INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants**

December 5, 2003

Intentional Fire-Related Injuries in Oklahoma, 1988-2001

Fire-related assaults are the 12th leading cause of non-fatal violent injuries in the United States. When looking at children under the age of five, fire-related assaults leap to the 4th leading cause of non-fatal violent injury. In November 1986, the Oklahoma State Department of Health made burn/smoke inhalation injuries that resulted in hospitalization or death a reportable condition. Collection of such information began in September 1987 and has continued since.

During the 14-year period 1988 to 2001, 6,803 Oklahomans were hospitalized in a burn center or died as a result of a burn or smoke inhalation injury. Of these, 309 were intentionally inflicted. Sixty-four percent of intentionally burned persons (197/309) were injured by fire, of which 51% died (Table 1). This report describes the occurrence and characteristics of the intentional fire-related injuries in Oklahoma.

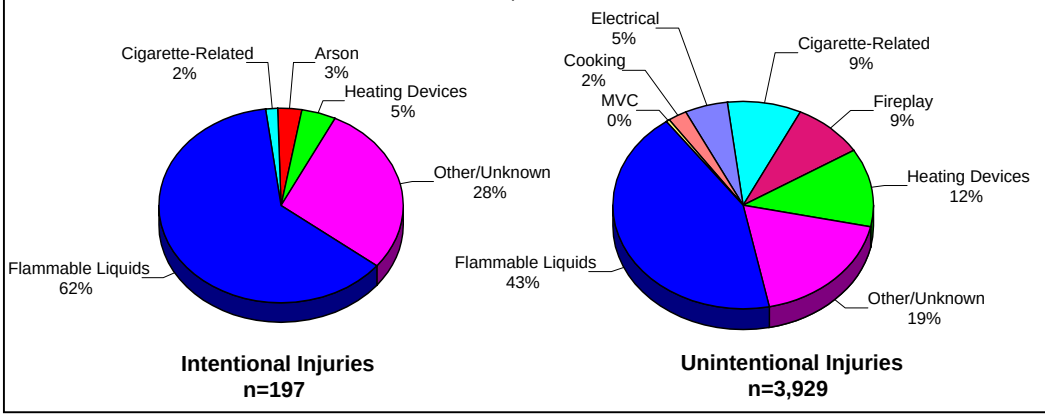
An injury was coded as intentional for this study if the person intentionally inflicted the injury himself or herself (i.e., suicide or suicide attempt) or if the injury was inflicted by another person (i.e., homicide, domestic violence, child abuse).

Table 1. Burn Injuries and Case-Fatality Rate by Agent, Oklahoma, 1988-2001

Agent	Unintentional Burns (# of injuries)	CFR %	Intentional Burns (# of injuries)	CFR %
Flame/Fire	3921	33	197	51
Hot Liquid	1515	2	87	1
Hot Solid	433	4	8	0
Electricity	330	14	3	0
Chemical	154	1	10	10
Other	141	5	4	0
Total	6494	21	309	33

Flammable substances were used in 62% (123/197) of intentional fire-related injuries compared to 43% (1694/3929) of unintentional fire-related injuries (Figure 1). Gasoline accounted for 68% of the substances used in the intentional fire-related injuries, followed by alcohol (9%), lighter fluid (6%), and kerosene (2%). Gasoline accounted for 67% of unintentional fire-related injuries followed by propane (6%), natural gas (4%), and diesel fuel (2%).

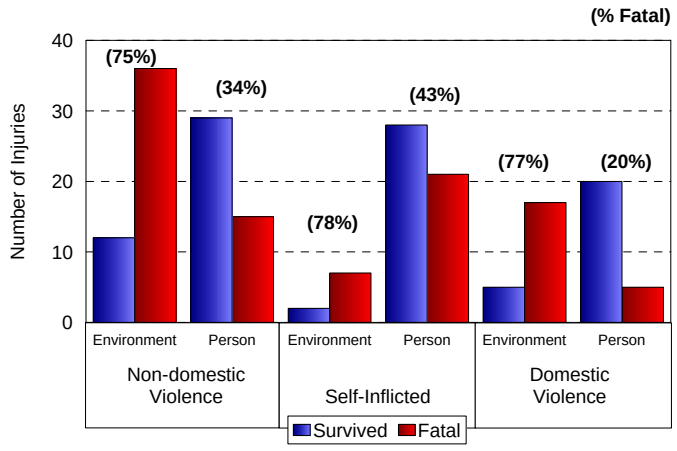
Figure 1. Causative Agent for Intentional and Unintentional Fire-Related Injuries, Oklahoma, 1988-2001



*The INJURY UPDATE is a report produced by the Injury Prevention Service, Oklahoma State Department of Health. Other issues of the INJURY UPDATE may be obtained from the Injury Prevention Service, Oklahoma State Department of Health, 1000 N.E. 10th Street, Oklahoma City, Oklahoma 73117-1299, 405/271-3430 or 1-800-522-0204 (in Oklahoma). INJURY UPDATES and other IPS information is also available at www.health.state.ok.us/program/injury.

Forty-eight percent (94/197) of injuries occurred among persons aged 25 to 44 years with an average age of 32 years. Seventeen percent of injuries occurred among children less than 15 years of age. Males accounted for 65% (128/197) of the injuries with a rate that was almost two times that of females (Table 2). Injury rates were highest among males 25 to 54 years of age (0.86 per 100,000 population). African Americans had the highest average annual injury rate (1.4 per 100,000 population) followed by Native Americans and whites (0.6 and 0.3 per 100,000 population, respectively). Table 2 shows the distribution of the demographic characteristics between intentional and unintentional fire-related injuries. Whites were nearly three times more likely to die if they were injured intentionally compared to unintentionally injured (OR=2.86; 95% CI: 1.98-4.14). Case fatality rates among other races did not differ significantly.

Figure 2. Number of Fire-Related Injuries by Ignition Location, Outcome and Intentional Category, Oklahoma, 1988-2001



Non-domestic violence (i.e., violence inflicted by a non-related person or non-intimate partner) accounted for 47% (92/197) of intentional injury cases; 30% of injuries were self-inflicted and 24% were results of domestic violence. Five of the six arson cases were non-domestic violence and consisted of throwing Molotov cocktails through windows, two homicides and one robbery cover-up. Forty-four persons (48%) were directly set on fire (Figure 2); 68% involved dousing the person with a flammable liquid and setting them on fire. However, persons who were injured when their surrounding environment was set on fire (52%) were more than five times as likely to die than persons that were directly set on fire (OR=5.80; CI: 2.13-16.11; chi-square p-value < 0.001); house fires were associated with 34 (71%) of these injuries. Twenty-nine injured persons were reported positive for alcohol or drugs.

Self-inflicted injuries were the next leading cause of intentional fire-related injuries (29%; 58/197). Persons who had self-inflicted injuries were more likely to set themselves on fire as opposed to their surrounding environment (84% vs. 16%, respectively). Six persons were sitting in a vehicle when trying to attempt suicide. Five persons had been released from a psychiatric facility, most within one week of the injury. Alcohol or drugs were reported in 11 of the self-inflicted injury cases. The odds of a person suffering a fatal injury when their environment was set on fire was almost five times higher than persons who directly set their personage on fire (OR = 4.67; 95% CI: 0.75-37.06) but this was not statistically significant (chi-square p-value = 0.118).

Domestic violence-related injuries rounded out the intentional injuries, accounting for 47 (24%) of the 197 intentional injuries. Persons were overwhelmingly injured at their own home as opposed to someone else's home, in a vehicle, or other location (85%, 6%, 4%, and 4%, respectively). Only three injured persons were reported positive for alcohol or drug use. The ignition location in domestic violence-related injuries was almost equally split between the environment being set on fire (22/47, 47%) and the person being set on fire (25/47, 53%). Persons who were injured when their surrounding environment was set on fire were almost 14 times more likely to die than persons who were directly set on fire (OR= 13.60; 95%CI: 2.79-74.60; chi-square p-value<0.001).

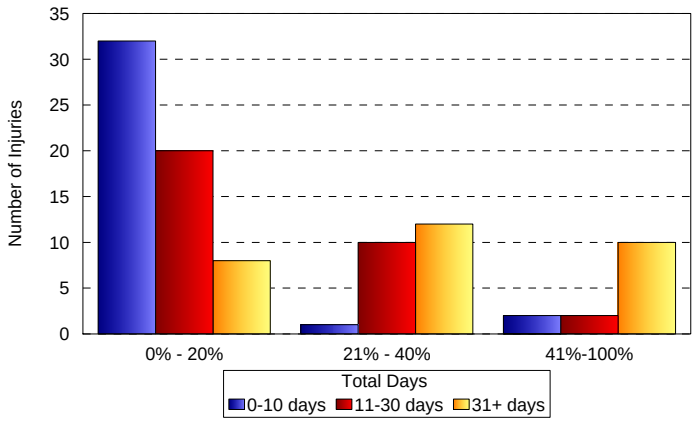
Table 2. Distribution of Intentional and Unintentional Fire-Related Injuries by Demographic Characteristics, Oklahoma, 1988-2001

	Type of Injury					
	Intentional			Unintentional		
Variable	N	%	Rate per 100,000 population	N	%	Rate per 100,000 population
Gender						
Male	128	65	0.61	2952	75	14
Female	69	35	0.32	977	25	4
Age						
0-4 years	15	8	0.50	330	8	11
5-14 years	18	9	0.28	438	11	7
15-24 years	28	14	0.45	571	15	9
25-34 years	50	25	0.80	702	18	11
35-44 years	44	22	0.69	612	16	10
45-54 years	26	13	0.53	408	10	8
55-64 years	8	4	0.21	304	8	8
65+ years	8	4	0.15	557	14	11
Race						
White	121	61	0.34	3083	79	9
African American	47	24	1.42	425	11	13
Native American	21	11	0.58	267	7	7
Place of Occurrence						
Injured Person's Home	127	65		2393	61	
Other Home	18	9		238	6	
Work	0	0		471	12	
Vehicle	17	9		490	13	
Other/Unknown	35	18		337	9	
Day of Occurrence						
Sunday	25	13		635	16	
Monday	21	11		490	13	
Tuesday	30	6		501	13	
Wednesday	31	16		505	13	
Thursday	24	12		537	14	
Friday	28	14		557	14	
Saturday	36	18		699	18	
Time of Occurrence						
11:00 pm - 6:59 am	77	39		997	25	
7:00 am - 2:59 pm	40	20		1220	31	
3:00 pm - 10:59 pm	53	31		1339	38	
Outcome			Case Fatality Rate			Case Fatality Rate
Fatal	101	51	51%	1275	32	32%
Nonfatal	96	49		2654	68	

* numbers do not add to the total due to missing values

Among survivors (97), the average length of stay in a burn center was 27 days with a range of less than 1 day to 135 days. Sixty-two percent (60/97) of survivors were burned on 20% or less of their body. Ten percent (10/97) of injured persons were hospitalized for more than 30 days and had burns over 40% of their body. Figure 3 shows the relationship between percentage of the body burned and the length of stay in a hospital.

Figure 3. Intentional Fire-Related Burn Injuries by Percent Body Burned and Number of Days Hospitalized Among Survivors, Oklahoma, 1988-2001



Case Briefs

- A 68-year old woman had just been released from a psychiatric facility when she set her car on fire and locked herself inside. She was hospitalized for a month with burns on 12.5% of her body.
- After filing for divorce, a 41-year old woman was killed by her abusive husband. He shot her and set the house on fire while she was still alive.
- A 46-year old woman was killed when a Molotov cocktail was thrown into her house. This was suspected gang activity aimed at her son who was not home at the time.
- A 28-year old father set fire to the family trailer killing his wife (28 years old) and three children (ages 4, 5, and 7). The report states that the father did not want to pay child support. He was arrested for arson and murder.

Prevention

Preventing intentional fire-related injuries poses a challenge to the public health community.

- Existing mental health programs should be evaluated for ways to improve services.
- Domestic violence organizations should educate their participants on ways to minimize fire-related incidences.
- Local police and fire departments should be made aware of local situations, such as gang activity, which might result in a fire-related injury.
- Families with a history of violence should be educated regarding options that are available to diffuse or leave the situation. Have emergency numbers, local shelter addresses and crisis help numbers available.
- Patients recently released from psychiatric treatment facilities should be regularly checked in case of a mental crisis.

Prepared by: Miriam McGaugh, M.S.
Epidemiologist