerators were national estimates of pediatric injury visits. Denominators for injury visit rates were calculated from the aggregated estimated US population data from the Census Bureau for 1 July, 1997 to 2001.^{20,21} The Census Bureau web site also provided denominators for the populations by sex, age, and race/ethnicity.

Denominators for the insurance types in tables 1 and 2 were derived from the National Health Interview Survey (NHIS) for the years 1997 to 2001.²² Families containing children under 19 years of age were surveyed for insurance coverage. We used a hierarchical approach: children reported as having private insurance were classified as such, those reported as having public coverage (Medicare, Medicaid, Medigap, CHIP, Other Public Insurance) and no private coverage were classified as publicly insured, and children reported as having no coverage were classified as self-pay. Because of discrepancies in reporting between the NHAMCS and the NHIS surveys, the “unknown” insurance category could not be assessed.

Differences in overall injury visit rates were assessed using 95% confidence intervals (CI) calculated from the standard error (SE) and the assumption of normality.

We carried out logistic regression for injury visit (controlling for covariates age, sex, region, urban location, and year) for each insurance population (private, public, self-pay) in order to determine the adjusted probabilities of an injury visit

Table 2 Adjusted injury visit rates to emergency departments (EDs) by race/ethnicity*, stratified by insurance type adjusted injury visit rate†

Insurance type	Non-Latino white	African American	Latino
Private	12.3 (11.1 to 13.5)	13.8 (11.7 to 16.0)	7.8 (6.0 to 9.6)
Public	27.1 (23.0 to 31.1)	20.1 (15.9 to 24.3)	12.3 (8.6 to 16.1)
Self Pay	18.7 (16.0 to 21.4)	22.7 (17.9 to 27.4)	8.8 (6.5 to 11.2)

*Bold indicates significant difference from non-Latino white children.

†Controlled for patient's sex, age, metropolitan location, region, and NHAMCS year.

Values are visits per 100 population per year (95% confidence interval).

NHAMCS, National Hospital Ambulatory Medical Care Survey.

Table 3 Rates of injury visits to emergency departments (EDs) by race/ethnicity stratified by injury visit subtype*

Injury visit type (% total; weighted visits in millions)	Non-Latino white	African American	Latino
Sports (22.7%; 12.7)	4.1 (3.7 to 4.5)	2.9 (2.4 to 3.5)	1.7 (1.2 to 2.1)
Accidental falls (15.5%; 8.7)	2.5 (2.3 to 2.8)	2.6 (2.0 to 3.1)	1.7 (1.3 to 2.2)
Struck by/between objects (11.7%; 6.6)	1.9 (1.7 to 2.2)	2.0 (1.5 to 2.5)	1.1 (0.8 to 1.3)
Motor vehicle traffic (8.4%; 4.7)	1.3 (1.1 to 1.4)	1.9 (1.5 to 2.3)	0.8 (0.5 to 1.1)
Cutting (6.2%; 3.5)	1.0 (0.9 to 1.2)	1.0 (0.8 to 1.2)	0.7 (0.5 to 1.0)
Accidents caused by natural/environmental factors (4.7%)	0.8 (0.7 to 0.9)	0.8 (0.6 to 1.0)	0.5 (0.3 to 0.7)
Intentional injury to other (3.7%)	0.4 (0.3 to 0.5)	1.3 (1.0 to 1.6)	0.5 (0.3 to 0.6)
Other accidents (3.1%)	0.5 (0.4 to 0.6)	0.6 (0.4 to 0.8)	0.3 (0.2 to 0.4)
Accidental swallowing of foreign body (3.1%)	0.5 (0.4 to 0.5)	0.7 (0.5 to 1.0)	0.3 (0.2 to 0.4)
Exertion (1.7%)	0.3 (0.3 to 0.4)	0.2 (0.1 to 0.3)	0.2 (0.1 to 0.3)

*Bold indicates significant difference from non-Latino white children.

Values are average annual rate per 100 population (95% confidence interval).

by race/ethnicity, using the PREDMARG procedure in SUDAAN.²³ Because the different datasets used to calculate the numerator and denominator are sampled to be nationally representative, these adjusted rate estimates can be used for the three insurance categories assessed. Because of discrepancies in reporting between the NHAMCS and the NHIS surveys, the “unknown” insurance category could not be included. The estimated expected number of children seeking care for an injury visit, by race/ethnicity and insurance type, was determined by multiplying the weighted total of ED visits by race/ethnicity and insurance category by the adjusted probability. We then used this estimation to generate population rates using the NHIS insurance population estimates as denominators and multiplying by 100; 95% confidence intervals were derived in accordance with the formulas for the variance of a product and quotient.²⁴ All estimates are reliable, as defined by the NCHS.

We calculated crude rates of both injury subtypes and ED procedures and hospital admissions by race/ethnicity and insurance type. Numerators for injury subtypes were national estimates of pediatric subtypes of injury visits. This analysis included 8465 children who received injury related procedures (defined as wound, eye/ENT, or orthopedic care) and 2069 children who were admitted to hospital following an ED visit.

RESULTS

Injury visits accounted for approximately 41% of 138 883 650 total ED visits for pediatric patients from 1997 to 2001 in the USA, an average of 27.8 million visits per year.

Injury visits occurred at higher rates for non-Latino white and African American children (16.2 and 18.3 per 100 person-years, respectively) than Latino (9.9) and Asian (6.8) children (table 1). Children with public insurance had higher injury visit rates (20.6) than children without insurance (15.6), who, in turn, had higher injury visit rates than privately insured children (11.7). Of note, total ED visits did not differ between Latino (30.3 (95% CI, 23.2 to 37.4)) and non-Latino white children (35.9 (32.9 to 38.8)) (table 1).

Adjusted rates of injury visits were stratified by race/ethnicity and insurance type (table 2). Non-Latino white children with public insurance had the highest rates of injury visits of any group (adjusted rate 27.1 per 100 population per year). In contrast, Latino children—regardless of their insurance coverage—had significantly lower rates of injury visits than non-Latino white children, with rates ranging from 7.8 per 100 population per year for private insurance to 12.3 for public insurance.

Compared with non-Latino white children, Latino children had significantly lower rates of the top three subtypes of

injury visits: sports injuries, accidental falls, and struck by/between objects (table 3).

We examined rates of procedures and hospital admissions following injury visits. Rates of ED procedures were similar for non-Latino white (55.5 per 100 ED visits (95% CI, 53.6 to 57.4)) and Latino children (51.6 (48.0 to 55.2)). Rates of hospital admissions were also similar: non-Latino white, 4.4 per 100 ED visits (95% CI, 3.8 to 5.0); Latino, 5.5 (3.9 to 7.1).

DISCUSSION

Injuries caused 40% of pediatric ED visits in this nationally representative five year sample, comparable to earlier studies.¹⁰ Our primary hypothesis was that lower rates of ED injury visits among Latino children would be explained by differences in health insurance coverage; however, we found that Latino children's lower injury visit rates persisted across all insurance types. A secondary hypothesis was that causes of injuries resulting in injury visits would differ among Latino children; we found that Latino children experienced lower rates of visits for sports, accidental falls, and being struck by/between objects.

There are four possible explanations for lower ED injury visit rates in Latino than non-Latino white children: differences in health insurance status; barriers to health care; health care seeking behavior; and injury patterns. Our findings suggest that access to similar types of health insurance (private versus public versus none) does not explain the difference in ED visit rates. Furthermore, given that total ED visit rates are similar for Latino and non-Latino white children, barriers to accessing ED care do not explain the lower rates of ED injury visits among Latino children. Thus our findings suggest that these differences are either caused by different health care seeking behavior for injuries, or by different injury patterns. It is possible that cultural factors that transcend national boundaries may be responsible for these differences. Further research is required to determine if these findings are also true in other countries in addition to the USA.

Surveys of parents of Latino children have reported lower rates of non-fatal injuries.²⁵ A possible explanation, then, is that Latino children experience fewer minor injuries, and thus seek care less often. There may also be fewer exposures (such as less access to after-school sports)—and thus less opportunity for injury—among Latino children. A subsequent study using this same data showed that Latino children experience lower rates of sports injury visits in all insurance groups, in part explaining the lower overall ED injury visit rate.²³ Finally, there may be differences in the home or neighborhood environments of Latino children that decrease injury, such as more parental supervision or more adults in the home, or both. Latino children may simply have fewer

ambulatory injuries than non-Latino white children. Alternately, there may be differences in health care seeking behavior; Latino families may be less likely to seek ED care for an injury and more likely to treat it at home. Whether they have fewer minor injuries, or are less likely to seek care, Latino children have lower rates of injury visits for sports injuries, accidental falls, and being struck by/between objects.

This study has several limitations. Perhaps most important is that we cannot assess the quality of health insurance from the NHAMCS survey, only the type of insurance. Survey bias is possible, but NHAMCS has several strategies to reduce this, including stratified sampling of practice sites, random selection of visits within a practice, and distribution of sampling frame evenly throughout the year. Diagnostic coding may differ between physicians—almost 3% of visits in the 1998 sample coded as injury visits were not acute injuries.¹⁰ The insurance variable is the payer source for the injury visit, and does not reflect changes in coverage over time. ED rates by health insurance status should be considered estimates, because classification of insurance differed in the NCHS surveys used for the numerators (NHAMCS) and denominators (NHIS); several analyses were undertaken and compared to determine the best approximation. Whereas the NHAMCS determines race/ethnicity from hospital administrative data, the NHIS determines race/ethnicity from self report. This difference could result in more or fewer people reporting Latino ethnicity, possibly leading to an underestimate or an overestimate of Latino injury visit rates. Additionally, there is no severity measure available; hospital admissions and procedures are a proxy for injury severity, with concomitant limitations. Although the NHAMCS provides information on insurance status and race/ethnicity, we do not have information on other variables linked to injury presentation in childhood, including socioeconomic status,^{1 26–29} health status, behavior disorders,³⁰ household conditions,^{31–33} and risk behaviors,³⁴ which are not collected with this survey instrument.

Implications for prevention

The implications of this study for prevention are that Latino children in the USA, compared with other racial and ethnic groups, have different injury patterns or different health care seeking behavior after injury, or both. Different health insurance does not explain lower rates of ED injury visits among Latino children. Our findings suggest the need for ongoing research to determine if there are truly different

injury patterns among different ethnic groups. If true, this finding implies a need for prevention practices targeted at racial/ethnic groups.

ACKNOWLEDGEMENTS

We greatly appreciate the contributions from the National Center for Health Statistics, Centers for Disease Control, for determination of injury visit rate by insurance, including Robin A Cohen PhD, Susan M. Schappert MA, and Iris Shimizu PhD. We are grateful for the critical manuscript review of Allison Kempe MD, MPH. TS had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

This work was previously presented in part at the May 2004 Pediatric Academic Society meeting in San Francisco, California; the October 2004 American Academy of Pediatrics meeting in San Francisco, California; and the May 2005 NRSA Trainees Research Conference in Boston, Massachusetts.

This project was supported in part by a 2003 AAP Resident Research grant from the American Academy of Pediatrics awarded to TDS. This research was also supported by the Primary Care Research Unit, University of Colorado Health Sciences Center, Denver, Colorado and HRSA Administrative Unit Grant No HP00054 5 D12.

Authors' affiliations

T D Simon, S J Hambidge, Department of Pediatrics, University of Colorado Denver School of Medicine, Denver, Colorado, USA
C Bublitz Emsermann, L M Dickinson, Department of Family Medicine, University of Colorado Denver School of Medicine
S J Hambidge, Community Health Services, Denver Health Medical Center
S J Hambidge, Colorado Health Outcomes Program, University of Colorado Denver School of Medicine

REFERENCES

- 1 **Danesco ER**, Miller TR, Spicer RS. Incidence and costs of 1987–1994 childhood injuries: demographic breakdowns. *Pediatrics* 2000;**105**:E27.
- 2 **Miller TR**, Romano EO, Spicer RS. The cost of childhood unintentional injuries and the value of prevention. *Future Child* 2000;**10**:137–63.
- 3 **Olson LM**, Lara M, Frintner MP. Measuring health status and quality of life for US children: relationship to race, ethnicity, and income status. *Ambul Pediatr* 2004;**4**:377–86.
- 4 **Overpeck MD**, Jones DH, Trumble AC, *et al.* Socioeconomic and racial/ethnic factors affecting non-fatal medically attended injury rates in US children. *Inj Prev* 1997;**3**:272–6.
- 5 **Beal A**. Policies to reduce racial and ethnic disparities in child health and health care. *Health Affairs* 2004;**23**:171–9.
- 6 **Flores G**, Fuentes-Afflick E, Barbot O, *et al.* The health of Latino children: urgent priorities, unanswered questions, and a research agenda. *JAMA* 2002;**288**:82–90.
- 7 **Institute of Medicine**. *Unequal treatment: confronting racial and ethnic disparities in health care*, 2002. Washington DC: National Academies Press, 2002.
- 8 **Powell EC**, Tanz RR. Adjusting our view of injury risk: the burden of nonfatal injuries in infancy. *Pediatrics* 2002;**110**:792–6.
- 9 **Hambidge SJ**, Davidson AJ, Gonzales R, *et al.* Epidemiology of pediatric injury-related primary care office visits in the United States. *Pediatrics* 2002;**109**:559–65.
- 10 **Simon TD**, Bublitz C, Hambidge SJ. External causes of pediatric injury-related emergency department visits in the United States. *Acad Emerg Med* 2004;**11**:1042–8.
- 11 **Scheidt PC**, Harel Y, Trumble AC, *et al.* The epidemiology of nonfatal injuries among US children and youth. *Am J Public Health* 1995;**85**:932–8.
- 12 **Agran PF**, Winn DG, Anderson CL. Surveillance of pediatric injury hospitalizations in Southern California. *Inj Prev* 1995;**1**:234–7.
- 13 **Centers for Disease Control and Prevention**. Health disparities experienced by Hispanics—United States. *MMWR* 2004;**53**:935–7.
- 14 **Lillie-Blanton M**, Hoffman C. The role of health insurance coverage at reducing racial/ethnic disparities in health care. *Health Affairs* 2005;**24**:398–408.
- 15 **Doty MM**. Insurance, access, and quality of care among Hispanic populations: 2003 Chartpack. Available at: http://www.cmwf.org/usr_doc/doty_insurance2003.pdf Accessed May 5, 2005.
- 16 **NHAMCS Estimation Procedures**. Available at: http://www.cdc.gov/nchs/about/major/ahcd/nhamcs_est_proc.htm, Accessed June 24 2002.
- 17 **NHAMCS Scope and Sample Design**. Available at: <http://www.cdc.gov/nchs/about/major/ahcd/sampham.htm>, Accessed June 24 2002.
- 18 **Woodwell DA**. National Ambulatory Medical Care Survey: 1998 Summary. *Advance Data* 1999;**305**:1–28.
- 19 **Shah BV**, Barnwell BG. *SUDAAN User's Manual: Release 9.0.1*. Research Triangle Park, North Carolina: Research Triangle Institute, 2004.

Key points

- Latino children have fewer ambulatory visits for injury than non-Latino white children in the USA.
- Insurance coverage increases access to health care, but Latino children are more likely to be uninsured than non-Latino white children in the USA.
- Latino children have lower rates of emergency department visits for injury among all insurance types, and lower rates of the top three subtypes of injury related emergency department visits: sports injuries, accidental falls, and struck by/between objects.
- These findings imply differences in injury patterns, health care seeking behavior, or both, among Latino children; differences in health insurance and different barriers to emergency department care do not explain different injury emergency department visit patterns in this population of children.

- 20 **United States Census Bureau.** Available at: <http://www.census.gov/population/estimates/nation/e90s/e9797rmp.zip>, e9898rmp, zip, e99rmp.zip. Accessed May 25, 2004.
- 21 **United States Census Bureau.** Available at: http://eire.census.gov/popest/data/national/tables/asro/2002RESIDENT2000 and 2001MONTHS07_12.txt. Accessed May 25, 2004.
- 22 **National Center for Health Statistics, National Health Interview Survey.** Available at: http://www.cdc.gov/nchs/about/major/nhis/quest_data_related_1997_forward.htm, Accessed on November 10 2005.
- 23 **Simon TD, Bublitz C, Hambidge SJ.** Emergency department visits among pediatric patients for sports related injury: basic epidemiology and association of race/ethnicity and insurance status. *Pediatr Emerg Care* 2006;**22**:309–15.
- 24 **Mood AM, Graybill FA, Boes DC.** *Introduction to the theory of statistics.* New York: McGraw-Hill, 1974:180–1.
- 25 **Warner M, Barnes P, Fingerhut L.** Injury and poisoning episodes and conditions: National Health Interview Survey, 1997. *Vital Health Stat* 2000;**10**:202.
- 26 **Marcin JP, Schembri MS, He J, et al.** A population-based analysis of socioeconomic status and insurance status and their relationship with pediatric trauma and hospitalization rates. *Am J Public Health* 2003;**93**:461–6.
- 27 **Faelker T, Pickett W, Brison RJ.** Socioeconomic differences in childhood injury: a population based epidemiological study in Ontario, Canada. *Inj Prev* 2000;**6**:203–8.
- 28 **Rivara FP, Barber M.** Demographic analysis of childhood pedestrian injuries. *Pediatrics* 1985;**76**:375–81.
- 29 **Durkin MS, Davidson LL, Kuhn L, et al.** Low-income neighborhoods and the risk of severe pediatric injury: a small-area analysis in northern Manhattan. *Am J Public Health* 1994;**84**:587–92.
- 30 **Brehaut JC, Miller A, Raina P, et al.** Childhood behavior disorders and injuries among children and youth: a population-based study. *Pediatrics* 2003;**111**:262–9.
- 31 **Agran PF, Winn DG, Anderson CL, et al.** Family, social, and cultural factors in pedestrian injuries among Hispanic children. *Inj Prev* 1998;**4**:188–93.
- 32 **Anderson CL, Agran PF, Winn DG, et al.** Demographic risk factors for injury among Hispanic and non-Hispanic white children: an ecologic analysis. *Inj Prev* 1998;**4**:33–8.
- 33 **Flores G, Tomany-Korman S, Olson L.** Does disadvantage start at home? *Arch Pediatr Adolesc Med* 2005;**159**:158–65.
- 34 **Pickett W, Schmid H, Boyce WF, et al.** Multiple risk behavior and injury: an international analysis of young people. *Arch Pediatr Adolesc Med* 2002;**156**:786–93.

LACUNAE

If it has wheels, better not drive it drunk in Ohio

In Ohio you can be charged with driving drunk in a whole lot more than your car. Look at the Vermilion man arrested Friday for driving a lawn mower while intoxicated. Dondi Bowles pleaded not guilty Tuesday to charges of being under the influence when he maneuvered his landlord's riding mower to a drugstore a mile away. The judge scheduled his case for June 20 but ordered him to serve time until then for violating probation on an earlier drunken driving charge. Bowles thought the mower would help him avoid what became his third driving-under-the-influence charge in the past six months and fourth overall, according to police. "If I knew that was the law," he said after court Tuesday, "I would have walked." Walking's a good idea in Ohio, where even a bike won't save you if you're drunk.

In the Buckeye State, the charge for drinking and driving is called OVI—operating a vehicle under the influence. And the definition of a vehicle is pretty broad. "It includes everything on wheels or runners, with few exceptions," says Lt Rick Zwayer, spokesman for the State Highway Patrol. More specifically, the law says a vehicle is "every device, including a motorized bicycle, in, upon, or by which any person or property may be transported or drawn upon a highway." It excludes motorized wheelchairs, trolleys, trains, and human powered devices that aren't bikes. Mix anything else with too much alcohol and you'll find yourself in trouble.

When it comes to odd vehicles, Cleveland lawyer Robert G Walton has heard it all. Drivers of bicycles and golf carts have been charged. So have boat captains and jet skiers, says Walton, who teaches continuing education courses in OVI law. "I don't know that they've gotten to stilts yet," he says, "But they've expanded the definition of vehicle to include just about anything that will get you from one place to another without putting your feet on the ground."

"If you were to go out to Middlefield, I'm sure you would hear about some Amish people arrested for operating a horse and buggy under the influence." The Amish do get arrested, says Lt Chad Enderby. Officers from his highway patrol station in Holmes County pull over several buggies every summer and arrest the drivers for OVI.

Painesville defense lawyer Leo Talikka remembers a highway patrolman writing a DUI ticket to a man on horseback in the 1970s. Talikka, chief assistant prosecutor in Lake County then, was forced to drop the charge. "The horse did not qualify as a vehicle," he says. Pedaling or galloping under the influence may sound like a joke. But it can turn serious.

Statistics provided by the Ohio State Highway Patrol show that 35 of the 1696 bicycle drivers injured in crashes in 2005 were alcohol-impaired. So were three of the 139 drivers in the "other" category. That includes horses and buggies.

Contributed by Les Fisher. From The Plain Dealer via CDC Public Health Law News.