

TBI: Mortality and Nonfatal Hospitalization

Data Analysis Report

Minnesota 2007

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Text Overview

Background: Minnesota is one of only four states funded by the CDC to conduct surveillance of traumatic brain injury (TBI) mortality and hospitalization for the 2005-2010 data period.

Methods: Electronic, centralized discharge data from death certificates, the Minnesota TBI/Trauma Registry and the Minnesota Hospital Association were analyzed using the CDC's TBI case definition. Analysis for this report was limited to Minnesota residents.

Results: In 2007, there were 852 TBI deaths, an adjusted rate of 15.7 per 100,000 population. This rate is similar to those of the previous three years. The number of nonfatal hospitalized (NH) TBIs in 2007 was 5,022, yielding an adjusted rate of 94.5 per 100,000 population. The data show a stable rate for TBI mortality across recent years and an increasing trend for TBI-NH. Comparison with 1993-1997 is difficult because of changes in case identification methods.

The TBI mortality data show a bi-modal curve, with peaks among adolescents/young adults and the elderly. The TBI-NH data show a tri-modal curve, with peaks among the infants, adolescents/young adults, and the elderly. Both the TBI mortality and TBI-NH peaks occur in older adults, with the highest rates among persons age 85 and above (107.8 per 100,000 population for mortality and 505.4 per 100,000 population for TBI-NH). The TBI mortality and TBI-NH rates for males were consistently higher than those for females, with male rates among infants and adolescents/young adults approximately twice that of the female rates. Male TBI mortality rates were approximately four times that of the female rates for elders 80-84 and male TBI-NH rates were about three times higher than female rates for young adults age 20-24. Some age- and gender-specific TBI mortality rates were not calculated due to small numbers.

The leading causes of TBI mortality were unintentional falls, firearms, especially self-inflicted, and motor vehicle traffic (MVT). The leading causes of TBI-NH were unintentional falls, MVT, and assault. TBI deaths from firearms were concentrated around middle-aged adults, while MVT fatalities were most prevalent in teens and young adults and unintentional fall deaths most often occurred in older adults. For TBI-NH, unintentional fall rates showed a bi-modal curve with the highest rates among older adults 65 years and above with a smaller peak in infants age < 1. MVT and assault TBI-NH rates were highest for adolescents/young adults, ages 15-24 for MVT and for assault.

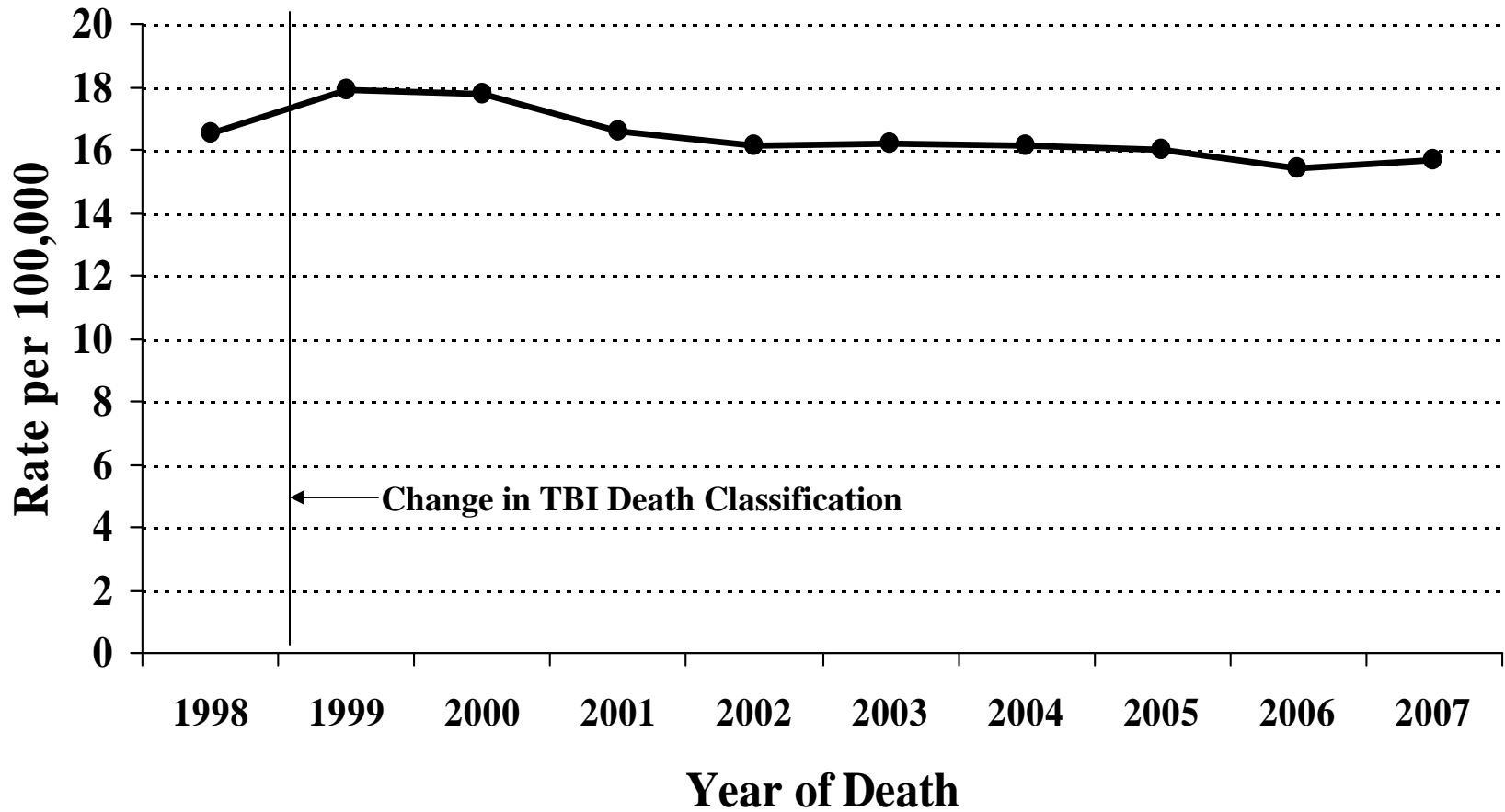
Discussion: Data in this report show the importance of TBI as a public health problem. Population-based information regarding TBI deaths and hospitalizations can be useful in assessing the effect of prevention efforts. Additionally, abstracted data will yield important information on demographic features (e.g., race/ethnicity), modifiable risk factors (e.g., alcohol use), and circumstances at time of injury (e.g., specific activity in which the individual was engaged at time of injury) that in turn can be used to guide intervention activities.

Table 1: TBI Mortality Number and Rate by Gender, Age Group, and Leading Causes, Minnesota 2007

	All causes		Fall,		Firearm				Motor vehicle traffic			
	total		unintentional		Total		Self-inflicted		Total		Occupant	
Total	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	852	15.7	270	4.8	227	4.3	193	3.6	226	4.3	145	2.8
<1	1	.	0	.	0	.	0	.	0	.	0	.
1-4	6	.	0	.	0	.	0	.	4	.	4	.
5-9	4	.	0	.	0	.	0	.	3	.	0	.
10-14	9	.	0	.	2	.	1	.	4	.	4	.
15-19	47	12.7	1	.	16	.	10	.	28	7.5	22	5.9
20-24	62	17.2	0	.	24	6.7	18	.	30	8.3	18	.
25-29	45	12.4	2	.	25	6.9	19	.	13	.	12	.
30-34	43	13.2	1	.	20	6.2	17	.	17	.	11	.
35-39	40	11.3	2	.	18	.	15	.	16	.	12	.
40-44	49	12.6	7	.	19	.	19	.	15	.	10	.
45-49	47	11.1	8	.	14	.	13	.	15	.	4	.
50-54	56	14.7	9	.	23	6.1	23	6.1	11	.	7	.
55-59	77	24.2	18	.	23	7.2	19	.	25	7.9	10	.
60-64	46	19.0	12	.	12	.	10	.	9	.	4	.
65-69	34	19.2	16	.	5	.	5	.	9	.	6	.
70-74	39	28.0	20	14.4	7	.	7	.	8	.	6	.
75-79	48	40.3	27	22.7	5	.	5	.	8	.	6	.
80-84	86	89.9	59	61.6	10	.	9	.	6	.	5	.
85+	113	107.8	88	83.9	4	.	3	.	5	.	4	.
Male												
All Ages	627	25.1	174	7.7	203	7.8	179	6.9	156	6.0	89	3.5
<1	1	.	0	.	0	.	0	.	0	.	0	.
1-4	1	.	0	.	0	.	0	.	1	.	1	.
5-9	4	.	0	.	0	.	0	.	3	.	0	.
10-14	3	.	0	.	1	.	1	.	1	.	1	.
15-19	30	15.8	1	.	12	.	8	.	15	.	13	.
20-24	55	30.0	0	.	23	12.5	17	.	25	13.6	15	.
25-29	40	21.2	2	.	23	12.2	17	.	10	.	9	.
30-34	34	20.5	1	.	18	.	16	.	13	.	9	.
35-39	33	18.3	2	.	18	.	15	.	9	.	5	.
40-44	40	20.4	6	.	18	.	18	.	9	.	4	.
45-49	33	15.5	7	.	10	.	10	.	8	.	0	.
50-54	43	22.4	5	.	22	11.5	22	11.5	8	.	4	.
55-59	66	41.5	13	.	21	13.2	19	.	22	13.8	8	.
60-64	36	30.3	9	.	9	.	8	.	6	.	2	.
65-69	23	27.1	9	.	5	.	5	.	7	.	4	.
70-74	29	45.2	14	.	6	.	6	.	7	.	5	.
75-79	35	67.7	19	.	5	.	5	.	5	.	3	.
80-84	61	161.4	42	111.1	9	.	9	.	5	.	4	.
85+	60	185.5	44	136.1	3	.	3	.	2	.	2	.
Female												
All Ages	225	7.5	96	2.8	24	0.9	14	.	70	2.7	56	2.2
<1	0	.	0	.	0	.	0	.	0	.	0	.
1-4	5	.	0	.	0	.	0	.	3	.	3	.
5-9	0	.	0	.	0	.	0	.	0	.	0	.
10-14	6	.	0	.	1	.	0	.	3	.	3	.
15-19	17	.	0	.	4	.	2	.	13	.	9	.
20-24	7	.	0	.	1	.	1	.	5	.	3	.
25-29	5	.	0	.	2	.	2	.	3	.	3	.
30-34	9	.	0	.	2	.	1	.	4	.	2	.
35-39	7	.	0	.	0	.	0	.	7	.	7	.
40-44	9	.	1	.	1	.	1	.	6	.	6	.
45-49	14	.	1	.	4	.	3	.	7	.	4	.
50-54	13	.	4	.	1	.	1	.	3	.	3	.
55-59	11	.	5	.	2	.	0	.	3	.	2	.
60-64	10	.	3	.	3	.	2	.	3	.	2	.
65-69	11	.	7	.	0	.	0	.	2	.	2	.
70-74	10	.	6	.	1	.	1	.	1	.	1	.
75-79	13	.	8	.	0	.	0	.	3	.	3	.
80-84	25	43.2	17	.	1	.	0	.	1	.	1	.
85+	53	73.1	44	60.7	1	.	0	.	3	.	2	.

Rates are per 100,000 population. Total rates are age-adjusted to the U.S. 2000 standard population.

Figure 1: TBI Mortality Rate by Year Minnesota 1998-2007



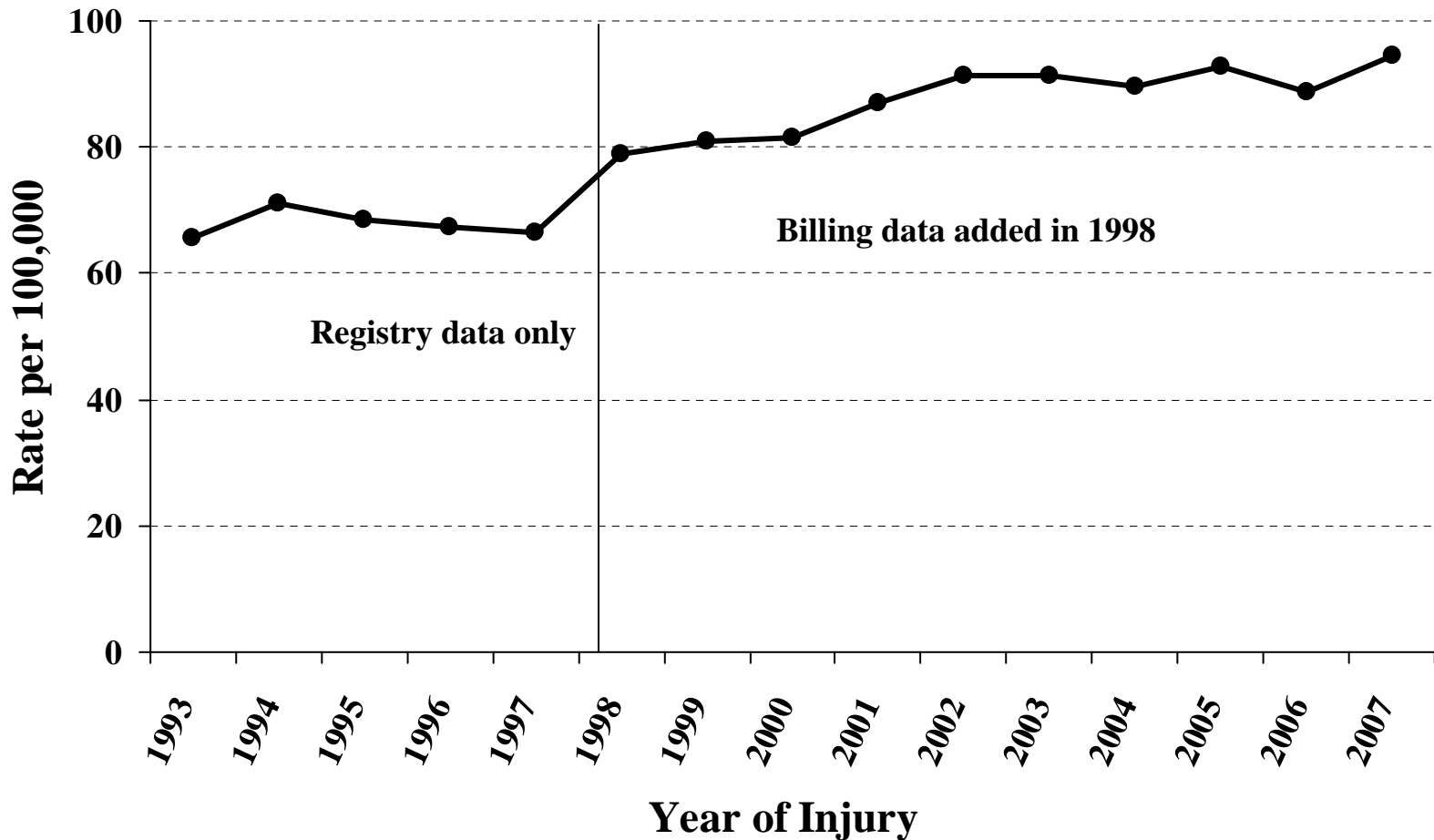
Rates are age-adjusted to the U.S. 2000 standard population.

Table 2: Nonfatal Hospitalized TBI Number and Rate by Gender, Age Group, and Leading Causes, Minnesota 2007

Total	All causes		Fall, unintentional		Motor vehicle traffic				Assault			
	total		unintentional		Total		Occupant		Total		Struck by or against	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	5,022	94.5	2,269	41.9	1,367	26.1	954	18.3	362	6.9	236	4.5
<1	96	130.3	56	76.0	4	.	4	.	26	35.3	0	.
1-4	134	47.8	81	28.9	13	.	8	.	7	.	0	.
5-9	118	35.3	38	11.4	35	10.5	18	.	0	.	0	.
10-14	172	49.6	39	11.3	37	10.7	20	5.8	5	.	4	.
15-19	444	119.5	55	14.8	234	63.0	199	53.5	51	13.7	37	10.0
20-24	360	99.8	36	10.0	172	47.7	137	38.0	69	19.1	52	14.4
25-29	289	79.9	44	12.2	120	33.2	88	24.3	42	11.6	24	6.6
30-34	201	61.8	48	14.8	86	26.4	57	17.5	27	8.3	19	.
35-39	244	68.8	52	14.7	103	29.0	66	18.6	29	8.2	24	6.8
40-44	256	66.0	85	21.9	92	23.7	56	14.4	29	7.5	21	5.4
45-49	325	76.8	98	23.1	118	27.9	70	16.5	36	8.5	29	6.9
50-54	306	80.5	130	34.2	90	23.7	49	12.9	24	6.3	15	.
55-59	273	85.8	130	40.9	83	26.1	44	13.8	7	.	5	.
60-64	216	89.3	135	55.8	38	15.7	28	11.6	2	.	0	.
65-69	187	105.4	115	64.8	35	19.7	25	14.1	2	.	1	.
70-74	237	170.4	167	120.0	36	25.9	28	20.1	4	.	4	.
75-79	294	247.0	225	189.0	34	28.6	27	22.7	1	.	1	.
80-84	340	355.2	287	299.9	19	.	15	.	1	.	0	.
85+	530	505.4	448	427.2	18	.	15	.	0	.	0	.
Male	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	3,028	119.7	1,150	47.6	880	33.6	573	21.9	310	11.7	212	8.1
<1	61	162.8	35	93.4	1	.	1	.	19	.	0	.
1-4	78	54.3	47	32.7	7	.	4	.	5	.	0	.
5-9	77	45.0	23	13.4	20	11.7	10	.	0	.	0	.
10-14	121	68.0	27	15.2	22	12.4	12	.	4	.	4	.
15-19	303	159.7	39	20.6	139	73.2	116	61.1	45	23.7	34	17.9
20-24	264	144.0	25	13.6	115	62.7	92	50.2	57	31.1	45	24.5
25-29	213	113.0	35	18.6	81	43.0	55	29.2	32	17.0	19	.
30-34	151	91.1	34	20.5	64	38.6	38	22.9	25	15.1	19	.
35-39	173	95.9	39	21.6	70	38.8	37	20.5	26	14.4	22	12.2
40-44	183	93.4	56	28.6	67	34.2	38	19.4	27	13.8	19	.
45-49	230	107.7	62	29.0	80	37.5	44	20.6	34	15.9	27	12.7
50-54	195	101.6	82	42.7	56	29.2	28	14.6	21	10.9	13	.
55-59	175	110.1	79	49.7	55	34.6	24	15.1	6	.	5	.
60-64	129	108.6	75	63.1	27	22.7	19	.	2	.	0	.
65-69	103	121.1	53	62.3	26	30.6	18	.	2	.	1	.
70-74	120	186.9	77	119.9	19	.	12	.	3	.	3	.
75-79	139	269.0	106	205.1	13	.	10	.	1	.	1	.
80-84	152	402.1	123	325.4	11	.	9	.	1	.	0	.
85+	161	497.8	133	411.2	7	.	6	.	0	.	0	.
Female	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	1,994	68.9	1,119	36.2	487	18.6	381	14.6	52	2.0	24	0.9
<1	35	96.7	21	58.0	3	.	3	.	7	.	0	.
1-4	56	41.0	34	24.9	6	.	4	.	2	.	0	.
5-9	41	25.1	15	.	15	.	8	.	0	.	0	.
10-14	51	30.2	12	.	15	.	8	.	1	.	0	.
15-19	141	77.5	16	.	95	52.2	83	45.6	6	.	3	.
20-24	96	54.1	11	.	57	32.1	45	25.4	12	.	7	.
25-29	76	43.9	9	.	39	22.5	33	19.1	10	.	5	.
30-34	50	31.3	14	.	22	13.8	19	.	2	.	0	.
35-39	71	40.7	13	.	33	18.9	29	16.6	3	.	2	.
40-44	73	38.0	29	15.1	25	13.0	18	.	2	.	2	.
45-49	95	45.3	36	17.2	38	18.1	26	12.4	2	.	2	.
50-54	111	59.0	48	25.5	34	18.1	21	11.2	3	.	2	.
55-59	98	61.5	51	32.0	28	17.6	20	12.6	1	.	0	.
60-64	87	70.7	60	48.7	11	.	9	.	0	.	0	.
65-69	84	90.9	62	67.1	9	.	7	.	0	.	0	.
70-74	117	156.2	90	120.1	17	.	16	.	1	.	1	.
75-79	155	230.2	119	176.7	21	31.2	17	.	0	.	0	.
80-84	188	324.6	164	283.2	8	.	6	.	0	.	0	.
85+	369	508.8	315	434.4	11	.	9	.	0	.	0	.

Rates are per 100,000 population. Total rates are age-adjusted to the U.S. 2000 standard population.

Figure 2: Nonfatal Hospitalized TBI Rate by Year Minnesota 1993-2007



Rates are age-adjusted to the U.S. 2000 standard population.