

# Violence in G-Rated Animated Films

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**S**TUDIES ON CHILDREN'S USE OF various media suggest that videocassette viewing is an important source of entertainment for children. A recent report by the Kaiser Family Foundation indicates that 96% of young children (ages 2-7 years) live in homes with at least 1 videocassette recorder, and 16% have a videocassette recorder in their own bedroom.<sup>1</sup> The young children in the study reported spending nearly 2 hours per day watching television and an additional half hour per day watching commercially prerecorded videotapes.<sup>1</sup> In a similar study by the Annenberg Public Policy Center, parents of young children (ages 2-5 years) reported that their children watched an average of 2.2 hours per day of television and 1.5 hours per day of videotapes.<sup>2</sup>

In 1998, 5 of the top 10 best-selling videos in the United States were animated features rated G (for general audiences) by the Motion Picture Association of America (MPAA).<sup>3</sup> Two recent studies of popular live-action films rated G and PG (parental guidance suggested) and likely to be seen by children found that firearms are "frequently shown"<sup>4</sup> and that injury prevention practices and consequences of injuries are poorly portrayed.<sup>5</sup> To our knowledge, no analysis quantified or characterized violent content in G-rated animated feature films. This study systematically compares the violent content of these animated films.

## METHODS

The study reviewed the content of all G-rated animated feature films available on

**Context** Children's exposure to violence in the media is a possible source of public health concern; however, violence in children's animated films has not been quantified.

**Objective** To quantify and characterize violence in G-rated animated feature films.

**Design** Violence content was reviewed for all 74 G-rated animated feature films released in theaters between 1937 and 1999, recorded in English, and available for review on videocassette in the United States before September 1999.

**Main Outcome Measures** Duration of violent scenes, type of characters participating in violent acts (good, neutral, or bad), number of injuries/fatalities, and types of weapons used for each film.

**Results** All 74 films reviewed contained at least 1 act of violence (mean duration, 9.5 minutes per film; range, 6 seconds–24 minutes). Analysis of time trends showed a statistically significant increase in the duration of violence in the films with time ( $P = .001$ ). The study found a total of 125 injuries (including 62 fatal injuries) in 46 (62%) of the films. Characters portrayed as "bad" were much more likely to die of an injury than other characters (odds ratio, 23.2; 95% confidence interval, 8.5–63.4). A majority of the violence (55%) was associated with good or neutral characters dueling with bad characters (ie, using violence as a means of reaching resolution of conflict), and characters used a wide range of weapons in violent acts.

**Conclusions** Our content analysis suggests that a significant amount of violence exists in animated G-rated feature films. Physicians and parents should not overlook videocassettes as a source of exposure to violence for children.

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videocassette in the United States. The study covered only movies first released in the theater, recorded in English, at least 60 minutes in length, and available for purchase or rental before September 1999. We do not include the numerous direct-to-video titles such as *Lion King: Simba's Pride* that were not released in theaters, which represent only 15% of the total video sales market.<sup>6</sup> Seventy-eight films that fit our criteria were identified through searching the "IMDb: Internet Movie Database"<sup>7</sup> and referencing *Leonard Maltin's Movie & Video Guide* for accuracy.<sup>8</sup> Four of these films were not available for sale or rental at the time of the study. We believe that the 74 films reviewed constitute the universe of G-rated animated feature film videos that are currently available for sale or rental. We recorded the data for each incident

of violence using a standard data collection instrument and a videocassette recorder with an on-screen time counter.

We define *violence* as intentional acts (eg, to cause harm, to coerce, or for fun) where the aggressor makes some physical contact that has potential to inflict injury or harm. We do not include accidental actions that lead to unintentional physical contact or harm or natural calamities such as earthquakes and storms if they are not attributed to the action of a character. An *incident of violence* was defined as an uninterrupted display of a

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character or a group of characters engaged in an act of violence, or the result of a violent offscreen action (eg, a shoe thrown offscreen by a character is seen hitting the target character on-screen). For each incident of violence, we recorded the name of the character(s) engaged in a violent act, their character quality (ie, good, bad, or neutral), the starting time of the incident (hours, minutes, and seconds from the beginning of the video), ending time of the incident (to allow calculation of the duration of the incident), and the type of weapon(s) used in the violent act(s). We noted whether the incident was a unilateral act where the victim did not physically retaliate against the character(s) inflicting harm or the violent act(s) was reciprocated (ie, a fight between characters). We also recorded whether the acts of violence resulted in any injuries, whether any character celebrated the violent acts, and whether any character verbally urged nonviolence. For each injury, we recorded whether the injury was fatal and whether the treatment or the pain of the injury was shown.

In addition, we made 2 subjective judgments to characterize the violence. First, we described the tone of the incident as light (or funny), dark (or sinister), neutral, or some combination of the 3. Second, since we have a broad definition of violence that may include both malicious acts to cause serious harm and physical comedy, we attempted to characterize the intent of the violent act. In our analysis, we divided the total screen time into violence with intent to injure—where at least 1 character acted with an intent to cause injury (ie, to hurt, to eat, or to kill)—or without that intent. For example, during an incident of violence, the hero may be defending himself against an attacker who is trying to kill him. This type of incident would be coded as having both “to defend” and “to kill” intentions, and in our analysis, it would be categorized as violence with intent to injure.

The data were entered into a database constructed with Microsoft Access, Version 97 (Microsoft Corp, Redmond, Wash). The descriptive analyses

were performed using Microsoft Access and Excel, Version 97 (Microsoft Corp). Statistical analyses were performed using S-PLUS, Version 4.5 (MathSoft Inc, Cambridge, Mass). For consistency, all films were reviewed and coded by one of the authors (F. Y.). A randomly selected subset of films (n=10) was verified by the second author, and all particular instances in films that were difficult to code were discussed.

## RESULTS

The TABLE summarizes the content of violence in G-rated animated films. All 74 films contained at least 1 act of violence. The total duration of exposure to violent acts ranged from only 6 seconds (*My Neighbor Totoro*) to 24 minutes (*Quest for Camelot*) with a mean of 9.5 minutes. Thirty-six films (49%) showed at least 1 character celebrating an act of violence by cheering or laughing, and only 24 films (32%) showed at least 1 character voicing a message on nonviolence. Although the violent content in the films is highly variable, there appears to be a small positive trend over time (FIGURE). We tested whether characters' use of violence in films has changed over time using the Spearman rank correlation and regression analysis. We found a statistically significant positive rank correlation ( $\rho=0.35$ ,  $P=.001$ ), and the correlation was also significant and positive when adjusted for variation in film length ( $\rho=0.33$ ,  $P=.003$ ). Similarly, we found a statistically significant positive trend using regression analyses for both absolute violent content ( $\beta=5.38$ ,  $P=.004$ ) and violence as a proportion of film length ( $\beta=0.099$ ,  $P=.009$ ).

At least 1 character engaged in a violent act with intent to cause bodily injury 81% of the time. Looking at the total amount of violence with intent to injure over time, we found an increase ( $\rho=0.38$ ,  $P=.001$ ), while the total duration of violence without the intent to injure has not changed over time ( $\rho=0.01$ ,  $P=.46$ ). These results also hold when we adjust for the difference in the length of films ( $\rho=0.36$ ,  $P=.001$ ) and ( $\rho=-0.004$ ,  $P=.51$ ), respectively.

There were 46 films (62%) where at least 1 character sustained an injury. In 10 (22%) of these films, at least 1 injury was treated through medical care such as bandaging or medicine, or through a magic spell. In 11 (24%) of these films, at least 1 character was shown experiencing pain from the injury. Of the 125 total injuries, 50 (40%) were suffered by characters deemed “bad.” Of the 62 fatal injuries, 44 (71%) were of bad characters, and bad characters were much more likely to die of their injuries than good characters (odds ratio, 23.2; 95% confidence interval, 8.5-63.4).

Fifty-five films (74%) had an identifiable primary antagonist who menaced the “good” guys. Of these characters, 26 (47%) were killed or presumably dead by the end of the film. Twenty (77%) were killed by a good or neutral character, 1 (4%) was killed by a bad character, and the other 5 (19%) died accidentally while engaged in a violent act to harm another character.

In all but 2 movies (*My Neighbor Totoro* and *Kiki's Delivery Service*), at least 1 character who was “good” participated in a violent act. Twenty-three percent of the time only neutral or good characters were seen engaged in acts of violence, and 22% of the time, bad characters alone engaged in violent acts. Unilateral acts of violence by good characters were predominantly depicted as light (72% of incidents), followed by neutral (19%) and dark (9%). In contrast, unilateral violent acts by bad characters were most often portrayed as dark (51%), followed by light (27%) and neutral (21%).

A majority of the violence occurred when bad characters fought against good or neutral characters (55%). We recorded a total of 165 such fighting sequences with a bad character initiating 122 (74%) of the fights, and a good or neutral character initiating the other 43 (26%). When a good or neutral character instigated a fight, in 33 (77%) of the 43 cases, the character was provoked in some way (eg, to save a captured friend).

In most of the incidents of violence (59%), only the body was used as a weapon. However, these incidents only

VIOLENCE IN G-RATED ANIMATED FILMS

**Table.** Violent Content in G-Rated Animated Films\*

Movie Title	Year	Length, s	Violence, s	Injuries (Fatal), No.			Weapons							
				Total	Good/ Neutral Character Quality	Bad Character Quality	Body	Sword	Gun	Magic	Explosive	Poison	Other	
<i>Snow White and the Seven Dwarfs</i>	1937	5040	474†	2 (1)	1 (0)	1 (1)	X	X					X	X
<i>Fantasia</i>	1940	7200	307	1 (1)	1 (1)	0	X							X
<i>Pinocchio</i>	1940	5280	432‡	1 (0)	1 (0)	0	X	X	X					X
<i>Dumbo</i>	1941	3780	75	0	0	0	X							X
<i>Bambi</i>	1942	4140	252	2 (1)§	2 (1)	0	X		X					X
<i>The Three Caballeros</i>	1945	4260	210	0	0	0	X		X		X		X	X
<i>Fun and Fancy Free</i>	1947	4380	552	0	0	0	X							X
<i>The Adventures of Ichabod and Mr. Toad</i>	1949	4080	527	0	0	0	X	X	X					X
<i>Cinderella</i>	1950	4560	273†	1 (1)	0	1 (1)	X	X						X
<i>Alice in Wonderland</i>	1951	4440	316‡	0	0	0	X							X
<i>Peter Pan</i>	1953	4560	863†‡	2 (1)	1 (0)	1 (1)	X	X	X		X			X
<i>Lady and the Tramp</i>	1955	4560	351	3 (1)	2 (0)	1 (1)	X		X					X
<i>Sleeping Beauty</i>	1959	4500	599	1 (1)	0	1 (1)	X	X		X				X
<i>101 Dalmatians</i>	1961	4740	492	0	0	0	X		X					X
<i>The Sword in the Stone</i>	1963	4740	1012†	0	0	0	X	X		X				X
<i>The Jungle Book</i>	1967	4680	676‡	3 (0)	3 (0)	0	X							X
<i>A Boy Named Charlie Brown</i>	1969	5100	109	0	0	0	X		X					X
<i>The Aristocats</i>	1970	4740	354	0	0	0	X	X						X
<i>Snoopy, Come Home</i>	1972	4800	500	1 (0)§	1 (0)	0	X							X
<i>Charlotte's Web</i>	1973	5640	164†	0	0	0	X		X					X
<i>Robin Hood</i>	1973	4980	814	0	0	0	X	X						X
<i>The Many Adventures of Winnie the Pooh</i>	1977	4980	65	0	0	0	X		X					X
<i>The Rescuers</i>	1977	4560	675‡	0	0	0	X		X		X			X
<i>The Fox and the Hound</i>	1981	4980	717	3 (1)§	2 (1)	1 (0)	X		X					X
<i>The Last Unicorn</i>	1982	5100	743	5 (3)	3 (1)	2 (2)	X	X		X				X
<i>The Secret of NIMH</i>	1982	5100	522†	4 (3)	3 (2)	1 (1)	X	X			X			X
<i>The Care Bears Movie</i>	1985	4680	471	0	0	0	X			X				X
<i>An American Tail</i>	1986	4860	701	0	0	0	X		X		X			X
<i>The Great Mouse Detective</i>	1986	4380	798	2 (2)	0	2 (2)	X	X	X					X
<i>The Land Before Time</i>	1988	4140	484	3 (2)	1 (1)	2 (1)	X							X
<i>Oliver and Company</i>	1988	4440	293	6 (3)	2 (0)	4 (3)	X		X					X
<i>All Dogs Go to Heaven</i>	1989	5340	554†	5 (3)§	3 (2)	2 (1)	X		X					X
<i>Kiki's Delivery Service</i>	1989	6180	35	0	0	0	X							
<i>The Little Mermaid</i>	1989	4980	517‡	2 (1)	1 (0)	1 (1)	X	X						X
<i>Duck Tales: The Movie</i>	1990	4440	494‡	1 (1)	0	1 (1)	X	X		X				X
<i>Happily Ever After</i>	1990	4440	1071	5 (3)	2 (0)	3 (3)	X	X		X				X
<i>Jetsons: The Movie</i>	1990	4920	221	3 (0)	3 (0)	0	X							X
<i>The Nutcracker Prince</i>	1990	4440	428‡	5 (2)§	2 (0)	3 (2)	X	X	X	X				X
<i>The Rescuers Down Under</i>	1990	4620	673	1 (1)	0	1 (1)	X	X	X					X
<i>An American Tail: Fievel Goes West</i>	1991	4500	873	0	0	0	X	X	X		X			X
<i>Beauty and the Beast</i>	1991	5040	786†‡	3 (1)§	2 (0)	1 (1)	X	X	X					X
<i>The Princess and the Goblin</i>	1991	4920	659	3 (2)§	1 (0)	2 (2)	X	X						X
<i>Aladdin</i>	1992	5400	968‡	1 (1)	1 (1)	0	X	X		X				X
<i>Fern Gully: The Last Rainforest</i>	1992	4560	475	0	0	0	X	X		X				X
<i>Little Nemo: Adventures in Slumberland</i>	1992	5100	578	3 (2)	1 (0)	2 (2)	X	X						X

account for 29% of the total screen duration of violence. All films contain acts of violence through direct body contact, and in all but 1 of the films, some object other than those listed in the Table is used (eg, rope, broom, stone). In 39 films (53%), a sword, knife, or other sharp metal object was used; in 26 films (35%), a gun or cannon was used; and in 17 films (23%), magic was used as a weapon. Only 10 films (14%) contained the use of an explosive, and poison was used in 3 films (4%).

**COMMENT**

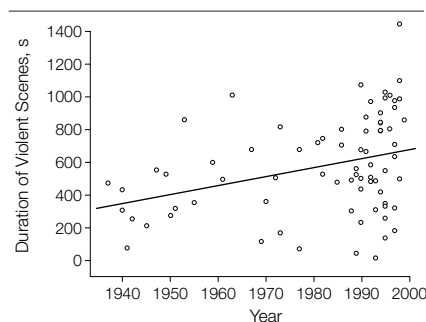
Clinicians and researchers have warned that exposure to media violence may stimulate children and adolescents to use aggressive behavior to achieve goals or resolve conflicts.<sup>9-11</sup> By contrast, a recent editorial cautions that it is “inaccurate to imply that the published work strongly indicates a causal link between virtual and actual violence.”<sup>12</sup> On balance, it is difficult to dispute the potentially powerful role of the media as a teacher of social norms to many young children.

This article characterizes children’s exposure to violence in animated films, but the results of our study have some limitations. First, coding information from movies is subjective. Having a single person code the data reduces variability, but it may have limited the accuracy. However, the use of a timer and recording actual screen times for incidents provides opportunity for validation. Second, we use a broad definition of violence that extends from slapstick comedy to premeditated murder.

**Table.** Violent Content in G-Rated Animated Films (cont)

Movie Title*	Year	Length, s	Violence, s	Injuries (Fatal), No.			Weapons						
				Total	Good/Neutral Character Quality	Bad Character Quality	Body	Sword	Gun	Magic	Explosive	Poison	Other
<i>Tom and Jerry: The Movie</i>	1992	5040	501†‡	1 (0)	1 (0)	0	X	X			X		X
<i>My Neighbor Totoro</i>	1993	5160	6	0	0	0	X						X
<i>Once Upon a Forest</i>	1993	4260	300	2 (2)	2 (2)	0	X					X	X
<i>We're Back! A Dinosaur's Story</i>	1993	4260	479†	0	0	0	X		X				X
<i>The Lion King</i>	1994	5280	838†‡	2 (2)	1 (1)	1 (1)	X						X
<i>The Pagemaster</i>	1994	4560	836	0	0	0	X	X	X	X			X
<i>The Swan Princess</i>	1994	5400	788‡	9 (2)	8 (1)	1 (1)	X	X		X			X
<i>Thumbelina</i>	1994	5160	410	1 (0)	1 (0)	0	X	X					X
<i>The Troll in Central Park</i>	1994	4560	900	0	0	0	X	X	X	X			X
<i>Arabian Knight</i>	1995	4380	542‡	2 (2)	1 (1)	1 (1)	X	X					X
<i>Balto</i>	1995	4680	338†‡	1 (0)	0	1 (0)	X	X					X
<i>A Goofy Movie</i>	1995	4680	127‡	0	0	0	X						X
<i>Gumby: The Movie</i>	1995	5400	990‡	1 (0)	1 (0)	0	X	X					X
<i>The Pebble and Penguin</i>	1995	4440	1026‡	1 (1)	0	1 (1)	X						X
<i>Pocahontas</i>	1995	4860	323†	3 (1)	3 (1)	0	X	X	X				X
<i>Toy Story</i>	1995	4860	246	0	0	0	X		X		X		X
<i>All Dogs Go to Heaven 2</i>	1996	4920	800	0	0	0	X			X			X
<i>The Hunchback of Notre Dame</i>	1996	5400	1006†‡	5 (2)§	4 (1)	1 (1)	X	X					X
<i>Anastasia</i>	1997	5640	630†	3 (2)§	1 (0)	2 (2)	X		X	X			X
<i>Babes in Toyland</i>	1997	4440	704	3 (1)	2 (0)	1 (1)	X						X
<i>Cats Don't Dance</i>	1997	4620	311	0	0	0	X						X
<i>Hercules</i>	1997	5520	974‡	3 (2)	1 (0)	2 (2)	X	X					X
<i>Pippi Longstocking</i>	1997	4680	172	0	0	0	X						X
<i>The Swan Princess 2</i>	1997	4320	932‡	3 (2)	1 (0)	2 (2)	X	X		X			X
<i>A Bug's Life</i>	1998	5700	1098‡	3 (1)§	2 (0)	1 (1)	X	X					X
<i>Mulan</i>	1998	5280	986‡	5 (2)	3 (0)	2 (2)	X	X			X		X
<i>Quest for Camelot</i>	1998	5160	1447	3 (2)§	2 (1)	1 (1)	X	X		X			X
<i>The Rugrats Movie</i>	1998	4860	492†‡	0	0	0	X						X
<i>The King and I</i>	1999	5340	855‡	2 (0)	2 (0)	0	X	X		X	X		X

\*The following films were not available for review: *Pinocchio and the Emperor of the Night*, *Race for Your Life*, *Charlie Brown*, *Rock-A-Doodle*, and *Rover Dangerfield*. “Other” weapons include things such as a rope, broom, or stone.  
 †At least 1 character was shown conveying a message of nonviolence.  
 ‡At least 1 character was shown celebrating the violent act through cheers or laughter.  
 §If at least 1 character was shown experiencing pain from an injury.  
 ||If at least 1 injury was treated through medical care (eg, bandaging, medicine) or magic.

**Figure.** Violent Content in G-Rated Animated Films Over Time

The slanted line represents a fitted regression line.

These actions may influence attitudes and behavior of children in very different ways. Third, it is not clear how our results for animated films compare with other entertainment for children such as G-rated nonanimated films (eg, actions of live actors may influence children's behavior more, the content of violence in live action G-rated films may be less) or commercial television.

Even with these limitations, our content analysis reveals a striking behavioral message implied by many of the G-rated animated films that the good guys triumph over the bad through the use of physical force. For example, in *The Land Before Time*, the baby dinosaurs plot to kill the *Tyrannosaurus rex* they call Sharp Tooth by setting a trap for him. There are, however, some films that do attempt to convey that killing is not the solution, but with mixed messages. For example, Aladdin finally defeats Jafar by tricking him and confining him to a magic lamp, but only after trying with physical force first. In *The Lion King*, Simba wins the physical fight with his uncle Scar and refuses to kill him, but he does nothing to prevent the hyenas from killing his uncle in the end. In only 1 film (*Balto*) does the main character resolve conflict with the antagonist without the use of violence. In addition, bad characters were much more likely to die of injuries than a good character, sending a message that these bad characters may deserve death, but that good characters are immune from serious harm when engaging in a fight. Furthermore,

the films send a message that violence by good or neutral characters are not as serious by portraying them as light or funny.

Surveys show that less than half of parents report "always watching" television with their children, even though experts emphasize the importance of parents covieing television programs and videos with children since parents can act as a "values filter and media educator."<sup>11</sup> In a brochure for parents, the American Psychological Association encourages parents to watch television with their children and discuss violent incidents they see on screen to help them understand why a character acted violently and explore alternative solutions without using violence.<sup>13</sup> Covieing and monitoring may be particularly important with animated films and television shows since parents cannot rely on the entertainment industry's rating system for information on violent content. For recent films, the MPAA lists the reasons for a movie's rating only if the film is not rated G (eg, "Rated PG for sci-fi violence and brief mild language").<sup>14</sup> On television, violence by animated characters are treated as fantasy violence ("FV") by the "TV Parental Guideline" regardless of how realistic the violent acts are.<sup>15</sup>

For parents who would like to monitor their child's intake of violence in movies, there are several Internet sites that review the content of feature-length films for material that may not be suitable for children. For example, the Web site "Kids-In-Mind"<sup>16</sup> provides a concise summary of a film's content and a rating, on a scale from 0 to 10, for 3 categories including violence/gore. Another Web site, "Screen It,"<sup>17</sup> provides a thorough yet impartial review of a film's content and a rating on 15 different aspects of the film such as violence, guns/weapons, and disrespectful/bad attitude on a scale from "none" to "heavy." This site also lists all occurrences of potentially objectionable material under each category. Through resources like these Web sites, parents can review the content of films before children watch them to determine suitability of the material for their child as well as prepare

to discuss the content of films that a child may see without the parent.

Our content analysis suggests that animated films determined to be acceptable for the general audience by a ratings board contain a significant amount of violence. A G rating does not automatically signify a level of violence acceptable for very young viewers. The MPAA should consider changing the current age-based rating system to one based on content, which is what an overwhelming number of parents prefer.<sup>15</sup> In addition, parents need to preview films themselves or use online resources to judge appropriateness of individual films for their children. Physicians and parents should not overlook videocassettes as a source of exposure to violence for children.

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**Table 1.** Distribution of Average Handgun Sales Among Federally Licensed Firearms Dealers in California, 1996-1998

Average Annual Handgun Sales, No.	Dealers, No. (%)	Handguns Sold, No. (%)*
<1	740 (22.3)	107 (<0.1)
1-9	1232 (37.2)	13 566 (1.5)
10-24	450 (13.6)	20 847 (2.4)
25-99	456 (13.8)	70 673 (8.0)
≥100	434 (13.1)	776 011 (88.1)
<b>Total</b>	<b>3312 (100.0)</b>	<b>881 204 (100.1)</b>

\*Percentages do not sum to 100 because of rounding.

**Table 2.** Distribution of Handgun Traces Among Federally Licensed Firearms Dealers in California, 1998

Handgun Traces, No.	Dealers, No. (%)*	Handguns Traced, No. (%)*
0	2959 (89.3)	0 (0.0)
1	164 (5.0)	164 (7.4)
2-4	106 (3.2)	275 (12.4)
5-9	36 (1.1)	243 (10.9)
10-24	23 (0.7)	351 (15.8)
25-99	22 (0.7)	933 (42.0)
≥100	2 (0.1)	257 (11.6)
<b>Total</b>	<b>3312 (100.1)</b>	<b>2223 (100.1)</b>

\*Percentages do not sum to 100 because of rounding.

of fewer than 1 handgun. The strength of the association between trace volume and sales volume was estimated by the Pearson correlation coefficient. Results were also summarized by a crime-gun trace ratio (CGTR), defined as [(handguns traced in 1998) / (average handgun sales for 1996-1998)] × 100. A CGTR of 100 would indicate that the number of handguns traced to a dealer in 1998 was equal to the average number of handguns sold by that dealer annually during 1996-1998. Average CGTRs, weighted by handgun sales volume, were calculated for all dealers (excluding those with no sales) and also for those selling 100 or more handguns annually.

**Results.** Of 3312 state-registered, federally licensed firearms dealers in California in 1999, 740 (22.3%) sold less than 1 handgun annually in 1996-1998. By contrast, 434 dealers (13.1%) accounted for 88.1% of all handgun sales (TABLE 1). Handgun traces were even more concentrated: only 24 dealers (0.7%) accounted for 53.6% of all handgun traces in 1998 (TABLE 2).

Handgun trace volume was strongly correlated with handgun sales volume ( $r=0.73$ ); the number of traces in 1998 increased by 9.8 (95% confidence interval, 9.5-10.2) for every

1000 handguns sold annually during 1996-1998. However, trace volume varied substantially among dealers with similar sales volumes. The CGTRs ranged from 0 to 300 among 2572 dealers with average sales of 1 or more handguns annually (weighted mean [SD], 0.75 [19.5]), and from 0 to 10.8 among 434 dealers with average sales of 100 or more handguns annually (weighted mean [SD], 0.77 [25.8]). Of 33 dealers with a CGTR greater than 10, 25 (75.7%) sold fewer than 10 handguns annually. One dealer with average annual sales of 666 handguns had a CGTR of 10.8 (72 traces in 1998); that dealer sold 1998 handguns in 1996 but none thereafter. Among all those with average annual sales of 1 or more handguns, 222 dealers (8.6%) with a CGTR greater than 0.75 accounted for 33.2% of all handgun sales during 1996-1998 but 82.7% of all handgun traces in 1998.

**Comment.** A small minority of firearms dealers are associated with more handgun traces than would be predicted by their sales volume, and these account for a substantial majority of all traced handguns. A recent agreement between 1 major handgun manufacturer and federal, state, and local governments emphasizes the need to focus on dealers selling a "disproportionate number of crime guns."<sup>4</sup> These findings suggest that such action could decrease the incidence of handgun violence.

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1. Commerce in firearms in the United States. Washington, DC: Bureau of Alcohol, Tobacco and Firearms; 2000. Available at: <http://www.atf.treas.gov/pub/index.htm#Firearms>. Accessed June 23, 2000.
2. President Clinton announces landmark report on gun industry and bold actions to crack down on illegal trafficking. Washington, DC: Office of the Press Secretary, The White House; February 4, 2000. Available at: <http://www.whitehouse.gov/uri-res/12R?urn:pd://oma.eop.gov.us/2000/2/4/13.text.1>. Accessed April 10, 2000.
3. White House plan nothing new, targets licensed, lawful Dealers. National Rifle Association, 2000. Available at: <http://www.nra.org/news/20000204-federalfirearmlicenses-001.shtml>. Accessed April 14, 2000.
4. Agreement between Smith & Wesson and the Departments of the Treasury and Housing and Urban Development, Local Governments and States, March 17, 2000. Available at: <http://www.smith-wesson.com/misc/agreement.html>. Accessed March 17, 2000.

## CORRECTION

**Incorrect Wording:** In the Medicine and the Media article entitled "Violence in G-Rated Animated Films" published in the May 24/31, 2000, issue of THE JOURNAL (2000;283:2716-2720), there was incorrect wording in the "Methods" section. On page 2716, the first sentence of the second paragraph under "Methods" should read as follows: We define *violence* as intentional acts (eg, to cause harm, to coerce, or for fun) where the aggressor attempts to make some physical contact that has potential to inflict injury or harm.

**Table 1.** Distribution of Average Handgun Sales Among Federally Licensed Firearms Dealers in California, 1996-1998

Average Annual Handgun Sales, No.	Dealers, No. (%)	Handguns Sold, No. (%)*
<1	740 (22.3)	107 (<0.1)
1-9	1232 (37.2)	13 566 (1.5)
10-24	450 (13.6)	20 847 (2.4)
25-99	456 (13.8)	70 673 (8.0)
≥100	434 (13.1)	776 011 (88.1)
<b>Total</b>	<b>3312 (100.0)</b>	<b>881 204 (100.1)</b>

\*Percentages do not sum to 100 because of rounding.

**Table 2.** Distribution of Handgun Traces Among Federally Licensed Firearms Dealers in California, 1998

Handgun Traces, No.	Dealers, No. (%)*	Handguns Traced, No. (%)*
0	2959 (89.3)	0 (0.0)
1	164 (5.0)	164 (7.4)
2-4	106 (3.2)	275 (12.4)
5-9	36 (1.1)	243 (10.9)
10-24	23 (0.7)	351 (15.8)
25-99	22 (0.7)	933 (42.0)
≥100	2 (0.1)	257 (11.6)
<b>Total</b>	<b>3312 (100.1)</b>	<b>2223 (100.1)</b>

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of fewer than 1 handgun. The strength of the association between trace volume and sales volume was estimated by the Pearson correlation coefficient. Results were also summarized by a crime-gun trace ratio (CGTR), defined as [(handguns traced in 1998) / (average handgun sales for 1996-1998)] × 100. A CGTR of 100 would indicate that the number of handguns traced to a dealer in 1998 was equal to the average number of handguns sold by that dealer annually during 1996-1998. Average CGTRs, weighted by handgun sales volume, were calculated for all dealers (excluding those with no sales) and also for those selling 100 or more handguns annually.

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