

Television-Related Injuries to Children in the United States, 1990–2011

AUTHORS: Ana C. De Roo, BA,^{a,b} Thiphalak Chounthirath, MS,^a and Gary A. Smith, MD, DrPH^{a,b,c}

^aCenter for Injury Research and Policy at Nationwide Children's Hospital, Columbus, Ohio; ^bThe Ohio State University College of Medicine, Columbus, Ohio; and ^cChild Injury Prevention Alliance, Columbus, Ohio

KEY WORDS

television, tip-over, injury, trauma, children, pediatric, emergency department

ABBREVIATIONS

CI—confidence interval

CPSC—Consumer Product Safety Commission

CRT—cathode ray tube

ED—emergency department

NEISS—National Electronic Injury Surveillance System

Ms De Roo conducted the data analysis, drafted and revised the manuscript, and approved the final manuscript; Mr Chounthirath assisted in data analysis, revised the manuscript, and approved the final manuscript; and Dr Smith conceptualized the study, assisted in data analysis, critically reviewed and revised the manuscript, and approved the final manuscript.

www.pediatrics.org/cgi/doi/10.1542/peds.2013-1086

doi:10.1542/peds.2013-1086

Accepted for publication May 23, 2013

Address correspondence to Gary A. Smith, MD, DrPH, Director, Center for Injury Research and Policy, The Research Institute at Nationwide Children's Hospital, 700 Children's Dr, Columbus, OH 43205. E-mail: gary.smith@nationwidechildrens.org

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2013 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: *The authors have indicated they have no financial relationships relevant to this article to disclose.*

FUNDING: Ms De Roo received a research scholarship stipend from the Medical Student Research Scholarship Program at The Ohio State University College of Medicine while she worked on this study. The interpretations and conclusions expressed in this article do not necessarily represent those of the funding organization.



WHAT'S KNOWN ON THIS SUBJECT: Previous research has demonstrated that pediatric injuries associated with television (TV) tip-overs are increasing, children aged ≤ 4 years are at highest risk for injury, and the head and neck are most commonly injured.



WHAT THIS STUDY ADDS: We analyzed a nationally representative sample comprising 22 years of data. On average, 17 313 children receive emergency treatment of a TV-related injury annually in the United States. The rate of injury attributable to falling TVs increased by 95% over 22 years.

abstract

FREE

OBJECTIVE: To investigate the epidemiology of television (TV)-related injuries to children in the United States.

METHODS: Using data from the National Electronic Injury Surveillance System, children aged < 18 years treated in United States hospital emergency departments for an injury associated with a TV from 1990 through 2011 were investigated.

RESULTS: An estimated 380 885 patients aged < 18 years were treated in emergency departments for a TV-related injury during the 22-year study period, which equals an annual average of 17 313 children. The median age of patients was 3 years; children < 5 years represented 64.3% of patients, and boys comprised 60.8%. The average annual injury rate was 2.43 (95% confidence interval [CI]: 2.07–2.80) injuries per 10 000 children aged < 18 years, with a range of 2.15 (95% CI: 1.64–2.66) to 2.90 (95% CI: 2.31–3.49). Although the overall injury rate was steady, the number and rate of injuries associated with falling TVs increased significantly by 125.5% and 95.3%, respectively, during the study period. In addition, there was a significant 344.1% increase in the number of injuries associated with a TV falling from a dresser/bureau/chest of drawers/armoire during 1995–2011.

CONCLUSIONS: The rate of pediatric injuries caused by falling TVs is increasing, which underscores the need for increased prevention efforts. Prevention strategies include public education, provision of TV anchoring devices at the point of sale of TVs, TV anchoring device distribution programs, strengthening of standards for TV stability, and redesign of TVs to improve stability. *Pediatrics* 2013;132:267–274

Televisions (TVs) are omnipresent; 99% of American households own ≥ 1 TV set, and 55% possess ≥ 3 .¹ During the 2010–2011 TV season, children aged 2 through 11 watched nearly 26 hours of TV weekly.¹ The frequent exposure to TVs presents opportunities for children to sustain TV-related injury. Between 2000 and 2011, 215 children died of injuries sustained from a falling TV.² Despite previous studies identifying the risks of TV tip-over injuries, newspaper articles highlighting local tragedies,^{3–6} and the US Consumer Product Safety Commission (CPSC) listing TV and furniture tip-overs third in their top 5 hidden hazards,⁷ safety standards for TV stability do not include the requirement that TVs be sold with antitip or anchoring devices, although this requirement exists for certain types of large furniture.^{8,9}

Previous studies implicate furniture and TV tip-overs as causes of serious injury and find the incidence of TV-related injury to be increasing,^{10–14} but many of the studies were published years ago.^{12,15,16} Most earlier studies were retrospective case reports,^{10,12–14,16–20} providing descriptive analysis and focusing on the serious neurologic sequelae resulting from a TV tip-over.^{21–25} Previous research finds the highest incidence of injury among the 1- to 4-year-old age group and the head most commonly injured.^{10,12–15,18–20} Studies using data from the National Electronic Injury Surveillance System (NEISS) evaluated fewer years and conducted less in-depth analyses than the current study.^{16,26}

This study examines trends of pediatric TV-related injuries by using a nationally representative data set over a 22-year period. It provides a discussion of relevant injury prevention strategies.

METHODS

This study analyzed data for children aged < 18 years who were treated in hospital emergency departments (EDs)

for a TV-related injury from January 1, 1990, through December 31, 2011. Data were obtained from the NEISS, a surveillance system maintained by the US CPSC that monitors ~ 100 EDs. These participating EDs represent a stratified probability sample of the > 5000 hospital EDs providing 24-hour care with ≥ 6 beds in the United States and its territories.²⁷

TV-related injuries were identified by using NEISS consumer product codes 0572 (TVs) and 0519 (TV tables or stands). Variables in the data set include age, gender, injury diagnosis, injured body region, product(s) involved, locale of injury, disposition from the ED, and a short narrative regarding the circumstances of the incident. Professional NEISS coders input data daily into the NEISS database extracted from patient ED medical records in participating hospitals.

The narrative text of each case was reviewed for potential miscoding and to classify the mechanism of injury into the categories of (1) TV falls, (2) patient strikes TV, (3) injury occurs while moving TV, and (4) other. In instances of multiple mechanisms of injury, a decision rule based on the likely causal sequence was used; “moving TV” took precedence over “TV falls,” which took precedence over “strikes TV.” Some case narratives listed the furniture on which the TV rested, and this information was used to create a variable with the categories of (1) dresser/bureau/chest of drawers/armoire, (2) entertainment center/TV stand, (3) shelf/rack, (4) table/nightstand, (5) cart, (6) cabinet/counter/changing table, (7) wall mount, and (8) other, which included bed, chair, toy box, and other furniture not designed to support a TV. Some case narratives also included information about the screen size of the TV, which was used to create a variable with the 2 categories of (1) TV ≤ 26 inches and (2) TV ≥ 27 inches.

NEISS injury diagnosis codes were condensed into 6 groups: (1) laceration (including amputation, puncture and avulsion), (2) concussion/closed head injury (including internal injury to the head), (3) soft tissue injury (including hematoma, crush injury, contusion and abrasion), (4) fracture, (5) strain/sprain, and (6) other. The “other” category included foreign object injury, burn, dental injury, electrical shock, and dislocation. NEISS body region codes were grouped into 5 categories: (1) head/neck, (2) upper extremity (including shoulder), (3) lower extremity, (4) torso (including pubic region), and (5) multiple body regions. Cases were excluded from this study if the primary reason for the ED visit was not a TV-related injury or if the injury was not directly related to a TV: for example, if the injury was associated with the furniture a TV was resting on, but not the TV itself; a cable box outdoors; ingestion of a remote control battery; or jumping off the TV. National estimates in this study were based on weighted data from 12 227 patients meeting inclusion criteria. Numbers presented in this article are weighted estimates unless otherwise stated.

Data were analyzed by using SPSS 19.0 (SPSS Inc, Chicago, IL) and SAS Version 9.3 (SAS Institute Inc, Cary, NC). Ninety-five percent confidence intervals (CIs) were calculated for national estimates. Sample weights provided by the CPSC and annual population estimates from the US Census Bureau were used to calculate national injury frequency and rate estimates.^{28–30} Weighted linear regression with weights equal to the inverse of the variance of each estimated statistic was performed to evaluate secular trends for TV-related injuries during the study period. Statistical assessment included χ^2 analysis with Yates’s correction and calculation of relative risks with corresponding 95% CIs. Statistically

significant relationships were determined by $\alpha = .05$. Estimates based on ≤ 20 unweighted cases are considered to be unstable by the CPSC and were excluded from analyses. This study was approved by the institutional review board of the author's institution.

RESULTS

Overall Trends and Demographics

An estimated 380 885 (95% CI: 322 630–439 141) pediatric patients were treated in US EDs for TV-related injuries during the 22-year study period, equaling an annual average of 17 313 (95% CI: 14 665–19 961) children. The injury rate remained consistent during the study period ($m = -0.01$, $P = .081$), with an annual average of 2.43 (95% CI: 2.07–2.80) injuries per 10 000 children ≤ 17 years of age and ranging from 2.15 (95% CI: 1.64–2.66) to 2.90 (95% CI: 2.31–3.49) injuries per 10 000 (Fig 1). The mean patient age was 4.7 (95% CI: 4.59–4.87) years, with a median age of 2.7 (95% CI: 2.67–2.77) years. Children < 5 years of age represented 64.3% of injured patients, followed by children 5 through 10 years of age (24.3%), and 11

through 17 years of age (11.4%; Table 1). Two-year-olds were the age group most commonly injured by TVs (19.0%). Injuries among male patients predominated, comprising 60.8% of the total (Fig 2). Among the 79.4% of cases with locale of injury documented, 98.1% occurred in the home.

Mechanism of Injury and Body Region Injured

The most common mechanism of injury was a TV falling and hitting the patient (52.5%), followed by the patient striking a TV (38.1%; Table 1). In contrast to steady overall injury rates during the study period, the rate of injury associated with falling TVs increased significantly ($m = 0.05$, $P < .001$) by 95.3%, from 0.85 (95% CI: 0.52–1.18) injuries per 10 000 children ≤ 17 years in 1990 to 1.66 (95% CI: 1.17–2.16) injuries per 10 000 children in 2011 (Fig 3). This corresponded to a 125.5% ($m = 400.8$, $P < .001$) increase in number of injuries associated with falling TVs from 5455 (95% CI: 3347–7562) in 1990 to 12 300 (95% CI: 8623–15 976) in 2011. The rate of injury from striking a TV decreased significantly ($m = -0.06$,

$P < .001$) by 71.9%, from 1.53 (95% CI: 1.06–2.01) injuries per 10 000 children in 1990 to 0.43 (95% CI: 0.28–0.57) injuries per 10 000 in 2011 (Fig 3). This corresponded to a 68.0% decrease in the number of injuries associated with striking a TV ($m = -344.1$, $P < .001$) from 9835 (95% CI: 6791–12 880) in 1990 to 3143 (95% CI: 2096–4190) in 2011.

The head and neck region was the most common body region injured (63.3%), followed by the lower extremities (21.5%; Table 1). When compared with other body regions, head and neck injury was 1.36 (95% CI: 1.03–1.80) times more likely to result in hospital admission. Compared with other age groups, children < 5 years of age were 1.36 (95% CI: 1.30–1.42) times more likely to injure their head and neck and 1.22 (95% CI: 1.15–1.32) times more likely to be injured by a falling TV. A falling TV was 3.28 (95% CI: 2.84–3.81) times more likely than other injury mechanisms to cause a lower extremity injury.

Injury Diagnosis

Lacerations and soft tissue injuries predominated, accounting for 36.7% and 35.1% of injuries, respectively (Table 1). Concussions and closed head injuries represented 13.3% of injuries among children < 5 years and 7.7% of injuries among patients 11 through 17 years of age (Table 1). TV falls, compared with other mechanisms of injury, were 3.04 (95% CI: 2.55–3.62) times more likely to lead to a diagnosis of concussion, and 2.18 (95% CI: 1.98–3.40) times more likely to cause a soft tissue injury.

Disposition From the ED

Only 2.6% of patients receiving emergency treatment of TV-related injuries required admission to the hospital or < 24 -hour observation (Table 1). Children < 5 years of age, when compared

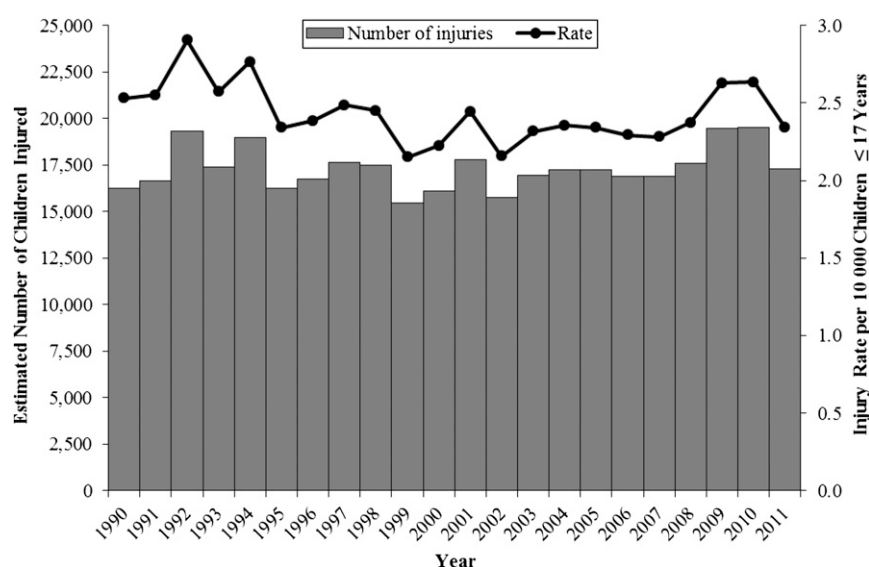


FIGURE 1

Estimated annual number and rate of children aged ≤ 17 years treated for a TV-related injury in a US ED, 1990–2011.

TABLE 1 TV-Related Injuries Treated in US EDs, by Age (1990–2011)

Description	<5 y of Age			5–10 y of Age			11–17 y of Age			Total		
	n	N (%)	95% CI	n	N (%)	95% CI	n	N (%)	95% CI	n	N (%)	95% CI
Total	8005	245 000 (64.3)	208 479–281 521	2982	92 621 (24.3)	76 454–108 789	1240	43 264 (11.4)	35 506–51 022	12 227	380 885 (100.0)	322 762–439 009
Gender												
Male	4942	150 409 (39.5)	127 934–172 884	1831	57 188 (15.0)	47 540–66 837	715	24 075 (6.3)	19 610–28 540	7 488	231 672 (60.8)	196 440–266 904
Female	3061	94 579 (24.8)	79 794–109 364	1151	35 433 (9.3)	28 521–42 345	525	19 189 (5.0)	15 580–22 799	4737	149 201 (39.2)	125 467–172 936
Mechanism of injury												
TV falls	4877	137 675 (36.1)	113 908–161 441	1677	49 087 (12.9)	39 797–58 376	411	13 031 (3.4)	9950–16 112	6965	199 793 (52.5)	165 041–234 544
Strike TV	2821	97 285 (25.5)	83 527–111 043	1048	35 222 (9.2)	29 545–40 900	352	12 778 (3.4)	10 407–15 150	4221	145 285 (38.1)	125 353–165 219
Move TV	83	3283 (0.9)	2241–4325	108	3286 (0.9)	2216–4356	341	12 629 (3.3)	9769–15 488	532	19 198 (5.0)	15 073–23 322
Other	224	6757 (1.8)	2957–10 557	149	5026 (1.3)	2685–7368	136	4826 (1.3)	3213–6439	509	16 609 (4.4)	9626–23 593
Body region injured												
Head/neck	5431	171 062 (44.9)	146 832–195 292	1853	57 915 (15.2)	48 035–67 795	357	12 121 (3.2)	9526–14 715	7641	241 098 (63.4)	205 883–276 313
Upper extremity	529	14 848 (3.9)	11 631–18 064	346	11 112 (2.9)	8628–13 595	361	12 335 (3.2)	9824–14 845	1236	38 295 (10.1)	31 203–45 384
Torso	302	7861 (2.1)	6210–9512	116	3624 (1.0)	2435–4812	143	5359 (1.4)	3826–6892	561	16 844 (4.4)	13 378–20 309
Lower extremity	1692	49 777 (13.1)	40 354–59 200	649	19 443 (5.1)	15 640–23 247	355	12 788 (3.4)	10 292–15 284	2686	82 008 (21.6)	67 455–96 560
Multiple body regions	31	975 (0.3)	493–1457	16	— ^a	—	23	645 (0.2)	185–1106	70	2127 (0.6)	1330–2924
Diagnosis												
Laceration	2710	93 277 (24.5)	80 234–106 321	1126	37 012 (9.7)	30 692–43 332	279	9682 (2.5)	7557–11 806	4115	139 971 (36.8)	119 721–160 222
Concussion/CHI	1367	32 607 (8.6)	24 008–41 206	405	10 309 (2.7)	7361–13 257	102	3321 (0.9)	2238–4403	1874	46 237 (12.2)	34 363–58 111
Soft tissue injury	2651	85 888 (22.5)	72 330–99 405	944	30 214 (7.9)	24 971–35 456	463	17 578 (4.6)	14 153–21 002	4058	133 660 (35.1)	112 975–154 343
Fracture	780	19 310 (5.1)	15 339–23 281	284	8252 (2.2)	6384–10 120	124	3984 (1.0)	2835–5133	1188	31 546 (8.3)	25 605–37 489
Strain/sprain	110	3645 (1.0)	2459–4831	67	2419 (0.6)	1538–3299	159	5631 (1.5)	4269–6993	336	11 695 (3.1)	9020–14 370
Other	375	9916 (2.6)	6665–13 167	148	4303 (1.1)	2543–6063	111	3055 (0.8)	2211–3900	634	17 274 (4.5)	12 251–22 297
Disposition from ED												
Treated and released ^b	7540	235 947 (61.9)	200 590–271 303	2875	90 315 (23.7)	74 702–105 929	1213	42 563 (11.2)	35 233–49 892	11 628	368 825 (96.9)	312 229–425 421
Treated and admitted ^c	358	6929 (1.8)	5278–8579	72	1773 (0.5)	1100–2445	13	— ^a	—	443	9003 (2.4)	6986–11 017
Held for <24 h ^d	37	443 (0.1)	141–745	11	— ^a	—	3	— ^a	—	51	588 (0.2)	180–1017
Left against medical advice	58	1303 (0.3)	692–1914	19	— ^a	—	11	— ^a	—	88	1990 (0.5)	1259–2722
Fatality ^e	5	— ^a	—	1	— ^a	—	0	— ^a	—	6	— ^a	—

n is the actual number of cases, and M is the national estimate. CHI, closed head injury.

^a Estimates are unstable because there were <20 actual cases.

^b Treated and released, or examined and released without treatment.

^c Includes treated and transferred to another hospital, treated and transferred for hospitalization, and treated and admitted for hospitalization within the same facility.

^d Held for <24 h in observation unit.

^e Includes died in the ED.

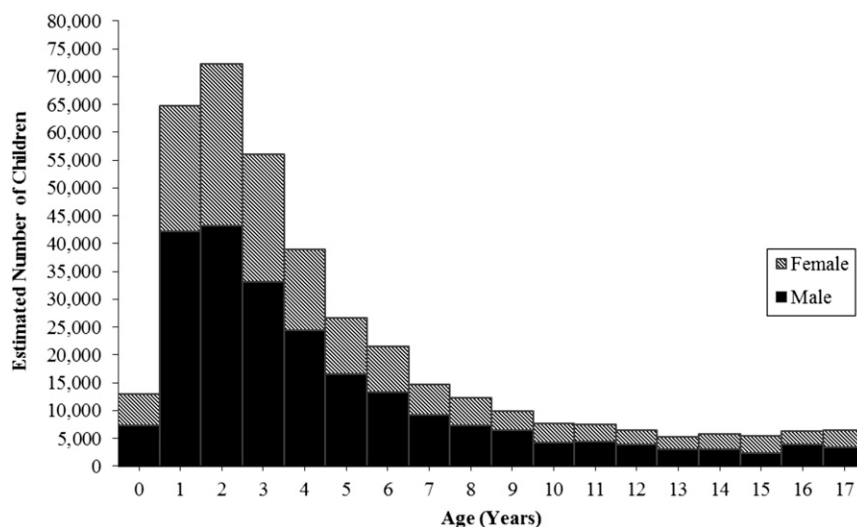


FIGURE 2

Estimated number of children aged ≤ 17 years treated for a TV-related injury in a US ED by child age and gender, 1990–2011.

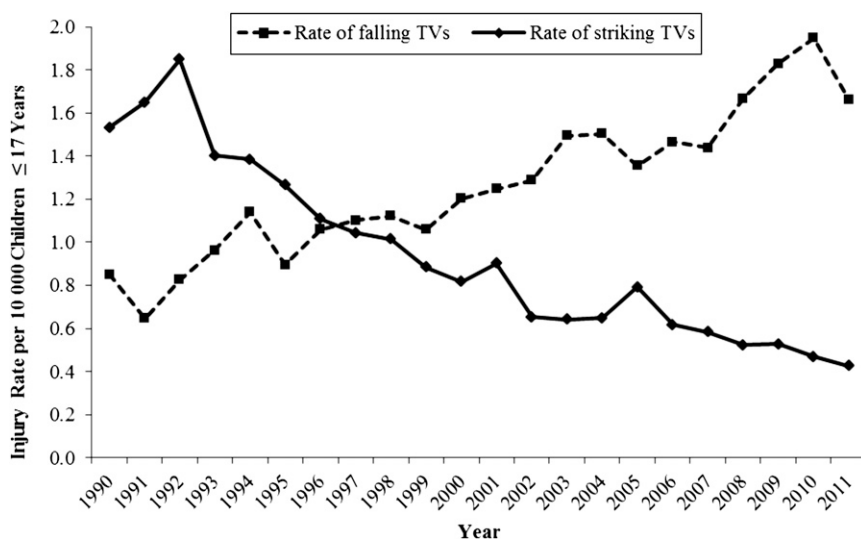


FIGURE 3

Rate of injury per 10 000 children aged ≤ 17 years associated with falling TVs and striking TVs, US EDs, 1990–2011.

with patients aged 5 to 17 years, were 1.84 (95% CI: 1.38–2.44) times more likely to be admitted to the hospital. TV fall-related injuries, compared with injuries associated with other mechanisms, were 4.31 (95% CI: 2.94–6.30) times more likely to require hospital admission.

Placement and Size of TVs

Among injury cases associated with falling TVs, the furniture on which the TV rested was noted in 30.5% of cases, and

the size of the TV was recorded in 19.0% of cases (Table 2). When documented, the most common type of furniture was a dresser/bureau/chest of drawers/armoire, representing 46.0% of these cases, followed by TV stands and entertainment centers (31.3%). The number of documented injuries associated with a TV falling from a dresser/bureau/chest of drawers/armoire increased significantly ($m = 93.3$, $P < .001$) by 344.1%, from 632 (95% CI: 367–895) in

1995 to 2807 (95% CI: 1808–3805) in 2011. During 1996–2011, there is no significant change ($m = 5.4$, $P = .754$) in the number of documented injuries resulting from a TV falling off TV stands and entertainment centers. When TV size was documented, TVs ≤ 26 inches were involved in 66.8% of these cases. There was no significant trend ($m = 13.3$, $P = .075$) in the number of documented injuries associated with a falling TV with a screen size of ≤ 26 inches during the period 1992–2011. There was also no significant trend ($m = 10.7$, $P = .468$) in the number of documented injuries associated with a falling TV with a screen size of ≥ 27 inches during the period 2000–2011.

DISCUSSION

More than 17 000 children receive emergency treatment of a TV-related injury in the US annually, which equals 1 child every 30 minutes. Although the overall rate of TV-related injury stayed fairly constant, the rate of injury associated with a falling TV almost doubled during the study period.

The number of US households with multiple TVs has more than doubled since 1990; now more than half of US households own ≥ 3 TVs. The escalating rate of injury from falling TVs may be due to the rising number of TVs in the home; however, if this were the only reason, then injury associated with striking the TV should also have increased due to increased exposure, but we found the opposite to be true.

The disparity between injury rates associated with falling TVs and striking a TV is provocative, especially given the more serious outcomes associated with falling TVs, and we speculate that changes in the location of TV placement in the home may be responsible for these observed trends. Sales of cathode ray tube (CRT) TVs have dropped

TABLE 2 Furniture Type and TV Sizes Reported for Injuries Associated With Falling TVs

	Number of Cases	National Estimate (%)	95% CI
Furniture type			
Dresser/bureau/chest of drawers/armoire	1021	28 439 (46.0)	22 595–34 284
Entertainment center/TV stand	646	19 380 (31.3)	15 013–23 746
Shelf/rack	141	4621 (7.5)	3472–5770
Table/nightstand	170	5433 (8.8)	3965–6902
Cart	30	726 (1.2)	262–1190
Cabinet/counter/changing table	61	1706 (2.8)	1092–2319
Wall mount	5	— ^a	
Other (bed, chair, stool)	52	1582 (2.6)	890–2274
Total	2126	61 887 (100.2) ^b	50 838–72 937
TV size			
≤26 inches	829	22 394 (66.8)	18 417–26 372
≥27 inches	494	11 110 (33.2)	7911–14 308
Total	1323	33 504 (100.0)	26 746–40 262

^a Estimate is unstable due to <20 actual cases in the NEISS.

^b Percentages may not sum to 100.0% due to rounding error.

steadily during recent years, with sales volume declining 84% in Europe from 2000 to 2010. In the United States, there have been negligible CRT TV sales in recent years, and based on an Internet search, many major electronics stores no longer carry CRT TVs.^{31,32} As consumers purchase newer flat-panel display TVs, the fate of older CRT TVs is relevant. Older TVs may be relegated to less safe locations in the home, such as on dressers or other unsuitable furniture. Although furniture companies have recalled unstable TV stands,³³ dressers are often implicated in TV tip-overs.^{11,15} Despite the relatively low documentation in NEISS narratives of the type of furniture on which falling TVs were placed, the frequency of dressers/bureaus/chests of drawers/armoires being used to support TVs (almost half of the cases in this study) is alarming. Moreover, the number of documented injuries associated with a TV falling from a dresser/bureau/chest of drawers/armoire increased almost 3.5-fold in 1995–2011, while there was no significant change in the number of documented injuries resulting from a TV falling off TV stands and entertainment centers during 1996–2011. As noted in previous studies, children may pull dresser drawers open to use as stairs to help them reach the TV, potentially pulling both the dresser and TV over

onto themselves.¹¹ Small TVs do not preclude injury; approximately two-thirds of TVs with the screen size documented had a screen that was ≤26 inches. Safely positioning all TVs on appropriate furniture and securely anchoring both the TV and furniture, usually to the wall, is critical for the prevention of TV tip-over injuries.

The conversion to flat-screen TVs may also be contributing to the observed injury trends. CRT TVs carry their weight toward the screen, predisposing them to tip forward, and in 1 study, the weight of an anthropomorphic model of a 4-year-old child tipped 90% of TVs, emphasizing the potential for injury.²⁴ Flat panel displays are 82% lighter than CRTs with a similar screen size. For example, 13- to 36-inch screen size CRTs weigh, on average, 80.9 pounds compared with an average of 14.8 pounds for flat panel displays of 16 to 37 inches.³⁴ Lighter weights coupled with a less bulky design may make flat panels more easily tipped than CRTs and may be contributing to the observed increase in the rate of injuries associated with falling TVs. Additional studies are needed to delineate the relative tip-over risks associated with CRT and flat panel display TVs.

Children <5 years of age have immature motor skills and judgment, and

they are at higher risk for TV tip-over injury and suffer worse outcomes than older children. A 2006 study found that 85% of adults accompanying young children receiving emergency treatment of a TV tip-over injury were unaware that a child could be injured by a falling TV.¹⁷ Increased efforts to educate parents and child caregivers about the importance and prevention of injuries associated with TV tip-overs are clearly needed.³⁵ Educational materials should be included with each new TV sale. Parents should appropriately place and anchor all TVs and should not place TV remote controls, toys, or other attractive items on top of a TV because this may encourage young children to climb and cause a TV tip-over.

In 2009, the voluntary safety standard for chests, door chests, and dressers was revised to require an antitip device or anchor be provided with the furniture at the point of sale.⁹ TVs are not covered by this voluntary standard, and even though they are implicated in approximately half of furniture-related tip-over injuries, no similar requirement applies to them.³⁶ Extending this type of requirement to TVs as part of the Underwriters Laboratories standard that addresses TV stability would be an important step in decreasing the number of injuries resulting from falling TVs.⁸ Unanchored TVs in the home are unsafe. Cars are not sold without safety belts, and similarly, TVs should not be sold without the necessary safety anchors. Initiatives to distribute TV anchoring devices, especially to households with young children, should also be undertaken.

TVs currently must meet the stability performance tests outlined in the UL 60065 safety standard for audio, video, and similar electronic equipment, which was most recently revised in late 2012.⁸ These stability tests include a tilt

test, vertical force test, and horizontal force test, with test conditions varying according to TV parameters, such as weight, height, and screen size. Further strengthening of these stability performance requirements, and redesign of TVs to meet these more stringent requirements, is another important strategy for prevention of injuries from falling TVs.

This study had a number of limitations. The NEISS likely underestimates the true number of TV-related injuries because it only captures injuries treated in hospital EDs and not those treated in other medical settings or those for which medical treatment is not sought. Fatalities are also not captured well by the NEISS. Another limitation is the

inconsistent amount of detail contained in NEISS narratives, which is limited by the information documented in ED medical records by health care professionals and also by the details extracted by NEISS coders. Bias may exist in the descriptive data reported; for example, parents may be more likely to report, and ED personnel and NEISS coders may be more likely to document, furniture that is unsuitable to support TVs and neglect to report appropriate furniture. An additional limitation was the lack of sufficient information in NEISS narratives to determine whether the TVs were CRT or flat-screen designs. More complete and consistent documentation in NEISS narratives about the type and size of TV involved in the injury

would help inform and evaluate future prevention efforts. Another limitation of this study was the lack of data quantifying exposure of children to TVs; however, the use of US Census data to calculate population-based injury rates is an acceptable method.

CONCLUSIONS

The rate of pediatric injuries caused by falling TVs is increasing, which underscores the need for increased prevention efforts. Prevention strategies include public education, provision of TV anchoring devices at the point of sale of TVs, TV anchoring device distribution programs, strengthening of standards for TV stability, and redesign of TVs to improve stability.

REFERENCES

- Nielsen. Television audience report 2010 & 2011. 2011. Available at: www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2011-Reports/2010-2011-nielsen-television-audience-report.pdf. Accessed February 15, 2013
- US Consumer Product Safety Commission. Product instability or tip-over injuries and fatalities associated with televisions, furniture, and appliances: 2012 report. 2012. Available at: www.cpsc.gov/PageFiles/135118/tipover2012.pdf. Accessed February 15, 2013
- Breckenridge MB. Anchoring furniture can prevent tragedy. *Beacon Journal*. January 14, 2012. Available at: www.ohio.com/news/local/mary-beth-breckenridge-anchoring-furniture-can-prevent-tragedy-1.255040. Accessed February 15, 2013
- Toddler dies after TV falls on her. *Times of Trenton*. May 10, 2007. Available at: http://blog.nj.com/timesupdates/2007/05/post_71.html. Accessed February 15, 2013
- Eldeib D, Stoffel M. TV tips over, kills 6-year-old boy. *Chicago Tribune*. November 1, 2011. Available at: http://articles.chicagotribune.com/2011-11-01/news/ct-met-child-tv-safety-20111101_1_flat-screen-televisions-tvs-head-injuries. Accessed February 15, 2013
- Williams-Harris D. "We just need to learn from this." Girl, 4, dies after TV set falls on her. *Chicago Tribune*. January 16, 2012. Available at: http://articles.chicagotribune.com/2012-01-16/news/chi-officials-girl-4-killed-after-tv-falls-on-her-in-university-park-20120115_1_gianna-share-custody-boyfriend. Accessed February 15, 2013
- US Consumer Product Safety Commission. Top 5 hidden hazards in the home. 2007. Available at: www.cpsc.gov/PageFiles/116304/hidden.pdf. Accessed February 15, 2013
- Underwriters Laboratories. *UL 60065 Safety Standard. 7th ed. Audio, Video and Similar Apparatus—Safety Requirements*. Northbrook, IL: Underwriters Laboratories Inc; 2012
- ASTM Standard F2057, 2000. *Standard Safety Specification for Chests, Door Chests, and Dressers*. West Conshohocken, PA: ASTM International; 2009
- Sikron F, Glasser S, Peleg K. Children injured following TV tipovers in Israel, 1997–2003. *Child Care Health Dev*. 2007;33(1):45–51
- Scheidler MG, Shultz BL, Schall L, Vyas A, Barksdale EM Jr. Falling televisions: the hidden danger for children. *J Pediatr Surg*. 2002;37(4):572–575
- DiScala C, Barthel M, Sege R. Outcomes from television sets toppling onto toddlers. *Arch Pediatr Adolesc Med*. 2001;155(2):145–148
- Mills J, Grushka J, Butterworth S. Television-related injuries in children—the British Columbia experience. *J Pediatr Surg*. 2012; 47(5):991–995
- Rutkoski JD, Sippey M, Gaines BA. Traumatic television tip-overs in the pediatric patient population. *J Surg Res*. 2011;166(2): 199–204
- Bernard PA, Johnston C, Curtis SE, King WD. Topped television sets cause significant pediatric morbidity and mortality. *Pediatrics*. 1998;102(3). Available at: www.pediatrics.org/cgi/content/full/102/3/e32
- Jea A, Ragheb J, Morrison G. Television tip-overs as a significant source of pediatric head injury. *Pediatr Neurosurg*. 2003;38(4):191–194
- Ota FS, Maxson RT, Okada PJ. Childhood injuries caused by falling televisions. *Acad Emerg Med*. 2006;13(6):700–703
- Gokhan S, Kose O, Ozhasenekler A, Orak M, Ustundag M, Guloglu C. Mortality and morbidity in children caused by falling televisions: a retrospective analysis of 71 cases. *Int J Emerg Med*. 2010;3(4):305–308
- Marnewick J, Dansey R, Morreau P, Hamill J. Television tip-overs: the Starship Children's Hospital experience and literature review. *Injury*. 2011;42(5):534–538
- Yahya RR, Dirks P, Humphreys R, Rutka JT, Taylor M, Drake JM. Children and television tipovers: a significant and preventable cause of long-term neurological deficits. *J Neurosurg*. 2005;103(suppl 3):219–222
- Muñiz AE. Craniofacial injuries from television tip-over. *Pediatr Emerg Care*. 2012;28(1):52–54

22. Suresh N, Harini G, Radhika R, Chidambaram B. Head injuries in children resulting from the fall of television. *Indian J Pediatr*. 2010; 77(4):459–460
23. Samson SKG, Nair PR, Baldia M, Joseph M. Television tip-over head injuries in children. *Neural India*. 2010;58(5):752–755
24. Dotchin SA, Gordon KE. The terrible truth about toppling televisions. *Paediatr Child Health (Oxford)*. 2007;12(3):221–224
25. Platt MS, Stanley CTV. TV tip-over morbidity and mortality in children. *J Forensic Sci*. 2011;56(5):1364–1367
26. Murray KJ, Griffin R, Rue LW III, McGwin G Jr. Recent trends in television tip over-related injuries among children aged 0-9 years. *Inj Prev*. 2009;15(4):240–243
27. Schroeder T, Ault K. *The NEISS Sample (Design and Implementation) 1997 to Present*. Washington, DC: US Consumer Product Safety Commission; 2001
28. US Census Bureau. US-EST90INT-07: Intercensal estimates of the United States resident population by age and sex, 1990–2000: selected months. 2004. Available at: www.census.gov/popest/data/intercensal/national/index.html. Accessed February 15, 2013
29. US Census Bureau. US-EST00INT-ALLDATA: Intercensal estimates of the resident population by single year of age, sex, race and Hispanic origin for the United States: April 1, 2000 to July 1, 2010. 2011. Available at: www.census.gov/popest/data/intercensal/national/nat2010.html. Accessed February 15, 2013
30. US Census Bureau. NC-EST2011-alldata: Monthly population estimates by age, sex, race, and Hispanic origin for the United States: April 1, 2010 to July 1, 2011 (with short-term projections to dates in 2012). 2012. Available at: www.census.gov/popest/data/national/asrh/2011/2011-nat-res.html. Accessed February 15, 2013
31. Huisman J, Magalini F, Keuhr R, et al. *2008 Review of Directive 2002/96 on Waste Electrical and Electronic Equipment (WEEE): Final Report*. Bonn, Germany: United Nations University; 2007
32. Consumer Electronics Association. 999: US consumer electronics sales and forecasts by product category. In: *Statistical Abstract of the United States: 2010*. 129th ed. Washington, DC: US Census Bureau; 2009
33. US Consumer Product Safety Commission. TV stands recalled by studio RTA due to TV tip-over hazard. 2008. Available at: www.cpsc.gov/en/Recalls/2008/Studio-RTA-Recalls-TV-Stands-Due-to-TV-Tip-over-Hazard/. Accessed February 15, 2013
34. Boggio B, Wheelock C. Materials footprint reduction of televisions and computer monitors: 2004–2010: Pike Research; 2011. Available at: <http://apps.ce.org/documents/PikeCEAFinal.pdf>. Accessed February 15, 2013
35. Ferguson RW, Mickalide AD. *A Report to the Nation on Home Safety: The Dangers of TV Tip-Overs*. Washington, DC: Safe Kids Worldwide; 2012
36. Gottesman BL, McKenzie LB, Conner KA, Smith GA. Injuries From furniture tip-overs among children and adolescents in the United States, 1990–2007. *Clin Pediatr (Phila)*. 2009;48(8):851–858

YOUR BOOK IS WATCHING YOU: *Course directors at my medical school, like most others, require students to purchase print or electronic books and complete on-line computer-assisted instruction cases. While the number of print texts sold seems to decline each year, gauging how involved the students have been with the electronic texts or cases is challenging. It turns out, however, that publishers have been carefully watching how students use their electronic texts. Companies can now package that information for individual faculty members. As reported in The New York Times (Technology: April 8, 2013), publishers can monitor how students interact with their electronic texts, including how often they open the text, underline, make notes, skip pages, or close the text immediately. Until recently, publishers mostly used that information internally. Now, however, at least one technology firm has packaged that information so that faculty members are told how their class (and each member of that class) is using a particular text. The information, described as an engagement index, is conveyed directly to the faculty member, not the student. Faculty members may share the information with students. Such feedback could be useful for a student who is struggling and has a low engagement index, suggesting he or she is not reading the text. The system could also be used to monitor students at risk for failing, particularly in virtual courses with little faculty contact. Pilot programs in large universities have generally been favorable. Interestingly, students do not seem to complain about being watched – maybe because they grew up in a digital age with little on-line privacy. Others are less sanguine about the monitoring and suggest that the system is imperfect. Students might get a low engagement index but may be recording notes on paper – something that cannot be tracked. Students learned long ago that opening the electronic text or case does not prevent one from opening another page and doing something else. I am lucky; my classrooms are real, not virtual. That flicker of recognition, smile, or “aha!” moment is so rich and gratifying – and seems so much more tangible than an engagement index.*

Noted by WVR, MD

Television-Related Injuries to Children in the United States, 1990–2011

Ana C. De Roo, Thiphalak Chounthirath and Gary A. Smith

Pediatrics 2013;132;267

DOI: 10.1542/peds.2013-1086 originally published online July 22, 2013;

Updated Information & Services

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/132/2/267>

References

This article cites 18 articles, 1 of which you can access for free at:
<http://pediatrics.aappublications.org/content/132/2/267#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Injury, Violence & Poison Prevention
http://www.aappublications.org/cgi/collection/injury_violence_-_poison_prevention_sub
Home Safety
http://www.aappublications.org/cgi/collection/home_safety_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Television-Related Injuries to Children in the United States, 1990–2011

Ana C. De Roo, Thiphalak Chounthirath and Gary A. Smith

Pediatrics 2013;132;267

DOI: 10.1542/peds.2013-1086 originally published online July 22, 2013;

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/132/2/267>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2013 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

