

TBI: Mortality and Nonfatal Hospitalization

Data Analysis Report

Minnesota 2008

Prepared by:

**Anna Gaichas, MS
Leslie Seymour, MD MPH
Jon Roesler, MS
Ayo Adeniyi, MPH MBBS
Mark Kinde, MPH**

**Minnesota Department of Health
St. Paul, Minnesota**

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Table of Contents

Text Overview.....	1
Table 1: TBI Mortality Number and Rate by Gender, Age Group, and Leading Causes, Minnesota 2008.....	2
Figure 1: TBI Mortality Rate by Year, Minnesota 1998-2008.....	3
Table 2: Nonfatal Hospitalized TBI Number and Rate by Gender, Age Group, and Leading Causes, Minnesota 2008...	4
Figure 2: Nonfatal Hospitalized TBI Rate by Year, Minnesota 1993-2008.....	5

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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 2008, there were 830 TBI deaths, an adjusted rate of 15.1 per 100,000 population. The number of nonfatal hospitalized (NH) TBIs in 2008 was 4,607, yielding an adjusted rate of 86.1 per 100,000 population. The data show a slight decrease in the rate of TBI mortality across recent years and a notable decrease in the rate of TBI-NH tempering the increasing trend seen in previous years. 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 (120.7 per 100,000 population for mortality and 446.4 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 2.5 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 20-39. 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.

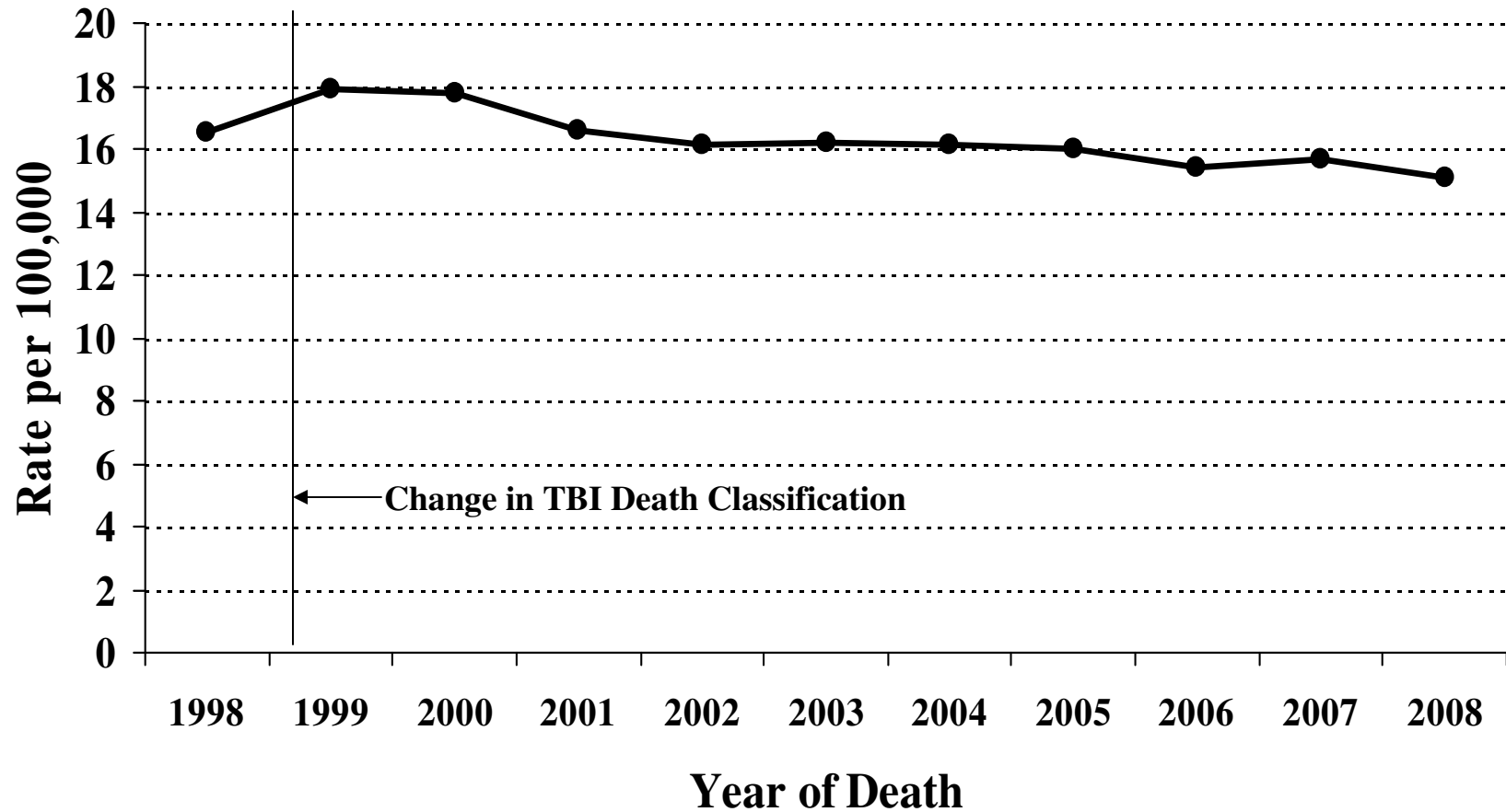
Discussion: Data in this report show the importance of TBI as a public health problem. Population-based information regarding TBI deaths and hospitalizations can be useful in assessing the effect of prevention efforts. Additionally, abstracted data will yield important information on demographic features (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 2008

Total	All causes		Fall,		Firearm				Motor vehicle traffic			
	total		unintentional		Total		Self-inflicted		Total		Occupant	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	830	15.1	278	4.8	256	4.8	231	4.4	180	3.4	115	2.2
<1	4	.	0	.	0	.	0	.	4	.	4	.
1-4	14	.	1	.	1	.	0	.	5	.	4	.
5-9	4	.	0	.	0	.	0	.	4	.	2	.
10-14	3	.	1	.	0	.	0	.	2	.	1	.
15-19	29	7.9	0	.	15	.	9	.	11	.	9	.
20-24	56	15.6	1	.	25	7.0	22	6.1	25	7.0	20	5.6
25-29	50	13.6	1	.	24	6.5	20	5.4	22	6.0	11	.
30-34	43	13.1	1	.	19	.	14	.	16	.	9	.
35-39	50	14.4	4	.	29	8.4	29	8.4	10	.	8	.
40-44	52	13.9	7	.	26	7.0	25	6.7	8	.	1	.
45-49	55	13.0	6	.	24	5.7	24	5.7	14	.	10	.
50-54	58	14.9	13	.	28	7.2	27	6.9	7	.	4	.
55-59	52	15.9	12	.	18	.	16	.	11	.	8	.
60-64	56	22.2	17	.	14	.	14	.	13	.	7	.
65-69	29	15.4	12	.	7	.	7	.	6	.	2	.
70-74	34	24.0	20	14.1	8	.	7	.	4	.	3	.
75-79	40	33.9	24	20.4	4	.	4	.	7	.	4	.
80-84	72	75.3	56	58.6	6	.	6	.	5	.	3	.
85+	129	120.7	102	95.5	8	.	7	.	6	.	5	.
Male												
All Ages	594	23.4	156	6.8	228	8.7	209	8.0	126	4.8	75	2.9
<1	2	.	0	.	0	.	0	.	2	.	2	.
1-4	7	.	0	.	1	.	0	.	2	.	1	.
5-9	3	.	0	.	0	.	0	.	3	.	1	.
10-14	3	.	1	.	0	.	0	.	2	.	1	.
15-19	21	11.2	0	.	13	.	9	.	6	.	4	.
20-24	45	24.7	1	.	23	12.6	20	11.0	16	.	13	.
25-29	46	24.0	0	.	22	11.5	18	.	21	11.0	10	.
30-34	37	22.1	1	.	17	.	13	.	13	.	8	.
35-39	39	22.1	3	.	25	14.1	25	14.1	7	.	5	.
40-44	42	22.3	6	.	22	11.7	22	11.7	6	.	1	.
45-49	43	20.2	5	.	20	9.4	20	9.4	9	.	7	.
50-54	42	21.4	5	.	25	12.7	24	12.2	4	.	2	.
55-59	42	25.6	10	.	16	.	16	.	7	.	5	.
60-64	48	38.9	13	.	13	.	13	.	11	.	5	.
65-69	23	25.5	9	.	7	.	7	.	3	.	0	.
70-74	29	44.1	17	.	7	.	6	.	4	.	3	.
75-79	20	38.9	11	.	4	.	4	.	3	.	2	.
80-84	45	118.9	32	84.6	6	.	6	.	4	.	3	.
85+	57	171.0	42	126.0	7	.	6	.	3	.	2	.
Female												
All Ages	236	7.6	122	3.4	28	1.1	22	0.8	54	2.0	40	1.5
<1	2	.	0	.	0	.	0	.	2	.	2	.
1-4	7	.	1	.	0	.	0	.	3	.	3	.
5-9	1	.	0	.	0	.	0	.	1	.	1	.
10-14	0	.	0	.	0	.	0	.	0	.	0	.
15-19	8	.	0	.	2	.	0	.	5	.	5	.
20-24	11	.	0	.	2	.	2	.	9	.	7	.
25-29	4	.	1	.	2	.	2	.	1	.	1	.
30-34	6	.	0	.	2	.	1	.	3	.	1	.
35-39	11	.	1	.	4	.	4	.	3	.	3	.
40-44	10	.	1	.	4	.	3	.	2	.	0	.
45-49	12	.	1	.	4	.	4	.	5	.	3	.
50-54	16	.	8	.	3	.	3	.	3	.	2	.
55-59	10	.	2	.	2	.	0	.	4	.	3	.
60-64	8	.	4	.	1	.	1	.	2	.	2	.
65-69	6	.	3	.	0	.	0	.	3	.	2	.
70-74	5	.	3	.	1	.	1	.	0	.	0	.
75-79	20	30.1	13	.	0	.	0	.	4	.	2	.
80-84	27	46.8	24	41.6	0	.	0	.	1	.	0	.
85+	72	97.9	60	81.6	1	.	1	.	3	.	3	.

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 1998-2008



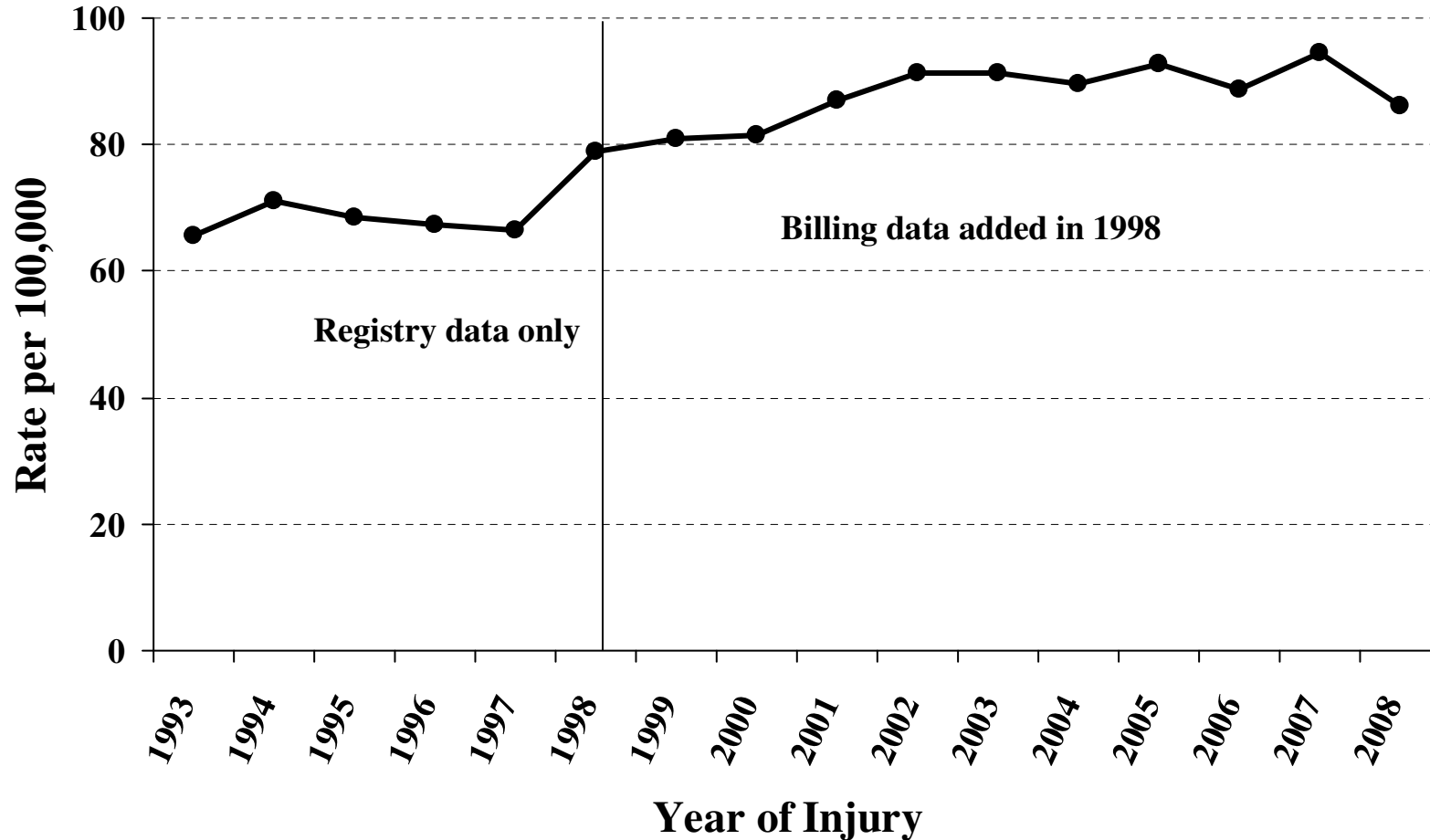
Rates are age-adjusted to the U.S. 2000 standard population.

Table 2: Nonfatal Hospitalized TBI Number and Rate by Gender, Age Group, and Leading Causes, Minnesota 2008

Total	All causes		Fall, unintentional		Motor vehicle traffic				Assault			
	total				Total		Occupant		Total		Struck by or against	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	4,607	86.1	2,241	41.2	1,204	22.9	862	16.4	328	6.3	226	4.3
<1	67	92.6	45	62.2	1	.	1	.	12	.	0	.
1-4	105	36.7	70	24.5	13	.	10	.	1	.	0	.
5-9	89	26.5	28	8.3	26	7.7	14	.	2	.	0	.
10-14	131	38.4	29	8.5	40	11.7	20	5.9	4	.	2	.
15-19	361	98.4	58	15.8	184	50.2	156	42.5	39	10.6	29	7.9
20-24	371	103.2	69	19.2	168	46.7	128	35.6	55	15.3	42	11.7
25-29	262	71.2	62	16.9	95	25.8	73	19.8	57	15.5	44	12.0
30-34	182	55.4	55	16.8	67	20.4	47	14.3	28	8.5	18	.
35-39	231	66.6	62	17.9	90	26.0	59	17.0	29	8.4	22	6.3
40-44	247	66.2	81	21.7	79	21.2	50	13.4	29	7.8	20	5.4
45-49	303	71.7	108	25.5	107	25.3	71	16.8	33	7.8	22	5.2
50-54	286	73.4	121	31.1	93	23.9	56	14.4	17	.	12	.
55-59	232	70.8	107	32.7	72	22.0	50	15.3	6	.	3	.
60-64	250	99.3	153	60.8	53	21.1	34	13.5	5	.	4	.
65-69	203	107.8	139	73.8	29	15.4	22	11.7	4	.	2	.
70-74	224	157.8	159	112.0	34	24.0	26	18.3	4	.	3	.
75-79	279	236.7	230	195.2	22	18.7	18	.	0	.	0	.
80-84	307	321.2	262	274.1	17	.	16	.	2	.	2	.
85+	477	446.4	403	377.2	14	.	11	.	1	.	1	.
Male	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	2,777	109.2	1,192	48.5	766	29.2	512	19.6	270	10.2	191	7.3
<1	38	102.6	23	62.1	0	.	0	.	9	.	0	.
1-4	61	41.7	42	28.7	9	.	7	.	1	.	0	.
5-9	61	35.5	18	.	19	.	8	.	2	.	0	.
10-14	87	49.7	23	13.1	24	13.7	11	.	3	.	2	.
15-19	235	125.5	40	21.4	104	55.6	85	45.4	32	17.1	25	13.4
20-24	275	150.9	57	31.3	116	63.6	87	47.7	44	24.1	35	19.2
25-29	202	105.4	52	27.1	62	32.3	44	23.0	50	26.1	37	19.3
30-34	133	79.3	37	22.1	48	28.6	33	19.7	23	13.7	15	.
35-39	170	96.2	49	27.7	63	35.6	36	20.4	28	15.8	22	12.4
40-44	160	85.0	56	29.8	46	24.4	28	14.9	18	.	14	.
45-49	212	99.4	72	33.8	71	33.3	46	21.6	27	12.7	18	.
50-54	189	96.2	75	38.2	57	29.0	29	14.8	15	.	11	.
55-59	133	81.0	63	38.4	37	22.5	20	12.2	5	.	2	.
60-64	158	127.9	91	73.7	37	30.0	22	17.8	4	.	3	.
65-69	121	134.1	79	87.6	22	24.4	15	.	3	.	2	.
70-74	108	164.3	71	108.0	18	.	12	.	4	.	3	.
75-79	141	274.2	108	210.0	14	.	12	.	0	.	0	.
80-84	126	333.0	103	272.2	11	.	10	.	1	.	1	.
85+	167	501.1	133	399.1	8	.	7	.	1	.	1	.
Female	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All Ages	1,830	63.3	1,049	34.0	438	16.7	350	13.3	58	2.3	35	1.3
<1	29	82.1	22	62.2	1	.	1	.	3	.	0	.
1-4	44	31.5	28	20.0	4	.	3	.	0	.	0	.
5-9	28	17.1	10	.	7	.	6	.	0	.	0	.
10-14	44	26.5	6	.	16	.	9	.	1	.	0	.
15-19	126	70.1	18	.	80	44.5	71	39.5	7	.	4	.
20-24	96	54.2	12	.	52	29.3	41	23.1	11	.	7	.
25-29	60	34.1	10	.	33	18.7	29	16.5	7	.	7	.
30-34	49	30.5	18	.	19	.	14	.	5	.	3	.
35-39	61	35.9	13	.	27	15.9	23	13.5	1	.	0	.
40-44	87	47.1	25	13.5	33	17.9	22	11.9	11	.	6	.
45-49	91	43.4	36	17.2	36	17.2	25	11.9	6	.	4	.
50-54	97	50.2	46	23.8	36	18.6	27	14.0	2	.	1	.
55-59	99	60.5	44	26.9	35	21.4	30	18.3	1	.	1	.
60-64	92	71.7	62	48.4	16	.	12	.	1	.	1	.
65-69	82	83.7	60	61.2	7	.	7	.	1	.	0	.
70-74	116	152.2	88	115.5	16	.	14	.	0	.	0	.
75-79	138	207.7	122	183.6	8	.	6	.	0	.	0	.
80-84	181	313.4	159	275.3	6	.	6	.	1	.	1	.
85+	310	421.6	270	367.2	6	.	4	.	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 1993-2008



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