Data Brief
Firearm-Related Injury

Minnesota 1998 to 2001

How many people were injured?

At least 2,996 Minnesotans sustained a firearm-related injury (FRI) between 1998 and 2001.

During this time, 1,284 people died from these injuries, while 1,712 survived and received hospital treatment for their injuries. The rate (per 100,000 people) of FRI was 8.6 for nonfatal hospitalized injuries, and 6.6 for fatal injuries. (These are annualized, age-adjusted figures.) Minnesota rates are lower than national rates; the U.S. year 2000 rate (per 100,000 people) of FRI was 26.6 for nonfatal and 10.1 for fatal injuries.

Firearms refer only to guns that use a powder charge to fire a projectile. Common firearms include rifles, shotguns, and handguns. For this data brief, firearm injuries are defined as injuries due to a projectile that was fired from a firearm. They do not include pistol whipping, or injuries caused by non-powder guns (such as air-guns).

What were the trends?

There was a slight decline in FRI over the four-year period (784 cases of FRI recorded in 1998, 745 in 1999, 720 in 2000, and 747 in 2001). The age-adjusted rates (per 100,000 people) were 16.4 in 1998, 15.5 in 1999, 14.9 in 2000, and 15.1 in 2001 **(Figure 1)**. Mortality data from 1995 suggested a decreasing trend in firearm related deaths; this validates a decreasing trend observed through 2000. Due to limited data, what appears to be an upward trend in rates recorded between 2000 and 2001 is not clearly discernible at this time.

How did the injuries occur (intent)?

Suicide was the primary manner of death for fatal FRI (76%) **(Figure 2)**. Homicidal, unintentional, undetermined FRI accounted for 21%, 2% and 1% of the fatalities, respectively. Nonfatal FRI was due to firearm assaults (50%), followed by unintentional injuries (36%), self-inflicted injuries (7%), undetermined intents (6%) and legal intervention (1%).

Fifty-one percent of residents (n=868) who sought medical care for their injuries received inpatient care, while 49% (n=844) received outpatient care **(Figure 3)**. Assaultive FRI (64%) was the major reason for inpatient hospitalizations, while the majority of emergency department/room consultations were due to unintentional injuries (51%).

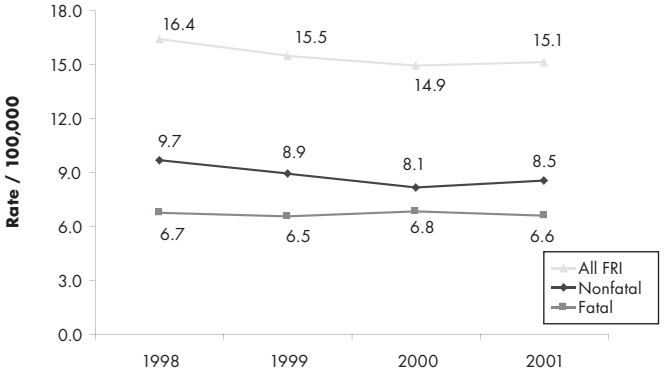
In this Data Brief...

Firearm related injuries and death in Minnesota:

- How many people were injured?
- What were the trends?
- How did the injuries occur (intent)?
- Who was injured?
- How much did hospital care cost?
- What data sources and methodology were used?

Figure 1.

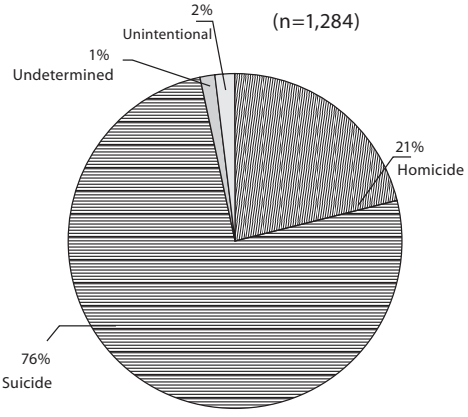
Firearm-Related Injury Rates by Year and Outcome: Minnesota



Note: Rates are age-adjusted to the US 2000 population

Figure 2.

Fatal Firearm-Related Injury by Intent: Minnesota, 1998-2001



Who was injured?

Evaluation data suggest there were some interactions between the incidence and intentionality of FRI, and the gender, age, residence, racial background and socioeconomic status (community median income) of the victims.

Gender and age

Males accounted for 88% of all fatal and nonfatal FRI in Minnesota between 1998 and 2001. Historically, males and youth have experienced the greatest burden of FRI in Minnesota.

Minnesotans aged 24 or younger sustained between 25 and 50% of all fatal and nonfatal FRI in the years 1998-2001. Youths aged 15 to 24 were most affected **(Figure 4)**. The rates (per 100,000 people) of firearm-related homicide (3.7), nonfatal assaults (14.9) and nonfatal unintentional injuries (6.7) were highest in this age group. Minnesota seniors and youths aged 15 to 24 had the highest rates of suicide by firearms, 7.4 and 6.5 respectively.

Residence

The majority of FRI occurred in the seven-county metropolitan area (n = 1,730) compared to the other 80 counties in greater Minnesota (n = 1,266). Assault and/or homicide comprised the majority of cases in the metropolitan area, whereas self-inflicted and unintentional injuries were the primary intents in residents in greater Minnesota **(Figure 5).** (The metropolitan counties are Anoka, Hennepin, Carver, Dakota, Ramsey, Scott, and Washington.)

Assaults/homicide. The age-adjusted rates (per 100,000 people) of firearm assaults and/or homicide were 8.8 in the metropolitan area and 1.9 in greater Minnesota.

Suicide/self-inflicted injuries. The rates (per 100,000 people) were 7.3 in greater Minnesota and 4.2 in the metropolitan area.

Unintentional injuries. The rates (per 100,000 people) were 4.1 in greater Minnesota and 2.5 in the metropolitan area.

Race[1]

The annualized, age-adjusted rate (per 100,000 people) of fatal and nonfatal FRI among Minnesota whites was 8.9 in 1998-2001. Rates were seven times higher in African-Americans (63.3), three times higher in American Indians (29.4) and one-and-a-half times greater among Asians (12.9). Minnesota's African-American youth bore the greatest burden of FRI; those aged 34 years or younger accounted for 67% of all the injuries and deaths sustained by all African-Americans between 1998 and 2001.

Socioeconomic status

Using community median household income as a proxy for socioeconomic status, communities with lower median incomes experienced higher rates of firearm related injuries.

Figure 3.

Nonfatal Firearm-Related Injury By Intent: Minnesota, 1998-2001

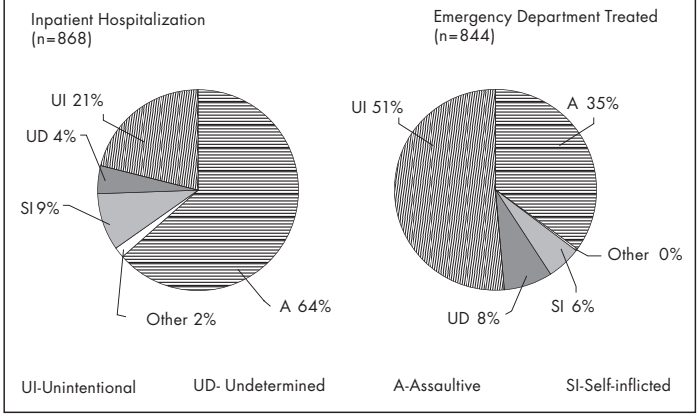


Figure 4.

Firearm-Related Injury 15-24 yr old vs All Ages*: Minnesota

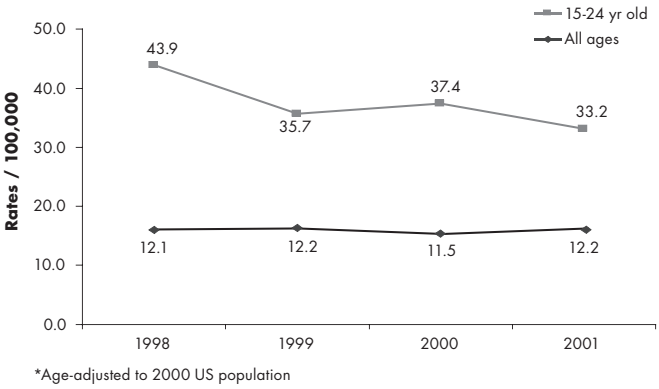


Figure 5.

Firearm-Related Injury by Residence and Intent: Minnesota, 1998-2001

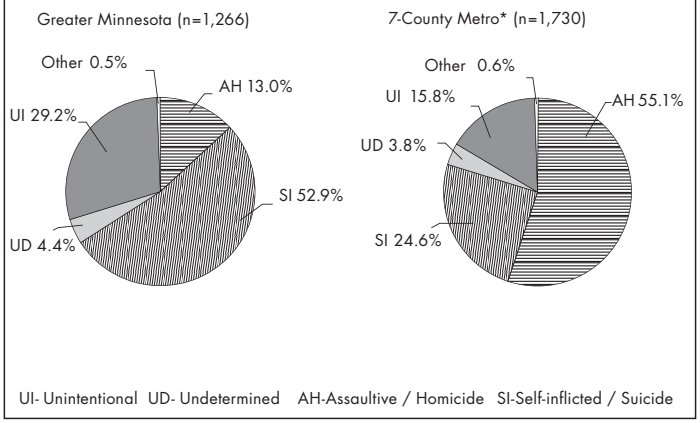
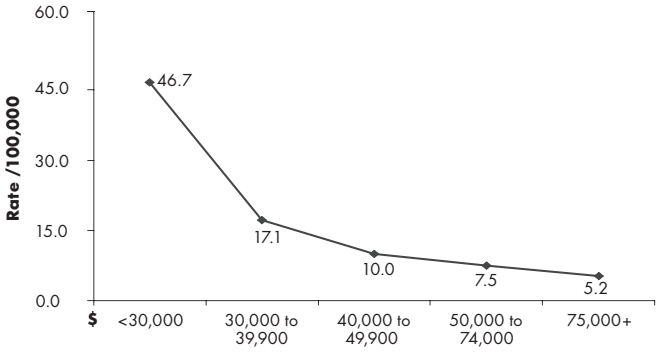


Figure 6.

Firearm-Related Injury Rate by Median Community Income: Minnesota, 1998-2001



Note: Rates are age-adjusted to the US 2000 population

The age-adjusted rates (per 100,000 people) for all cases of FRI were 46.7 in communities with a median annual income less than $30,000, versus 5.2 in communities with a median annual income at or above $75,000 **(Figure 6)**.

[1] There were limited data on racial background; rates may have been under-estimated for Asians and American Indians.

How much did hospital care cost?[2]

Between 1998 and 2001, the median hospital charges for firearm-related injury were $14,569 for inpatient care and $730 for outpatient care. Within this period, hospital charges for nonfatal firearm-related injuries rose from $4.5 million to $7 million. This increase was primarily due to inpatient charges, which steadily increased from about $2.8 million in 1998 to nearly $6.7 million in 2001 **(Table 1)**. Outpatient charges dropped from $1.7 million to about $300,000. The length of stay for inpatient hospitalizations ranged between 38 and 371 days. About 34% of hospitalizations were self-pay, 27% were Medicaid, 4% were Medicare, and 34% were commercial health insurance or government insurance (other than Medicaid or Medicare).

Table 1.

Hospital charges and length of stay for Firearm-Related Injury, Minnesota 1998-2001

Year	Hospital Care	Number	Total Charge* ($)	Median Charge($)	Median LOS**(days)
1998	Inpatient	176	2,787,487	12,116	3
	Outpatient	289	1,670,458	712	
1999	Inpatient	218	4,157,944	11,823	4
	Outpatient	214	214,779	491	
2000	Inpatient	241	5,862,406	16,793	4
	Outpatient	151	240,440	839	
2001	Inpatient	233	6,747,059	16,892	3
	Outpatient	190	321,260	909	

*Did not include fatal injuries.

** Hospital length of stay.

Data sources and methodology

Fatal and nonfatal FRI were identified using International Classification of Diseases codes.[3] Hospital-treated FRI data were obtained from the Universal Billing dataset aggregated by the Minnesota Hospital Association (MHA), and from the Minnesota Trauma Data Bank (MTDB) at the Minnesota Department of Health (MDH). MHA receives data from about 95% (98% of hospitalizations) of hospitals in Minnesota. The MTDB includes information on injuries reported by hospitals and trauma centers and information abstracted from hospital medical records. FRI death data were obtained from Certificates of Death at the MDH. Between 1998 and 2001, there were 1,811 FRI cases in the MHA dataset, 1,892 FRI cases in the MTDB, and 1,284 Certificates of Death listed as firearm related.

Initial data management involved eliminating duplicate cases from the databases, as well as hospital fatalities (n = 147) and false positive injuries (n = 40) from air guns or "BB guns," pistol whippings, or injuries not resulting directly from a fired projectile. Data linkage techniques were used to identify cases of nonfatal FRI (n = 1,507) used in this analysis. The linkage was done hierarchically, using a combination of dataset variables such as: date of discharge, Medicare Provider Number and Hospital Medical Record Number (n = 1,379); gender, date of discharge and date of birth (n = 59); date of discharge only (n = 36); and date of birth only (n = 33). The 205 records that remained unlinked in the MTDB were added to the linked 1,507 records to comprise the 1,721 hospital-treated, nonfatal cases of FRI. The unlinked MHA records (n = 172) were deleted. The retained MTDB records were a combination of abstracted hospital records, and cases that were reported directly to the MDH by non-MHA hospitals. Thus, these were deemed true positive cases of FRI. In contrast, the deleted MHA records were probable cases of FRI, which could not be ascertained at the time of analysis. Rates were age-adjusted to the 2000 US population where applicable.

[2] Hospital fatalities are not included

[3] International Classification of Diseases, 9th –CM-Revision, Codes (FRI codes): E922.0, E922.1, E922.2, E922.3, E922.8, E922.9, E955.0, E955.1, E955.2, E955.3, E955.4, E965.0, E965.1, E965.2, E965.3, E965.4, E970, E985.0, E985.1, E985.2, E985.3, E985.4, E991.0, E991.1, E991.2. International Classification of Diseases, 10th Revision, Codes (FRI codes): W32, W33 W34, X72, X73, X74, X93, X94, X95, Y22, Y23, Y24, Y35.0.

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Firearm-Related Injury Data Brief 1998 to 2001, was prepared by the Injury and Violence Prevention Unit at the Minnesota Department of Health.

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COUNTY	YEAR					Annualized rate per 100,000
	1998	1999	2000	2001	Total	
Aitkin	5	3	2	3	13	
Anoka	18	14	11	22	65	5.5
Becker	2	9	5	6	22	18.4
Beltrami	11	14	10	11	46	29.1
Benton	2	2	1	3	8	
Big Stone	0	0	1	1	2	
Blue Earth	4	4	2	9	19	
Brown	4	3	1	3	11	
Carlton	5	4	2	4	15	
Carver	5	5	5	10	25	9.1
Cass	3	5	8	10	26	24.0
Chippewa	3	3	2	6	14	
Chisago	3	5	4	0	12	
Clay	2	3	2	2	9	
Clearwater	1	3	2	1	7	
Cook	0	0	1	2	3	
Cottonwood	0	2	1	0	3	
Crow Wing	7	3	12	8	30	13.9
Dakota	21	9	20	19	69	4.9
Dodge	0	2	4	1	7	
Douglas	7	6	1	2	16	
Faribault	2	3	5	1	11	
Fillmore	2	5	3	1	11	
Freeborn	5	4	4	4	17	
Goodhue	1	9	1	4	15	
Grant	0	0	0	1	1	
Hennepin	293	255	260	241	1,049	24.0
Houston	1	1	0	0	2	
Hubbard	6	6	5	7	24	33.9
Isanti	3	10	4	7	24	19.3
Itasca	11	6	7	11	35	19.9
Jackson	1	0	0	4	5	
Kanabec	1	2	2	3	8	
Kandiyohi	4	3	7	3	17	
Kittson	1	2	1	3	7	
Koochiching	0	1	1	1	3	
Lac Qui Parle	2	0	2	0	4	
Lake	3	2	0	6	11	
Lake Of The Woods	0	2	0	3	5	
Le Sueur	1	7	5	2	15	
Lincoln	0	0	1	0	1	
Lyon	1	4	0	4	9	
Mcleod	2	1	0	1	4	
Mahnomen	0	0	1	0	1	
Marshall	5	3	3	0	11	
Martin	7	5	0	4	16	
Meeker	5	4	5	1	15	
Mille Lacs	3	2	2	10	17	
Morrison	5	4	4	3	16	
Mower	18	16	8	24	66	43.6
Murray	1	0	1	1	3	

COUNTY	YEAR					Annualized rate per 100,000
	1998	1999	2000	2001	Total	
Nicollet	4	2	0	2	8	
Nobles	3	2	1	0	6	
Norman	0	1	1	0	2	
Olmsted	15	15	3	11	44	9.0
Otter Tail	6	9	5	10	30	13.3
Pennington	1	2	1	3	7	
Pine	3	8	6	4	21	20.6
Pipestone	1	0	2	0	3	
Polk	2	9	7	4	22	17.7
Pope	0	4	3	1	8	
Ramsey	119	89	109	110	427	21.4
Red Lake	0	1	1	0	2	
Redwood	2	2	3	3	10	
Renville	9	1	2	2	14	
Rice	2	12	4	7	25	11.2
Rock	0	0	1	3	4	
Roseau	3	2	1	1	7	
Scott	7	7	12	10	36	13.4
Sherburne	14	1	5	7	27	14.0
Sibley	0	0	2	0	2	
St. Louis	30	39	30	25	124	5.0
Stearns	11	20	23	10	64	12.2
Steele	1	5	2	1	9	
Stevens	1	1	0	0	2	
Swift	2	0	0	0	2	
Todd	1	3	11	2	17	
Traverse	2	1	0	0	3	
Wabasha	1	0	0	2	3	
Wadena	2	2	1	2	7	
Waseca	0	2	3	2	7	
Washington	11	13	14	10	48	6.0
Watonwan	2	4	1	1	8	
Wilkin	0	1	4	3	8	
Winona	7	3	5	8	23	11.7
Wright	7	9	9	8	33	9.2
Yellow Medicine	3	0	5	4	12	
Unknown County					76	N/A
Minnesota	**784**	**745**	**720**	**747**	**2,884**	**15.3**
7-county metro area**	**474**	**392**	**430**	**434**	**1,730**	**15.4**
Greater Minnesota	**310**	**353**	**290**	**313**	**1,266**	**13.9**

*Rates are not calculated where FRI totals are less than 20 cases.
** Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties.