SURVEILLANCE REPORT

Traumatic Brain Injury-related Hospitalizations and Deaths by Age Group, Sex, and Mechanism of Injury

UNITED STATES 2016 / 2017

SUPPLEMENTAL TABLE 1

Estimated number and rate* of traumatic brain injury-related (TBI) hospitalizations† and deaths by age group — United States, 2016 and 2017

AGE GROUP (YRS)	YEAR	Hospitalizations†		Deaths	
		NO.	RATE* (95% CI)	NO.	RATE* (95% CI)
0-17	2016	19,530	26.5 (23.3 - 29.7)	2,698	3.7 (3.5 - 3.8)
	2017	17,610	23.9 (21.0 - 26.9)	2,810	3.8 (3.7 - 4.0)
0-4	2016	7,395	37.1 (31.4 - 42.8)	708	3.6 (3.3 - 3.8)
	2017	6,500	32.7 (27.2 - 38.1)	750	3.8 (3.5 - 4.0)
5-9	2016	2,945	14.4 (12.1 - 16.8)	310	1.5 (1.3 - 1.7)
	2017	2,865	14.1 (11.9 - 16.3)	274	1.3 (1.2 - 1.5)
10-14	2016	3,825	18.5 (15.8 - 21.3)	508	2.5 (2.2 - 2.7)
	2017	3,460	16.7 (14.2 - 19.2)	517	2.5 (2.3 - 2.7)
15-24	2016	24,315	55.9 (51.3 - 60.5)	6,919	15.9 (15.5 - 16.3)
	2017	22,015	51.0 (47.0 - 55.0)	7,030	16.3 (15.9 - 16.7)
25-34	2016	23,710	53.0 (48.7 - 57.3)	7,495	16.8 (16.4 - 17.1)
	2017	21,955	48.5 (44.6 - 52.4)	7,557	16.7 (16.3 - 17.1)
35-44	2016	18,445	45.6 (42.0 - 49.1)	6,146	15.2 (14.8 - 15.6)
	2017	17,685	43.4 (40.0 - 46.8)	6,148	15.1 (14.7 - 15.5)
45-54	2016	23,755	55.6 (51.6 - 59.6)	7,072	16.5 (16.2 - 16.9)
	2017	22,640	53.6 (49.8 - 57.4)	7,195	17.0 (16.6 - 17.4)
55-64	2016	28,045	67.7 (63.3 - 72.1)	7,904	19.1 (18.7 - 19.5)
	2017	28,290	67.5 (63.5 - 71.6)	8,175	19.5 (19.1 - 19.9)
65-74	2016	29,990	104.8 (99.2 - 110.4)	6,911	24.2 (23.6 - 24.7)
	2017	30,430	102.7 (97.3 - 108.1)	7,201	24.3 (23.7 - 24.9)
75+	2016	64,610	313.4 (298.5 - 328.4)	15,561	75.5 (74.3 - 76.7)
	2017	67,875	320.8 (305.8 - 335.7)	16,284	77.0 (75.8 - 78.1)
Total§	2016	227,055	70.3 (66.5 - 74.1)	59,540	18.4 (18.3 - 18.6)
	2017	223,720	68.8 (65.2 - 72.4)	61,134	18.8 (18.7 - 19.0)&
Adjusted¶	2016	227,035	65.7 (64.3 - 67.2)	59,534	17.3 (17.1 - 17.4)
	2017	223,715	63.6 (62.3 - 65.0)	61,131	17.5 (17.4 - 17.7)

SOURCES: Healthcare Cost and Utilization Project's National Inpatient Sample and CDC's National Vital Statistics System.

Abbreviations: CI = confidence interval.

*Per 100,000 population.

†In-hospital deaths and patients who transferred from another hospital were excluded.

§Cases with missing age were included. Numbers subject to rounding error.

¶Cases with missing age were excluded. Rates age-adjusted to NCHS 2000 U.S. standard population.

&Rate significantly different compared to 2016, t-tests p-value <0.05.

SURVEILLANCE REPORT

Traumatic Brain Injury-related Deaths by Age Group, Sex, and Mechanism of Injury

UNITED STATES 2018 AND 2019

TABLE 1 – Annual number and rate per 100,000 of traumatic brain injury-related deaths† by selected socio-demographic characteristics — National Vital Statistics System, United States, 2018 and 2019

Socio-Demographic Characteristic		2018 Number	2018 Rate* (95% CI)	2019 Number	2019 Rate* (95% CI)
Age (Years)					
Birth-17		2,493	3.4 (3.3-3.5)	2,476	3.4 (3.3-3.5)
Birth-4		659	3.3 (3.1-3.6)	612	3.1 (2.9-3.4)
5-9		248	1.2 (1.1-1.4)	270	1.3 (1.2-1.5)
10-14		456	2.2 (2.0-2.4)	497	2.4 (2.2-2.6)
15-24		6,688	15.6 (15.2-16.0)	6,417	15.0 (14.7-15.4)
25-34		7,376	16.2 (15.8-16.5)	7,251	15.8 (15.4-16.1)
35-44		6,041	14.7 (14.3-15.0)	6,110	14.7 (14.3-15.0)
45-54		6,780	16.3 (15.9-16.7)	6,536	16.0 (15.6-16.4)
55-64		8,250	19.5 (19.1-20.0)	8,057	19.0 (18.6-19.4)
65-74		7,473	24.5 (24.0-25.1)	7,542	24.0 (23.4-24.5)
75+		16,591	75.7 (74.5-76.8)	17,314	76.7 (75.6-77.8)
Sex					
Male	**Crude§**	44,496	27.7 (27.4-27.9)	44,610	27.6 (27.3-27.9)
	Adjusted¶		26.8 (26.6-27.1)		26.6 (26.4-26.9)
Female	**Crude§**	16,069	9.7 (9.5-9.8)	16,001	9.6 (9.5-9.8)
	Adjusted¶		8.2 (8.1-8.4)		8.1 (8.0-8.2)
Race/Ethnicity**					
White, Non-Hispanic persons	**Crude§**	45,402	22.6 (22.4-22.8)	45,160	22.5 (22.3-22.7)
	Adjusted¶		19.0 (18.8-19.2)		18.7 (18.5-18.9)
Black or African American, Non-Hispanic persons	**Crude§**	6,983	16.3 (15.9-16.7)	7,135	16.5 (16.1-16.9)
	Adjusted¶		16.4 (16.0-16.8)		16.6 (16.2-17.0)
Hispanic persons	**Crude§**	5,761	9.7 (9.4-9.9)	5,937	9.8 (9.6-10.1)
	Adjusted¶		11.1 (10.8-11.4)		11.3 (11.0-11.6)
American Indian or Alaska Native, Non-Hispanic persons	**Crude§**	656	23.9 (22.0-25.7)	611	22.1 (20.3-23.8)
	Adjusted¶		24.5 (22.5-26.4)		23.1 (21.3-25.0)
Asian or Pacific Islander, Non-Hispanic persons	**Crude§**	1,619	8.0 (7.6-8.3)	1,649	7.9 (7.6-8.3)
	Adjusted¶		8.2 (7.8-8.6)		8.0 (7.6-8.4)
U.S. Census Region of Decedent's Residence					
Northeast	**Crude§**	8,306	14.8 (14.5-15.1)	8,092	14.5 (14.1-14.8)
	Adjusted¶		12.8 (12.5-13.1)		12.3 (12.0-12.6)
Midwest	**Crude§**	13,478	19.8 (19.4-20.1)	13,335	19.5 (19.2-19.8)
	Adjusted¶		18.0 (17.7-18.3)		17.7 (17.4-18.0)
South	**Crude§**	25,179	20.2 (20.0-20.5)	25,323	20.2 (19.9-20.4)
	Adjusted¶		19.0 (18.8-19.2)		18.9 (18.6-19.1)
West	**Crude§**	13,602	17.5 (17.2-17.8)	13,861	17.7 (17.4-18.0)
	Adjusted¶		16.4 (16.2-16.7)		16.5 (16.3-16.8)
Total	**Crude§**	60,565	18.5 (18.4-18.7)	60,611	18.5 (18.3-18.6)
	Adjusted¶		17.1 (17.0-17.2)		16.9 (16.8-17.1)

TABLE 1 (cont'd)

Annual number and rate per 100,000 of traumatic brain injury-related deaths† by selected socio-demographic characteristics — National Vital Statistics System, United States, 2018 and 2019

Key Findings

- Nationally 60,565 TBI-related deaths occurred during 2018 and 60,611 during 2019.
- Children from birth to 17 years accounted for approximately 4.1% (data not shown) of TBI-related deaths during both 2018 and 2019.
- Rates of TBI-related deaths per 100,000 population were highest among adults aged ≥75 years (75.7 in 2018 and 76.7 in 2019), those aged 65-74 years (24.5 in 2018 and 24.0 in 2019), and individuals aged 55-64 years (19.5 in 2018 and 19.0 in 2019).
- The age-adjusted rate of TBI-related deaths per 100,000 population in males (26.8 in 2018 and 26.6 in 2019) was more than three times the rate of females (8.2 in 2018 and 8.1 in 2019).
- During 2018 and 2019, American Indian or Alaska Native, Non-Hispanic persons had the highest average annual age-adjusted rate (24.5 per 100,000 population in 2018 and 23.1 in 2019) of TBI-related deaths when compared to other racial and ethnic groups.
- Age-adjusted rates of TBI-related deaths per 100,000 population were highest among persons residing in the South (19.0 in 2018 and 18.9 in 2019), followed by persons residing in the Midwest (18.0 in 2018 and 17.7 in 2019), West (16.4 in 2018 and 16.5 in 2019), and Northeast (12.8 in 2018 and 12.3 in 2019).

Abbreviations: CI = confidence interval

§Deaths with missing age were included.

¶Deaths with missing age were excluded (3 deaths in 2018 and 5 deaths in 2019). Rates were age-adjusted by the direct method to the 2000 U.S. Census population.

**Deaths in persons with an unknown Hispanic origin were excluded from the distribution by race/ethnicity (144 deaths in 2018 and 119 deaths in 2019).

TABLE 2 – Average annual number and rate per 100,000 of traumatic brain injury-related deaths[†] by age group and mechanism of injury — United States, 2018 and 2019

AGE GROUP (YRS)	Unintentional Motor Vehicle Traffic Crash		Unintentional Falls[§]		Unintentionally Struck by or Against an Object		Other or Unspecified Unintentional Injury		Suicide[¶]		Homicide		Other[**]	
	NO.	RATE (95% CI)	NO.	RATE (95% CI)	NO.	RATE (95% CI)	NO.	RATE (95% CI)	NO.	RATE (95% CI)	NO.	RATE (95% CI)	NO.	RATE (95% CI)
Birth-17	755	1.0 (1.0-1.1)	37	0.1 (0.0-0.1)	28	0.0 (0.0-0.0)	258	0.4 (0.3-0.4)	¶	¶	662	0.9 (0.9-1.0)	75	0.1 (0.1-0.1)
Birth-4	166	0.8 (0.8-0.9)	17	0.1 (0.1-0.1)	12	0.1 (0.0-0.1)	111	0.6 (0.5-0.6)	¶	¶	292	1.5 (1.4-1.6)	39	0.2 (0.2-0.2)
5-9	135	0.7 (0.6-0.7)	††	††	††	††	37	0.2 (0.1-0.2)	¶	¶	64	0.3 (0.3-0.4)	††	††
10-14	139	0.7 (0.6-0.7)	††	††	††	††	50	0.2 (0.2-0.3)	183	0.9 (0.8-1.0)	85	0.4 (0.3-0.5)	12	0.1 (0.0-0.1)
15-24	1,996	4.7 (4.5-4.8)	88	0.2 (0.2-0.2)	17	0.0 (0.0-0.1)	270	0.6 (0.6-0.7)	2,784	6.5 (6.3-6.7)	1,290	3.0 (2.9-3.1)	108	0.3 (0.2-0.3)
25-34	1,978	4.3 (4.2-4.5)	185	0.4 (0.4-0.4)	39	0.1 (0.1-0.1)	346	0.8 (0.7-0.8)	3,288	7.2 (7.0-7.4)	1,330	2.9 (2.8-3.0)	149	0.3 (0.3-0.4)
35-44	1,390	3.4 (3.2-3.5)	329	0.8 (0.7-0.9)	38	0.1 (0.1-0.1)	334	0.8 (0.7-0.9)	2,933	7.1 (6.9-7.3)	925	2.2 (2.1-2.3)	128	0.3 (0.3-0.3)
45-54	1,396	3.4 (3.3-3.5)	741	1.8 (1.7-1.9)	49	0.1 (0.1-0.1)	482	1.2 (1.1-1.2)	3,219	7.8 (7.6-8.0)	635	1.5 (1.5-1.6)	136	0.3 (0.3-0.4)
55-64	1,370	3.2 (3.1-3.4)	1,706	4.0 (3.9-4.2)	59	0.1 (0.1-0.2)	667	1.6 (1.5-1.7)	3,687	8.7 (8.5-8.9)	529	1.2 (1.2-1.3)	137	0.3 (0.3-0.4)
65-74	884	2.9 (2.7-3.0)	2,945	9.5 (9.3-9.8)	51	0.2 (0.1-0.2)	583	1.9 (1.8-2.0)	2,688	8.7 (8.4-8.9)	283	0.9 (0.8-1.0)	76	0.2 (0.2-0.3)
75+	838	3.8 (3.6-3.9)	12,076	54.3 (53.6-55.0)	50	0.2 (0.2-0.3)	1,043	4.7 (4.5-4.9)	2,705	12.2 (11.8-12.5)	171	0.8 (0.7-0.9)	71	0.3 (0.3-0.4)
Total[§§]	10,291	3.1 (3.1-3.2)	18,098	5.5 (5.5-5.6)	329	0.1 (0.1-0.1)	3,920	1.2 (1.2-1.2)	21,486	7.5 (7.4 - 7.5)	5,603	1.7 (1.7-1.7)	863	0.3 (0.3-0.3)
Age Adjusted Rate[¶¶]		3.1 (3.0-3.1)		4.6 (4.5-4.6)		0.1 (0.1-0.1)		1.1 (1.1-1.1)		7.2 (7.2-7.3)		1.7 (1.7-1.8)		0.3 (0.2-0.3)

Abbreviation: CI = confidence interval

¶Age <10 years were excluded, because determining intent in younger children can be difficult. Rates for TBI-related deaths due to suicide were age-adjusted to the population 10 years and older.

**Includes undetermined intent, legal intervention, war, and suicide for age <10 years.

††Suppressed for counts <10.

§§Deaths with missing age were included.

¶¶Deaths with missing age were excluded. Rates were age-adjusted to the 2000 U.S. Census population.