

Pediatric Shopping Cart-Related Injuries Treated in US Emergency Departments, 1990-2011

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Abstract

Background: The subject of shopping cart-related injuries has received increasing attention. **Purpose:** The objective of this study was to investigate the epidemiology of shopping cart-related injuries among children < 15 years.

Methods: A retrospective cohort analysis of shopping cart-related injuries treated in U.S. emergency departments (EDs) from 1990 to 2011 was conducted using the National Electronic Injury Surveillance System (NEISS) database.

Results: An estimated 530,494 children < 15 years were treated for shopping cart-related injuries from 1990-2011. The most commonly injured body region was the head (78.1%). Children aged 0-4 years sustained 84.5% of all shopping cart-related injuries, 90.7% of injuries to the head region and fall-from-cart rates of more than 25 times that of older children. Among children < 15 years, the annual fall-from-cart rate per 10,000 children increased by 39.4% from 2.27 in 1990 to 3.17 in 2011, (m = 0.017, p = 0.029) and the annual concussion/closed head injury rate per 10,000 children increased by 213.3% from 0.64 in 1990 to 2.02 in 2011 (m = 0.053, p < 0.001).

Conclusions: Shopping cart-related injuries are an important source of injury to children, particularly those aged 0-4 years.

Background

- Shopping carts are an important cause of injury among children, especially those younger than 5 years.¹⁻³
- This is the first study to investigate the epidemiologic characteristics of shopping cart-related injuries among US children during a 22-year study period, 1990-2011.
- Specifically, this study looks at whether there have been changes in these injuries since the development of voluntary standards for shopping carts by the American Society for Testing and Materials (ASTM) International in 2004.
- The goal of this research is to provide information to educate child caregivers and health professionals about shopping cart-related injuries, improve shopping cart design, and ultimately prevent injuries associated with these products among children.

Methods

- NEISS data for shopping cart-related injuries (product code 1679) were obtained from the US Consumer Product Safety Commission (CPSC). The NEISS represents a stratified probability sample of > 5,000 hospitals with a 24-hour ED with at least 6 beds in the United States.⁴
- Data for 17,052 actual cases of shopping cart-related injury between Jan. 1, 1990 and Dec. 31, 2011 were identified. The NEISS database includes variables for patient demographics, injury location and diagnosis, and a narrative of the circumstances of the incident.
- The mechanism of injury variable included the categories: falls out of the shopping cart, cart tipovers, entrapment, being struck/run over by a cart, running into/falling over a cart and other. Other NEISS variables were regrouped prior to data analysis (see Table 1).
- Data were analyzed using SPSS version 19.0 and national injury estimates were calculated based on statistical weights provided by the CPSC.⁵ Data are reported in this study as national estimates.
- Rates were calculated using US population data from the US Census Bureau.⁶

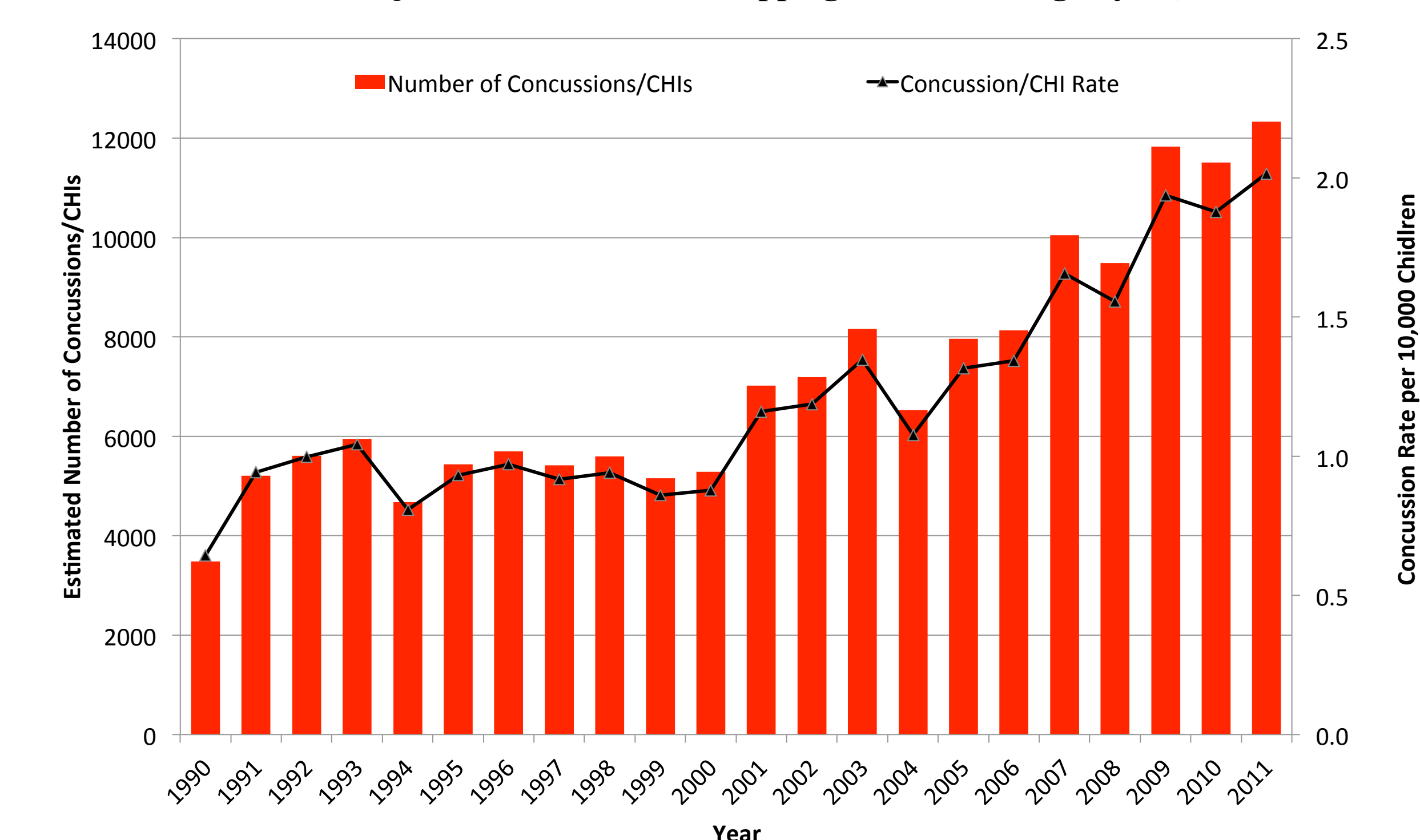
Results

Table 1: Characteristics of Shopping Cart-Related Injuries among Children Younger Than 15 Years, United States, 1990–2011.

Variable	Actual Cases	Weighted Cases (%)	95% CI
Age			
0-4 years	14373	448519(84.5)	(376073 - 520964)
0 years	2076	62142(13.9)	(49924 - 74360)
1 year	4054	122134(27.2)	(100832 - 143435)
2 years	4203	134534(30.0)	(113287 - 155780)
3 years	2485	79737(17.8)	(67569 - 91905)
4 years	1555	49972(11.1)	(42158 - 57786)
5-14 years	2566	81975(15.5)	(69670 - 94280)
Sex			
Male	9360	288652(54.4)	(245537 - 331766)
Female	7576	241722(45.6)	(201752 - 281692)
Body Region			
Head region	13191	409644(78.1)	(344892 - 474396)
Head	9673	290105(70.8)	(239703 - 340588)
Face	2690	94035(23.0)	(79596 - 108474)
Mouth	681	21322(5.2)	(17964 - 24680)
Neck	142	1780(0.4)	(1065 - 2495)
Ear	49	1681(0.4)	(1088 - 2273)
Eye	32	721(0.2)	(362 - 1080)
Upper extremity	2180	72266(13.8)	(61054 - 83518)
Finger	1223	42947(59.4)	(36220 - 49674)
Lower Arm	277	7921(11)	(6188 - 9654)
Elbow	223	5891(8.1)	(4301 - 7481)
Hand	127	4827(6.7)	(3616 - 6038)
Shoulder	143	4498(6.2)	(3013 - 5982)
Wrist	114	3754(5.2)	(2617 - 4890)
Upper Arm	73	2449(3.4)	(1643 - 3255)
Lower extremity	1009	31411(6)	(26045 - 36778)
Lower leg	318	8683(27.6)	(6828 - 10537)
Foot	187	5983(19)	(4493 - 7474)
Knee	142	5430(17.3)	(4155 - 6705)
Upper leg	162	4816(15.3)	(3545 - 6087)
Ankle	127	4194(13.4)	(2891 - 5497)
Toe	73	2305(7.3)	(1504 - 3106)
Trunk	304	9390(1.8)	(7362 - 11418)
Lower Trunk	151	4209(4.8)	(3274 - 5144)
Upper trunk	96	3465(36.9)	(2332 - 4598)
Pubic region	57	1716(18.3)	(1038 - 2394)
Other	46	1633(0.3)	(993 - 2273)

Variable	Actual Cases	Weighted Cases (%)	95% CI
Diagnosis			
Concussion	6011	157707(29.8)	(121109 - 194304)
Soft Tissue Injury	5819	217608(41.1)	(183297 - 251918)
Laceration	2828	92084(17.4)	(78890 - 105278)
Fracture	1326	35651(6.7)	(29268 - 42095)
Other	931	26693(5)	(20200 - 30308)
Mechanism of Injury			
Fall out	12200	373316(70.4)	(311550 - 435082)
Ran into/fell over cart	1290	42109(7.9)	(35241 - 48976)
Tipover	1002	33129(6.2)	(27761 - 38497)
Entrapment	893	32620(6.1)	(27380 - 37859)
Other	935	29086(5.5)	(23428 - 34744)
Struck/run over by cart	619	20235(3.8)	(16357 - 24113)
Disposition from ED			
Released	15988	508032(96)	(429098 - 586966)
Admitted	736	16553(3.1)	(13253 - 19851)
AMA	181	4698(0.9)	(2637 - 6758)
Location			
Store	14150	449372(96.1)	(374290 - 524455)
Other	575	18206(3.9)	(13514 - 22898)

Figure 3: Estimated number and rate of concussions/CHIs to children younger than 15 years of age treated in US EDs for injuries associated with shopping carts according to year, 1990–2011.



Discussion

- Shopping cart-related injuries are an important source of injury to children < 15 years.
- Because children aged 0-4 years sustain 84.5% of shopping cart-related injuries, 90.7% of injuries to the head region, and experience fall-out rates of more than 25 times that of older children, this age group is a major priority for design and safety standard changes for shopping carts.
- The predominance of head injuries among children < 5 years is a result of young children's higher center of gravity, which causes them to land on their head during a fall.
- Falling out of a shopping cart places children at higher risk for traumatic brain injury, which may cause long-term effects.⁷
- These findings make a strong argument for the necessity of avoiding these injuries in children 0-4 years by implementing changes in cart design and safety standards.
- Prevention efforts should include education targeting child caregivers, shopping cart design changes, store-based interventions, and a revision of the national shopping cart safety standard to more adequately address the mechanisms of injury among young children.

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Figure 1: Estimated number and rate of injuries to children younger than 15 years of age treated in US EDs for injuries associated with shopping carts according to year and gender, 1990–2011.

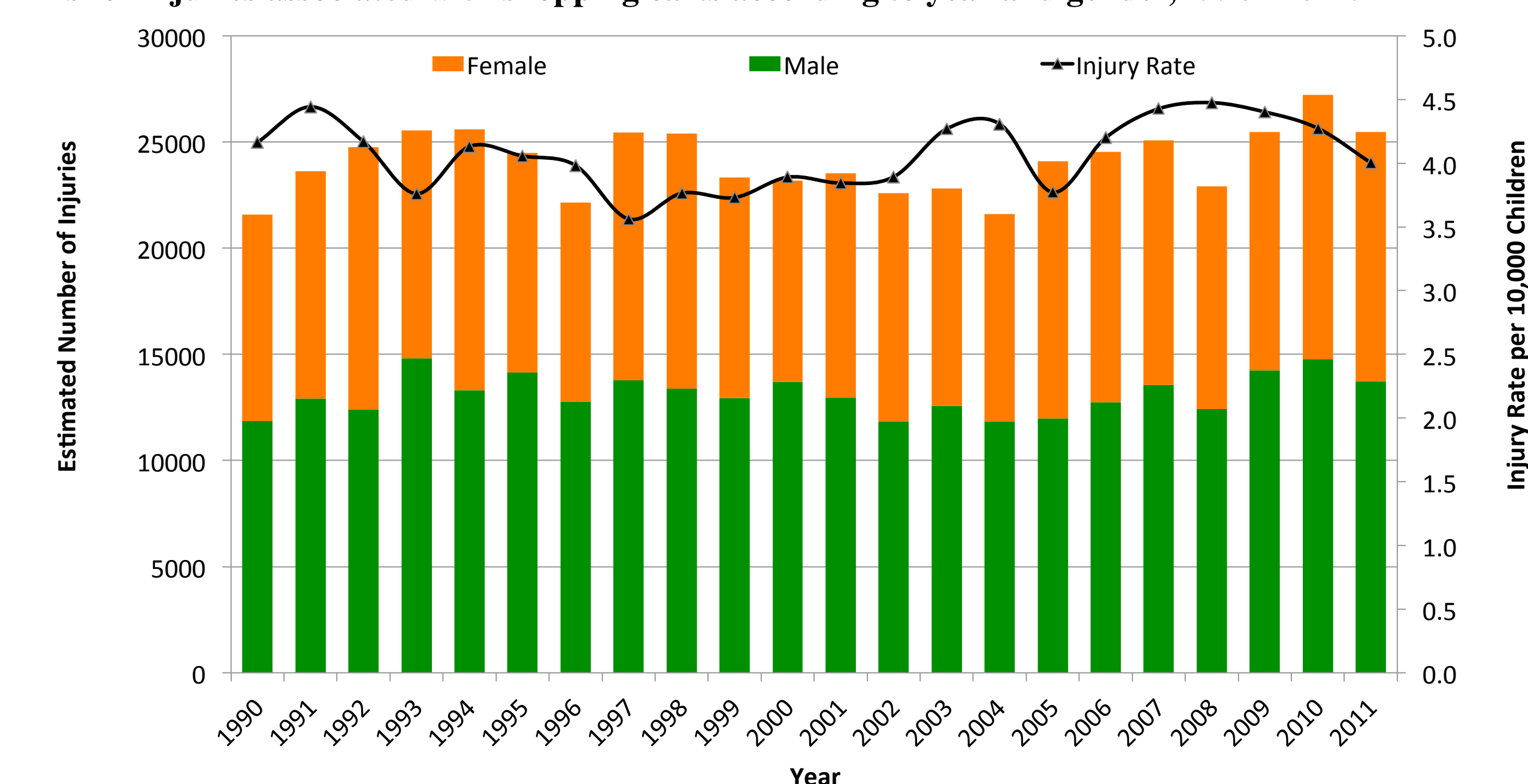


Figure 2: Estimated number and rate of falls of children younger than 15 years of age treated in US EDs for injuries associated with shopping carts according to year, 1990–2011.

