**Supplementary Appendix S1.** Search strategy methods

Medline Search

1 exp Incidence/ (142891)

2 exp Prevalence/ (145467)

3 exp Epidemiology/ (18081)

4 1 or 2 or 3 (291843)

5 (brain concussion or brain injuries).mp. [mp=title, original title, abstract,

name of substance word, subject heading word, unique identifier] (38766)

6 4 and 5 (699)

7 exp Brain Concussion/ep [Epidemiology] (268)

8 exp Brain Injuries/ep [Epidemiology] (1593)

9 6 or 7 or 8 (1850)

10 limit 9 to yr="1985 -Current" (1681)

11 limit 10 to animals (38)

12 10 not 11 (1643)

Embase Search

1 exp INCIDENCE/ (199578)

2 exp PREVALENCE/ (254504)

3 \*EPIDEMIOLOGY/ (22263)

4 1 or 2 or 3 (452512)

5 (brain concussion or concussion or Traumatic Brain Injury).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer] (20983)

6 exp brain concussion/ep [Epidemiology] (147)

7 exp CONCUSSION/ep [Epidemiology] (258)

8 exp traumatic brain injury/ep [Epidemiology] (271)

9 4 and 5 (1091)

10 6 or 7 or 8 or 9 (1433)

11 limit 10 to yr="1985 -Current" (1422)

12 limit 11 to animals (3)

13 11 not 12 (1419)

**Supplementary Appendix S2.** Study quality assessment tool

**Quality Assessment**

*Articles are assigned 1 point for each “yes” received on the following scale for a total score out of 8. If a question is not applicable for the study under review, select “yes”.*

REPRESENTATIVENESS OF SAMPLE

**1. Is the target population clearly defined?**

□ Yes □ No □ Unclear □ Not reported

e.g. The target population must be defined by shared characteristics assessed and measure accurately. Some of these characteristics include age, sex, ethnicity, income, etc. Clear inclusion and exclusion criteria.

**2. Was either of the following ascertainment method used (must be one or the other)**

1. **probability sampling OR**
2. **entire population surveyed**

□ Yes □ No □ Unclear □ Not reported

e.g. Members of the target population were identified through a sampling frame or listing of potential respondents. This listing must provide access to all members or the defined target population except for exclusions acknowledged by the study authors.

**3. Is the response rate ≥70%**

□ Yes □ No □ Not reported □ Not Applicable

**4. Are non-responders clearly described?**

□ Yes □ No □ Not reported □ Not Applicable

**5. Is the sample representative of the target population?**

□ Yes □ No □ Unclear □ Not reported

e.g. need to ensure that non responders have similar characteristics as responders (otherwise may have selection bias)

ASSESSMENT OF NEUROLOGICAL CONDITION

**6. Were data collection methods standardized?**

□ Yes □ No □ Unclear □ Not reported

e.g. Identical methods of assessment and data collection were used with all respondents so that the information for analysis is completely comparable. Standardization of methods not only refer to eliciting information from respondents but also to interviewing training, supervision, enlistment of respondents and processing of data.

**7. Were validated criteria used to assess for the presence/absence of disease?**

□ Yes □ No □ Unclear □ Not reported

e.g. a validated scale, diagnostic tool, survey, etc.

STATISTICAL ANALYSIS

**8. Are the estimates of incidence given with confidence intervals and in detail by**

**subgroup (if applicable)?**

□ Yes □ No □ Unclear □ Not reported

**TOTAL QUALITY SCORE: \_\_\_\_\_\_\_\_\_**

**Quality Score Denominator: \_\_\_\_\_\_\_\_**

**Supplementary Table S3a.** Characteristics of included incidence studies of traumatic brain injury (TBI)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study interval (type of incidence) | Region | Population | TBI Severity | Diagnostic criteria  | Data source | Diagnosis established by | Crude overall incidence (95% CI)/100,000  | Age-standardized overall incidence (95% CI)/100,000 | Crude incidence (95% CI)/100,000*males females*  | Standardized incidence (95% CI)/100,000*males females* |
| Alaranta, 2000 | 1991-1995 (annual) | Finland | All ages | Mild; Moderate; Severe | ICD-9 | Registry | Administrative Data Codes; Other | Per 100,000 person-years1991: 99.5 1992: 95.5 1993: 94.6 1994: 95.2 1995: 99  | - | Per 100,000 person-years124.2 113.9 114 114 117.5  | Per 100,000 person-years76.2 78.1 76.3 77.2 81.3  | - | - |
| Andelic, 2008 | 1987-1991 (5-year) | Iceland | Infant; Pediatric | Mild; Moderate; Severe | ICD-10 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 83.3 | - | 108.9  | 58.9 | - | - |
| Andersson, 2003 | 2005-2006 (2-year) | Norway | All ages | Mild; Moderate; Severe | ICD-9 | Hospital/Clinic Review; Registry | Health Care Professional; Administrative Data Codes; Chart Review; Other | 546 | - | - | - | 644  | 442 |
| Arnarson, 1995 | 1992-1993 (1-year) | Sweden | All ages | Mild; Moderate; Severe | ICD-9 | Administrative Database; Hospital/Clinic Review; Registry; Other | Administrative Data Codes; Chart Review | Per 1,000 person-years: Overall: 1.7 Severe: 0.28 | - | - | - | - | - |
| Asemota, 2013 | 2005-2009 (4-year) | United States | Adolescent | Mild; Moderate; Severe | ICD-9-CM | Administrative Database | Administrative Data Codes | 2005 – 2009 Overall: 66.82005: 75.52006: 73.72007: 67.72008: 57.92009: 59.3Mild2005: 33.82009: 27.4Moderate2005: 30.12009: 22.5Severe2005: 11.72009: 9.4 |  |  |  |  |  |
| Baldo, 2003 | 1996-2000 (annual) | Italy | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Hospital/Clinic Review | Administrative Data Codes | 1996Overall: 301Mild: 134.3Moderate: 42.7Severe: 170-4yoa: 617.1 5-14yoa: 315.8 15-24yoa: 526.4 25-44yoa: 205.9 45-64yoa: 197.8 65-84yoa: 347.7 >85yoa: 686.91997Overall: 269.9Mild: 119.1Moderate: 39.9Severe: 18.80-4yoa: 543.1 5-14yoa: 238.4 15-24yoa: 445.7 25-44yoa: 184.1 45-64yoa: 179.2 65-84yoa: 341.6 >85yoa: 759.61998Overall: 249.3Mild: 108.4Moderate: 40.8Severe: 18.60-4yoa: 538.6 5-14yoa: 235.9 15-24yoa: 377.4 25-44yoa: 175 45-64yoa: 155.4 65-84yoa: 323.7 >85yoa: 733.91999Overall: 207.2Mild: 82.5Moderate: 43.1Severe: 16.50-4yoa: 443.6 5-14yoa: 186.7 15-24yoa: 298.5 25-44yoa: 141.1 45-64yoa: 133 65-84yoa: 278.5 >85yoa: 692.32000Overall: 212.4Mild: 112.8Moderate: 28.1Severe: 37.70-4yoa: 465.65-14yoa: 202.4 15-24yoa: 294.4 25-44yoa: 143.1 45-64yoa: 137.4 65-84yoa: 287.6 >85yoa: 698.7 | - | 1996375.1 1997331.6 1998311.9 1999262.4 2000273.2  | 1996230.71997211.3 1998189.9 1999154.8 2000154.7 | - | - |
| Bener, 2010 | 2003-2007 (average annual) | Qatar | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other; Registry  | Administrative Data Codes; Chart Review | Per 10,000:2003: 4.22004: 4.12005: 4.62006: 4.92007: 4.2 | - | - | - | - | - |
| Bowman, 2008 | 1991-1993; 1994-1996; 1997-1999; 2000-2002; 2003-2005 (average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9 | Administrative Database; Other | Administrative Data Codes | 1991Overall: 119.41991-1993Overall: 107.2 (99.7-114.6)0-4yoa: 107 (96-117.9) 5-9yoa: 78.7(71.5-85.9)10-14yoa: 85.6(78.8-92.4)15-19yoa: 160.3 (150.2-170.5)1994-1996Overall: 83(77.1-88.8)0-4yoa: 77.2 (69.8-84.5) 5-9yoa: 51.7 (47.1-56.4)10-14yoa: 64.2 (59.2-69.2)15-19yoa: 141.3 (131.1-151.5)1997-1999Overall: 78(71.9-84.1)0-4yoa: 66.8 (59-74.7) 5-9yoa: 47.7 (42.8-52.7)10-14yoa: 58.4 (52.9-63.8)15-19yoa: 131.8 (120.9-142.6)2000-2002Overall: 65.9(60.3-71.5)0-4yoa: 76.6 (67-86.2) 5-9yoa: 37.3 (33-41.6)10-14yoa: 47.4 (42.6-52.3) 15-19yoa: 113.6 (104.7-122.5)2003-2005Overall: 74.9(68.8-81)0-4yoa: 72.8 (66.1-79.5) 5-9yoa: 43.2 (37.9-48.4)10-14yoa: 55.4 (49.4-61.4)15-19yoa: 126.2 (116.1-136.3)2005Overall: 72.7 | - | 1991-1993140 (130.3-149.7) 1994-1996109 (101.2-116.7) 1997-1999101.1 (93.2-109) 2000-200288.1 (80.7-95.5) 2003-200598 (89.6-106.5)  | 1991-199372.7 (67.5-78)1994-199655.6 (51.7-59.6)1997-199953.7 (49.3-58.1)2000-200245.9 (41.8-50)2003-200551.4 (46.7-56.2) | - | - |
| CDC, 1997 | 1990-1993 (average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Hospital/Clinic Review; Other | Administrative Data Codes; Chart Review | Overall: 102.1Colorado: 101.9Missouri: 103Oklahoma: 97.7Utah: 108<5yoa: 1015-14yoa: 69.715-24yoa: 176.725-34yoa: 105.735-44yoa: 84.145-54yoa: 68.455-64yoa: 6765-74yoa: 82.2 >75yoa: 186.2 | Colorado: 104.8Missouri: 104.1Oklahoma: 98.1Utah: 105.7(Adjusted to the 1990 United States population) | 140  | 66 | - | - |
| CDC, 2006 | 2002 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other | Administrative Data Codes; Chart Review | - | Overall: 79Alaska: 92.8Arizona: 96.9California: 75.8Colorado: 90.9Maryland: 92.8Minnesota: 87.7Nebraska: 50.6New Jersey: 81.2New York: 74.4Oklahoma: 83.4South Carolina: 65.2Utah: 79.80-4yoa: 61.2 5-14yoa: 42 15-24yoa: 103.3 25-34yoa: 62.9 35-64yoa: 60.965-74yoa: 97.9 >75yoa: 264.4(Adjusted to the 2000 United States population) | - | - | 105.3  | 53.4 |
| CDC, 2007 | 2003 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-10; ICD-9-CM | Administrative Database; Other | Administrative Data Codes | Overall: 87.9Alaska: 93.9Arizona: 105Colorado: 91.8Maryland: 91.8Minnesota: 89.5Nebraska: 51.8Oklahoma: 90.5South Carolina: 69.6Utah: 83.1 0-4yoa: 60.1 5-14yoa: 43.4 15-24yoa: 118 25-34yoa: 75 35-64yoa: 69.2 65-74yoa: 104.6 >75yoa: 287.3 | - | 115.1  | 61.1 |  | - |
| Chiu, 1995 | 1988-1994 (average annual) | Taiwan | All ages | Mild; Moderate; Severe | ICD-9 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | - | 382(Adjusted “to the county population”) | - | - | 499  | 244 |
| Chiu, 2007 | 1991; 2001 (annual) | Taiwan | All ages | Mild; Moderate; Severe | ICD-9 | Registry | Administrative Data Codes; Chart Review; Other | Taipei 2001: 218Hualien 2001: 417 | - | - | - | Hualien: 2001: 516 Taipei: 2001: 285  (Adjustment standard not specified) | Hualien: 2001: 306 Taipei: 2001: 152  |
| Coronado, 2005 | 1999 (1-year) | United States | Elderly | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other | Administrative Data Codes; Chart Review | Overall: 154.5African: 103.1Asian: 122Indian: 110.6White: 150.365-74yoa: 85.175-84yoa: 187.4>84yoa: 366.6 | Overall: 155.9African: 107.4Asian: 138.8Indian: 118.9White: 150.4(Adjusted to the 2000 United States population) | 170.2  | 143.3 | 185.2  | 137.2 |
| Coronado, 2012 | 1995-2009 (15-year) | United States | All Ages | Mild; Moderate; Severe | CDC: ICD-9; ICD-10 | Administrative Database; Hospital/Clinic Review; Other | Administrative Data Codes; Chart Review; Other |  | 1995: 549.61996: 425.61997: 451.91998: 540.71999: 555.82000: 560.02001: 523.02002: 540.22003: 534.12004: 604.02005: 618.52006: 594.42007: 565.22008: 728.72009: 798.4(Adjusted to the 2000 United States population) |  |  |  |  |
| Day, 2006 | 2002-2003 (annual) | United States | All ages | Mild; Moderate; Severe | CDC TBI | Administrative Database; Hospital/Clinic Review; Other | Administrative Data Codes; Chart Review | - | African: 338.8 (311.3-366.3)Asian: 113.6 (99.6-131)Hispanic: 138.8 (119.5-149.9) Indian: 199.4 (161.7-237.1)Non-Hispanic: 174.7 (171-178.4)White: 156.1(152.4-159.8)Counties outside Minnesota/St. Paul: 216.6 (211-222.2)Greater Minnesota: 149.7 (144.7-154.7)Minnesota: 185.7 (181.9-189.5)(Adjusted to the 2000 United States population) | - | - | 227.6 (221.6-233.6)  | 146.2 (141.4-150.9) |
| Di Maggio, 2013 | 1999-2007 (8-year) | United States | Children  | Mild; Moderate; Severe | ICD-9  | Administrative Database | Administrative Data Codes | *Per 10 000 person-years*1999 – 2007 Overall: 29.2 |  | *Per 10 000 person-years*Overall: 33.1<1: 7.7 (3.9 – 11.4)1: 23.8 (17.1 – 30.5)2: 33.3 (24.9 – 41.6)3: 42.9 (34.2 – 51.6)4: 17.1 (12.3 – 22.0)5: 15.7 (11.2 – 20.1)6: 46.9 (39.4 – 54.5)7: 38.7 (32.8 – 44.5)8: 52.3 (45.5 – 59.1) | *Per 10 000 person-years*Overall: 24.9<1: 9.7 (5.4 – 14.1)1: 17.5 (11.5 – 23.4)2: 21.7 (14.8 – 28.6)3: 31.1 (23.5 – 38.7)15.9 (11.1 – 20.7)13.4 (9.2 – 17.5)31.3 (24.9 – 37.6)32.1 (26.3 – 37.8)37.4 (31.3 – 43.6) |  |  |
| Diamond, 1996 | 1988-1993 (6-year) | United States | Adult; Elderly; Pediatric | Mild; Moderate; Severe | ICD-9-CM | Other; Registry | Administrative Data Codes | <6yoa: 23740-69yoa: 5670-79yoa: 93>80yoa: 123 | - | - | - | - | - |
| Eisele, 2006 | 1999 (1-year) | United States | Infant; Pediatric | Mild; Moderate; Severe | ICD-9-CM | Other | Administrative Data Codes; Other | 1moa: 1788moa: 127.9<1yoa: 122 1yoa: 63 |  |  |  |  |  |
| Emanuelson, 1997 | 1987-1991 (average annual) | Sweden | Pediatric | Mild; Moderate; Severe | ICD-9  | Other | Administrative Data Codes; Chart Review | Overall: 12(10.7-14)City of Goteborg: 14.4 (10.6-18.3)County of Alvsborg: 11.6(8.6-14.8)County of Goteborg and Bohus: 8.7 (5.6-11.9)County of Halland: 12.5 (8.4-16.8)County of Skaraborg: 12.9 (8.8-17.1) 0-4yoa: 85-9yoa: 1010-14yoa: 1115-17yoa: 10 | - | 14.1 (11.9-16.7)  | 8.3(6.6-10.3) | - | - |
| Engberg, 2001 | 1985-1987; 1991-1993 (average annual) | Denmark | All ages | Mild; Moderate; Severe | ICD-8 | Other; Registry | Administrative Data Codes | - | 1985-1987: 2241991-1993: 157(Adjusted to the 1986 Danish population) | - | - | - | - |
| Feigin, 2013 | 2010-2011 (March 1- Feb 28) | New Zealand | All Ages | Mild; Moderate; Severe | ICD-10 | Hospital/Clinic Review; Registry | Chart Review; Imaging | Overall: 790 (749-832)0-4 yoa: 1300 (1105 – 1496)5-14 yoa: 818 (709-928)15-34 yoa: 1033 (948 – 1119)35-64 yoa:508 (452-564)65 yoa: 623 (506 – 740)Mild Overall: 749 (709 – 790)0 – 4 yoa: 1262 (1069-1455)5-14 yoa: 811 (702-920)15-34 yoa: 970 (887-1054)35-64 yoa: 484 (430 – 539)65 yoa: 537 (429 – 646)Overall Moderate-severe: 41 (31-51)0-4 yoa: 38 (5-72)5-14 yoa:8 (0-18)15-34 yoa: 63 (42-84)35-64 yoa: 24 (12-36)65 yoa: 36 (42-129)European: 887 (827 – 947)Maori: 1206 (1091-1321)Other: 245 (199-292) | Overall: 811 (769 – 855)Mild: 771 (730-814)Moderate-severe: 40 (32-51)European: 975 (909 – 1046)Maori: 1200 (1085 – 1327)Other race: 248 (205-301)(Adjusted to the World Health Organization world population standard) | Overall: 1020 (951-1088)0-4 yoa: 1575 (1272-1878)5-14 yoa: 1008 (839-1176)15-34 yoa: 1445 (1300-1590)35-64 yoa: 624 (535-714)65 yoa:639 (460-818)MildOverall: 959 (893-1025)0-4 yoa: 1545 (1245-1845) 5-14 yoa: 1000 (832-1168)15-34 yoa: 1335 (11985-1474)35-64 yoa: 584 (497-671)65 yoa: 548 (382-713)Moderate-SevereOverall: 61 (44-77)0-4 yoa: 30 (0-72)5-14 yoa: 7 (0-22)15-34 yoa: 110 (70-150)35-64 yoa:40 (17-63)65 yoa:91 (24-159) | Overall: 575 ( 525-625)0-4 yoa: 1020 (774-1267)5-14 yoa: 618 (481-754)15-34 yoa: 641 (547-736)35-64 yoa: 402 (333-471)65 yoa: 611 (456 – 765)MildOverall: 552 (504-601)0-4 yoa: 974 (734-1215)5-14 yoa: 610 (474-745)15-34 yoa: 623 (530-716)35-64 yoa: 393 (325 – 461)65 yoa: 529 (386-673)Moderate-severeOverall: 22 (13-32)0-4 yoa: 46 (0-99)5-14 yoa: 8 (0 – 23)15-34 yoa: 18 (2 – 34)35-64 yoa: 9 (0 – 20)65 yoa: 81 (25 – 138) | Overall: 1041 (973-1113)Mild980 (915-1051)Moderate-severe60 (46-80) | Overall: 589 (539-642)Mild568 (519-620)Moderate-severe21 (13-33) |
| Fletcher, 2007 | 1992-2003 (annual) | United States | Elderly | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other | Administrative Data Codes; Chart Review | 1992-2003: Overall: 180.6African: 130.4Indian: 90.7White: 185.265-74yoa: 99.875-84yoa: 219.4>85yoa: 566.21992-1994:Overall: 133.3African: 118.3Indian: 93.3White: 134.565-74yoa: 81.375-84yoa: 158.7>85: 308.42001-2003 Overall: 238.4African: 159.8Indian: 120.4White: 245.165-74yoa: 12375-84yoa: 294.1>85yoa: 566.2  | - | 1992-2003203.8 1992-1994163.2  2001-2003253   | 1992-2003164.51992-1994113.12001-2003228 | - | - |
| Gabella, 1997 | 1991-1992 (average) | United States | All ages | Mild; Moderate; Severe | ICD-9 | Administrative Database; Other | Administrative Data Codes | - | Overall: 101.4(98.9-103.9)Denver-Boulder: 97.8 (94.4-101.1) Other Metro: 94.7 (90-99.2)Rural non-remote: 123.9 (116.2-131.5)Rural remote: 172.1 (148.6-195.6)(Adjusted to the 1980 United States population) | - | - | - | - |
| Guerrero, 2000 | 1995-1996 (average annual) | United States | All ages | Mild | ICD-9-CM | Other | Administrative Data Codes; Chart Review; Other | Overall: 392(341-443)All other races: 358 (256-465)White: 397 (342-453)0-14yoa: 692 (562-821) 15-24yoa: 567 (421-715)  25-44yoa: 313 (241-386) >45yoa: 180 (126-233) | - | 479 (403-558)  | 306(248-364) | - | - |
| Harrison, 2012 | 2000-2006 (6-year) | Australia | Adolescent; Adults | Mild; Moderate; Severe | ICD-10-AM | Administrative Database | Administrative Data Codes | Overall: 618.5 (614.7 – 622.3)2000-1: 636.0 (626.4 – 645.7)2001-2: 639.8 (630.3-649.4)2002-3: 605.9 (596.7-615.2)2003-4: 589.4 (580.4-598.5)2004-5: 611.4 (602.3-620.6)2005-6: 629.7 (620.6-639.0)15-19 yoa: 623.0 (617.6 – 628.4)20-24 yoa: 614.1 (608.7 – 619.4) |  | 937.3 (930.8 – 943.9) | 287.2 (283.5 – 290.9) |  |  |
| Harvey, 2012 | 1998-2011 (13-year) | Australia | Adults; Elderly | Mild; Moderate; Severe | ICD-10-AM | Administrative Database | Administrative Data Codes |  | 1998-1999: 19.32010-2011: 72.2(Adjusted to the New South Wales population in each year estimated) |  |  | 1998-1999: 24.62010-2011: 86.5 | 1998-1999: 15.32010-2011:61.2 |
| Hawley, 2003 | 1992-1998 (average annual) | United Kingdom | Pediatric | Mild; Moderate; Severe | BSRM | Other; Registry | Chart Review | 280 | - | - | - | - | - |
| Heskestad, 2009 | 2003 (1-year) | Norway | All ages | Mild; Moderate; Severe | ICD-10 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | Overall: 20715-19yoa: 428 | - | 258  | 156 | - | - |
| Hillier, 1997 | 1987 (1-year) | Australia | Infant; Pediatric | Mild; Moderate; Severe | ICD-9 | Administrative Database | Administrative Data Codes; Chart Review | Per 100,000 person-years322 (313-331) | - | - | - | - | - |
| Ingebrigtsen, 1998 | 1993 (1-year) | Norway | All ages | Mild; Moderate; Severe | None | Hospital/Clinic Review | Chart Review | 229 | - | 287  | 169 | - | - |
| Jager, 2000 | 1992-1994 (estimated average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Other | Administrative Data Codes | Overall: 444(390-498)African: 582 (439-725)Non-Black and Non-White: 333 (155-512)White: 429 (373-485)0-4yoa: 1091 (839-1343) 5-14yoa: 571 (438-704) 15-24yoa: 639 (496-782) 25-34yoa: 361 (263-459) 35-44yoa: 335 (240-430) 45-54yoa: 181 (99-262) 55-64yoa: 165 (75-255) 65-74yoa: 233 (119-347) 75-84yoa: 331 (152-509) >84yoa: 1026 (468-1584) |  - | 557 (477-637) | 336 (279-393) | - | - |
| Kerr, 2014 | 2010-2011 (1-year) | United States (North Carolina Only) | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database | Administrative Data Codes | *Per 1,000 person-years*Overall: 7.30-4: 13.15-9: 6.410-14: 7.315-19: 10.620-24: 9.025-29: 7.030-34: 5.735-39: 5.040-44: 4.745-49: 4.750-54: 4.455-59: 4.360-64: 4.365-69: 5.370-74: 7.375-79: 11.380-84: 17.9>85: 30.6 |  | 7.9 | 6.8 |  |  |
| Kim, 2009 | 2007-2008 (average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9 | Other; Registry | Administrative Data Codes | Overall: 501.1<1yoa: 1672 1-5yoa: 793 6-12yoa: 404 13-18yoa: 778 19-25yoa: 684 26-45yoa: 364 46-59yoa: 299 60-79yoa: 362 >80yoa: 1174 | - | 584.3  | 420.2 | - | - |
| Kleiven, 2003 | 1987-2000 (average) | Sweden | All ages | Mild; Moderate; Severe | ICD-10; ICD-9 | Other; Registry | Administrative Data Codes | 259 | - | - |  | - | - |
| Koepsell, 2011 | 2007-2008 (1-year) | United States | Infants; Children; Adolescents | Mild; Moderate; Severe | ICD-9 | Hospital/Clinic Review; Telephone Survey | Chart Review; Administrative Data Codes; Self-Report | Overall: 304 (229 – 383)Age0 – 4 yoa: 421 (303-581)5 – 9 yoa: 213 (147 – 290)10 – 14 yoa: 267 (173 – 360)15 – 17 yoa: 316 (206 – 458)SeverityMild: 296 (221-375)0 – 4 yoa: 412 (294-571)5 – 9 yoa: 210 (145-289)10 – 14 yoa: 260 (167-354)15 – 17 yoa: 301 (191-443)Moderate, Severe, Fatal: 7.6 (5.2-10.6)0 – 4 yoa: 8.8 (4.2 – 14.4)5 – 9 yoa: 2.4 (0.0-5.6)10 – 14 yoa: 6.8 (3.1 – 11.2)15 – 17 yoa: 15.2 (6.7-25.9) |  | Overall: 387 (283 – 490)Age0 – 4 yoa: 482 (339-666)5 – 9 yoa: 265 (177-373)10 – 14 yoa: 373 (236-518)15 – 17 yoa: 444 (270-674)SeverityMild: 376 (272-479)0 – 4 yoa: 469 (329-654)5 – 9 yoa: 262 (175-370)10 – 14 yoa: 363 (228-510)15 – 17 yoa: 423 (251-655)Moderate, Severe, Fatal: 10.7 (6.6-15.5)0 – 4 yoa: 12.5 (4.7-22.2)5 – 9 yoa: 3.0 (0.0-7.2)10 – 14 yoa: 10.0 (3.6-17.0)15 – 17 yoa: 20.9 (7.5-39.5) | Overall: 218 (163-279)Age0 – 4 yoa: 357 (244-503)5 – 9 yoa: 158 (102-228)10 – 14 yoa: 156 (93-225)15 – 17 yoa: 184 (107-271)SeverityMild: 213 (158-274)0 – 4 yoa: 352 (239-497)5 – 9 yoa: 156 (100-226)10 – 14 yoa: 152 (89-220)15 – 17 yoa: 174 (96-260)Moderate, Severe, Fatal: 4.4 (2.1-7.2)0 – 4 yoa: 4.8 (1.2-9.8)5 – 9 yoa: 1.8 (0.0-6.3)10 – 14 yoa: 3.6 (0.0 – 8.9)15 – 17 yoa: 9.4 (2.0 – 21.5) |  |  |
| Koskinen, 2008 | 1991-2005 (annual) | Finland | All ages | Mild; Moderate; Severe | ICD-10; ICD-9 | Administrative Database; Other; Registry | Administrative Data Codes | 1991-20051011991-5 971996-20001022001-5104 | - | 1991-2005122  | 80 | - | - |
| Langlois, 2003 | 1997 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Registry | Administrative Data Codes; Chart Review | Overall: 69.4African: 74.2Asian: 30.9Indian: 76.7White: 63 Alaska: 79.1Arizona: 89.9California: 60.4Colorado: 87.8Louisiana: 57.8Maryland: 97.7Minnesota:56.8Missouri:88.2Nebraska:65.2New York:72.1Oklahoma:65.3Rhode Island:53.8South Carolina:58.7Utah:72.10-4yoa: 64 5-14yoa: 48.1 15-19yoa: 103.5 20-24yoa: 90.6 25-34yoa: 64.3 35-44yoa: 57.4 45-64yoa: 51.1 >65yoa: 121.2 | Overall: 69.7African: 74.4Asian: 34.8Indian: 75.3White: 62.9Alaska: 81.4Arizona: 89.4California: 61.4Colorado: 89.4Louisiana: 57.7Maryland: 99.2Minnesota:56.7Missouri:87Nebraska:64New York:71.9Oklahoma:64.2Rhode Island:52.1South Carolina:58.7Utah:71.6(Adjusted to the 2000 United States population) | 90.9  | 48.5 | 91.9  | 47.7 |
| Langlois, 2005 | 1995-2001 (average annual) | United States | Pediatric | Mild; Moderate; Severe | ICD-9; ICD-9-CM | Administrative Database; Other | Administrative Data Codes | Overall: 798.8African: 801.4White: 803.20-4yoa: 1120.75-9yoa: 659.310-14yoa: 628.6 | - | - | - | - | - |
| Leibson, 2011 | 1987-2000 (13-year) | United States | All Ages | Mild; Moderate; Severe | ICD-9; ICD-9-CM | Hospital/Clinic Review | Chart Review | Overall: 558 (528-590)< 16 yoa: 790 (719-867)16-64 yoa: 480 (445-517)>65 yoa: 485 (399-583) |  | Overall: 640 (593-689)< 16 yoa: 987 (876-1108)16-64 yoa: 522 (470-578)>65 yoa: 451 (323-611) | Overall: 482 (443-523)< 16 yoa: 583 (496-680)16-64 yoa: 440 (393-490)> 65 yoa: 506 (396-638) |  |  |
| Mackenzie, 1989 | 1986 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other | Administrative Data Codes | Overall: 131.7Mild: 92Moderate: 23Serious: 12Severe: 5 0-4yoa: 140.3 5-14yoa: 115.3 5-24yoa: 237 25-34yoa: 148.2 35-44yoa:91 45-54yoa:72.6 55-64yoa:64.1 65-74yoa:89.3 >75yoa: 188.1 | - | 176  | 87 | - | - |
| MacKenzie, 1990 | 1986 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database | Administrative Data Codes | - | 1985 Overall: 133.7White: 135.4Other: 132.3Mild: 95.25Moderate: 20.8Serious: 12Severe: 5.71986 Overall: 134.2White: 134Other: 137.7Mild: 94.3Moderate: 23.1Serious: 11.8Severe: 51986 0-4yoa: 1401986 15-24yoa: 236(Adjusted to the 1980 United States population) |  -  | - | 1985147 1986144.2  | 198568.1198667.4 |
| Mauritz, 2014 | 2009-2011 (2-year) | Austria | All Ages | Mild; Moderate; Severe | ICD-10 | Registry; Administrative Database | Chart Review; Administrative Data Codes | Overall: 3030-4 yoa: 4705-9 yoa: 33510-14 yoa: 34815-19 yoa: 46920-24 yoa: 35525-29 yoa: 22030-34 yoa: 17035-39 yoa: 15040-44 yoa: 14945-49 yoa: 16950-54 yoa: 19855-59 yoa: 20260-64 yoa: 21465-69 yoa: 25670-74 yoa: 36275-79 yoa: 47380-84 yoa: 72185-89 yoa: 121390-94 yoa: 2210> 95 yoa: 2538 |  | Overall: 3640-4 yoa: 4735-9 yoa: 39310-14 yoa: 43915-19 yoa: 55820-24 yoa: 48325-29 yoa: 30630-34 yoa: 23535-39 yoa: 20840-44 yoa: 20045-49 yoa: 22450-54 yoa: 26255-59 yoa: 27260-64 yoa: 30265-69 yoa: 35570-74 yoa: 47975-79 yoa: 58880-84 yoa: 85985-89 yoa: 138990-94 yoa: 2576> 95 yoa: 2991 | Overall: 2450-4 yoa: 4675-9 yoa: 27610-14 yoa: 24815-19 yoa: 37320-24 yoa: 22525-29 yoa: 13530-34 yoa: 10235-39 yoa: 9240-44 yoa: 9345-49 yoa: 11350-54 yoa: 13655-59 yoa: 14260-64 yoa: 13165-69 yoa: 16870-74 yoa: 26375-79 yoa: 38780-84 yoa: 63885-89 yoa: 114390-94 yoa: 2096> 95 yoa: 2422 |  |  |
| McCarthy, 2002 | 1998 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other | Administrative Data Codes | Overall: 666African: 616.4Non-African and Non-White: 620.4 White: 690.2<1yoa: 1268.91-4yoa: 865.15-9yoa: 484.710-14yoa: 493.315-19yoa: 765.9 | - | Overall: 833  | Overall: 491.4 | - | - |
| McKinlay, 2008 | 1977-2002 (average annual) | New Zealand | All ages | Mild; Moderate; Severe | None | Hospital/Clinic Review; Other; Telephone Survey | Health Care Professional; Undiagnosed Self Report; Chart Review; Diagnosed Self Report | Per 100Overall: 1.75 0-5yoa: 1.855-10yoa: 1.110-15yoa: 1.1715-20yoa: 2.3620-25yoa: 2.25 | - | - | - | - | - |
| Nell, 1991 | 1986-1987 (1-year; May 1986-Feb 1997) | South Africa | Adolescent; Adult; Elderly | Mild; Moderate; Severe | ICD-9 | Hospital/Clinic Review; Other | Administrative Data Codes; Other | Per 100,000 person-yearsOverall: 316.42African: 355.3Asian: 208.97Colored: 298.26White: 109.3815-24yoa: 359.1625-44yoa: 408.7945-64yoa: 227.05>64yoa: 63.4 | - | Per 100,000 person-years523.64  | Per 100,000 person-years109 | - | - |
| Numminen 2011 | 2002-2004 (2-years) | Finland | Adolescent; Adults | Mild; Moderate; Severe | ICD-10 | Hospital/Clinic Review | Health Professional; Imaging; Administrative Data Codes | 221 (176 – 265) | 213 (181-244)(Adjusted to the “European standard population”) | < 65 yoa: 214 (145-283)> 65 yoa: 419 (194-643) | < 65 yoa: 155 (95 – 215)>65 yoa: 324 (172-477) | < 65 yoa: 210 (161-260)>65 yoa: 430 (265-594) | < 65 yoa: 155 (111-199)>65 yoa: 319 (212-425) |
| Perez, 2012 | 2000-2009 (9-years) | Spain | All Ages | Mild; Moderate; Severe | ICD-9-CM | Registry | Administrative Data Codes |  | *Per 1,000,000* 472.6 (470.6 – 474.7)(Adjusted to the “sum of the population over all years”) | *Per 1,000,000*Traffic-crashes: 0-17 yoa:278.8 (273.6 – 284.1)18-34 yoa: 282.9 (278.6-287.2)35-64 yoa: 122.2 (119.8 – 124.5)>65 yoa: 165.3 (160.8 – 169.9)Other circumstances0-17 yoa: 702.9 (694.6-711.2)18-34 yoa: 251.2 (247.2-255.3)35-64 yoa: 292.4 (288.8 – 296.1)>65 yoa: 796.7 (786.7 – 806.7) | *Per 1,000,000*Traffic-crashes: 0-17 yoa: 112.6 (109.3-116.1)18-34 yoa: 82.8 (80.5 – 85.2)35-64 yoa: 43.5 (42.1-44.9)>65 yoa: 76.5 (73.9-79.2)Other circumstances0-17 yoa: 428.9 (422.2-435.6)18-34 yoa: 52.1 (50.2-54.0)35-64 yoa: 77.6 (75.7-79.5)>65 yoa: 691.1 (683.2-699.0) | *Per 1,000,000*Overall: 630.12000: 775.92001: 737.32002: 682.32003: 644.32004: 6262005: 611.12006: 583.72007: 574.72008: 534.82009: 545.3Traffic-crashes: 201.3 (199.4-203.2)0-17 yoa:18-34 yoa:35-64 yoa:>65 yoa:Other circumstances: 428.8 (426.0-431.6) | *Per 1,000,000*Overall: 319.22000: 360.52001: 352.72002: 324.52003: 3112004: 3132005: 309.52006: 3002007: 295.12008: 299.82009: 316Traffic-crashes: 71.4 (70.3-72.5)Other circumstances: 247.7 (245.6 – 249.8) |
| Piatt Jr., 2012 | 1997; 2000; 2003; 2006; 2009(5 annual estimates) | United States | Children | Mild; Moderate; Severe | ICD-9-CM | Survey; Other: KID | Cannot Determine | Overall 1997: 79.3< 5 yoa:76.75 – 9 yoa: 53.010 – 14 yoa:62.215 – 18 yoa: 137.9Overall 2000: 63.8< 5 yoa: 66.45 – 9 yoa: 39.210 – 14 yoa: 40.015 – 18 yoa: 110.6Overall 2003: 59.8< 5 yoa: 61.45 – 9 yoa: 34.010 – 14 yoa: 47.015 – 18 yoa: 104.4Overall 2006: 60.2< 5 yoa: 63.25 – 9 yoa: 31.5 10 – 14 yoa: 44.515 – 18 yoa: 108.9Overall 2009: 55.0< 5 yoa: 66.95 – 9 yoa: 26.9 10 – 14 yoa: 40.415 – 18 yoa: 90.8Severe Head Injuries1997: 8.11< 5 yoa: 6.235 – 9 yoa: 4.7810 – 14 yoa: 6.3415 – 18 yoa: 16.98 2000: 7.57< 5 yoa: 5.785 – 9 yoa: 4.0810 – 14 yoa: 5.3315 – 18 yoa: 16.922003: 6.95< 5 yoa: 5.175 – 9 yoa: 3.9310 – 14 yoa: 5.2815 – 18 yoa: 14.902006: 6.70< 5 yoa: 4.505 – 9 yoa:3.3410 – 14 yoa:4.6215 – 18 yoa: 15.732009: 5.58< 5 yoa: 4.885 – 9 yoa: 2.2410 – 14 yoa: 4.0315 – 18 yoa: 12.22 |  | Overall 1997: 101.0< 5 yoa: 87.15 – 9 yoa: 68.110 – 14 yoa: 85.615 – 18 yoa: 179.7Overall 2000: 82.3< 5 yoa: 75.45 – 9 yoa: 50.010 – 14 yoa: 67.615 – 18 yoa: 150.0Overall 2003: 76.1< 5 yoa: 70.05 – 9 yoa: 42.310 – 14 yoa: 63.615 – 18 yoa: 140.1Overall 2006: 78.2< 5 yoa: 73.55 – 9 yoa: 40.010 – 14 yoa: 61.615 – 18 yoa: 147.8Overall 2009: 70.8< 5 yoa: 77.65 – 9 yoa: 33.610 – 14 yoa: 55.715 – 18 yoa: 124.3Severe Head Injuries1997: 10.58< 5 yoa: 7.365 – 9 yoa: 5.9410 – 14 yoa: 8.1415 – 18 yoa: 23.562000: 10.08< 5 yoa: 6.975 – 9 yoa: 5.0410 – 14 yoa: 6.9615 – 18 yoa: 24.032003: 9.12< 5 yoa: 5.995 – 9 yoa: 5.0410 – 14 yoa: 7.0715 – 18 yoa: 20.392006: 8.76< 5 yoa: 5.045 – 9 yoa: 3.9510 – 14 yoa: 6.0215 – 18 yoa: 22.072009: 7.33< 5 yoa: 5.595 – 9 yoa: 2.8610 – 14 yoa:5.2415 – 18 yoa:17.20 | Overall 1997: 56.6< 5 yoa: 65.95 – 9 yoa: 37.210 – 14 yoa:37.515 – 18 yoa: 93.7Overall 2000: 44.3< 5 yoa: 57.05 – 9 yoa: 28.110 – 14 yoa: 29.315 – 18 yoa: 68.9Overall 2003: 42.6< 5 yoa: 52.35 – 9 yoa: 25.310 – 14 yoa: 29.615 – 18 yoa: 68.5Overall 2006: 41.4< 5 yoa: 52.55 – 9 yoa: 22.510 – 14 yoa: 26.615 – 18 yoa: 67.9Overall 2009: 38.4< 5 yoa: 55.85 – 9 yoa: 19.910 – 14 yoa: 24.315 – 18 yoa: 55.6Severe Head Injuries1997: 5.53< 5 yoa: 5.025 – 9 yoa: 3.5710 – 14 yoa: 4.4815 – 18 yoa: 10.022000: 4.92< 5 yoa: 4.545 – 9 yoa: 3.0610 – 14 yoa: 3.6315 – 18 yoa: 9.392003: 4.66< 5 yoa: 4.245 – 9 yoa: 2.7710 – 14 yoa: 3.4215 – 18 yoa: 9.092006: 4.52< 5 yoa: 3.925 – 9 yoa: 2.7010 – 14 yoa: 3.1515 – 18 yoa: 9.042009: 2.97< 5 yoa: 4.155 – 9 yoa: 1.6110 – 14 yoa: 2.7615 – 18 yoa: 6.96 |  |  |
| Polinder, 2005 | 1999 (1-year) | Austria, Denmark, England, Greece, Ireland, Italy, Netherlands, Norway, Spain, Wales | All ages | Mild; Moderate; Severe | ICD-9 | Administrative Database | Other | -  | Per 1,000: 1.2(Adjusted to the “total population of all countries in 1999”) | - | - | - | - |
| Reid, 2001 | 1993 (1-year) | United States | Pediatric | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other; Registry | Administrative Data Codes | Overall: 73.5Metropolitan Minnesota: 72.4 Non-metropolitan Minnesota: 76.1 | - | - | - | - | - |
| Rickels, 2010 | 2000-2001 (1-year; Mar 2000 - Feb 2001) | Germany | All ages | Mild; Moderate; Severe | ICD-10 | Hospital/Clinic Review | Administrative Data Codes; Chart Review | Overall: 332<1yoa: 670<16yoa: 581Cases provided for remaining ages. | - | - | - | - | - |
| Rutland-Brown, 2006 | 2000-2003 (annual) | United States | All ages | Mild; Moderate; Severe | ICD-10; ICD-9-CM | Administrative Database; Other | Administrative Data Codes | 1998: 538.41999: 549.92000: 555.82001: 517.32002: 538.92003: 538.20-4yoa: 1188.5 5-14yoa: 520.5 15-24yoa: 917.5 25-44yoa: 386.7 45-64yoa: 327.3 >65yoa: 524.3 | - | - | - | - | - |
| Sallee, 2000 | 1996-1998 (average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Other; Registry | Administrative Data Codes; Chart Review | Overall: 105.2African: 58.4Alaska Native: 214.3Asian: 52.7Hispanic:29.1White: 82.3 | - | 144.5  | 62 | - | - |
| Schneier, 2006 | 2000 (1-year) | United States | Pediatric | Mild; Moderate; Severe | ICD-9-CM | Administrative Database | Administrative Data Codes; Chart Review | - | Overall: 70African: 51White: 54(Adjusted for potential confounding variables) | - | - | - | - |
| Servadei, 2002 | 1998 (1-year) | Italy | All ages | Mild; Moderate; Severe | ICD-9 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | Overall: 250.41-4yoa: 732.65-9yoa: 231.310-14yoa: 247.315-24yoa: 453.625-34yoa:179.135-44yoa:115.445-54yoa:145.955-64yoa:173.465-74yoa:262.6 >75yoa:402.8 | - | - | - | - | - |
| Sills, 2005 | 1994-2002 (average annual) | United States | Pediatric | Mild; Moderate; Severe | ICD-10; ICD-9 | Administrative Database; Other | Administrative Data Codes | Overall: 63.1Intentional TBI: 16.1 (11-21.2)Unintentional TBI: 47 (38.2-55.7) | - | - | - | - | - |
| Sosin, 1996 | 1991 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9 | Other | Administrative Data Codes; Undiagnosed Self Report; Diagnosed Self Report | Per 100,000 person-yearsOverall: 618(565-671)African: 448(330-566)Hispanic: 474 (339-609)White: 467(418-518)City: 461(385-537)Rural:464(372-556)Suburban: 468(403-533)Northeast US: 439(353-525)Midwest US: 451(371-531)South US: 455 (379-531)West US: 520 (414-626) | - | Per 100,000 person-years579 (510-648)  | Per 100,000 person-years357(302-412) | - | - |
| Steudel, 2005 | 1994-1999 (annual) | Germany | All ages | Mild; Moderate; Severe | ICD-10; ICD-9 | Registry | Administrative Data Codes; Other | 1998: 337 | - | - | - | - | - |
| Styrke, 2007 | 2001 (1-year) | Sweden | All ages | Mild; Moderate; Severe | ICD-10 | Administrative Database | Administrative Data Codes; Chart Review | Overall: 354Mild: 342 | - | - | - | - | - |
| Tate, 1998 | 1988 (1-year) | New South Wales | Adolescent; Adult; Pediatric | Mild; Moderate; Severe | ICD-9  | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | Overall: 100(89.4-110.6)Mild: 64 (55.6-72.4)Moderate: 20 (15.2-24.8)Severe: 12 (8.3-15.7)15-24yoa: 245(199.8-290.2)Remaining: Only cases provided | - | - | - | - | - |
| Thurman, 1996 | 1990-1992 (average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Other | Administrative Data Codes; Chart Review | Overall: 108.80-4yoa: 132.4 5-14yoa: 99.9 15-24yoa: 154.8 25-34yoa: 95 35-44yoa: 80.5 45-54yoa: 69.5 55-64yoa: 85.4 65-74yoa: 80.5 >75yoa: 189.1 | 106.3(Adjusted to the 1990 United States population) | 148.3  | 69.9 | - | - |
| Thurman, 1999 | 1994-1995 (average annual) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM | Other | Administrative Data Codes | Overall: 98(86-110)Mild: 51 (43-59)Moderate: 21(15-27)Severe: 19(13-25)0-4yoa: 105(68-142) 5-14yoa: 75 (50-100) 15-24yoa: 133(106-160) 25-44yoa: 86(72-100)  45-64yoa: 66(50-82) >65yoa: 165(134-196)  | - | 128 (110-146) | 71(59-83) | - | - |
| Tieves, 2005 | 2001 (1-year) | United States | All ages | Mild; Moderate; Severe | ICD-9-CM; ICD-10 | Administrative Database | Administrative Data Codes | - | 94.4(Adjusted to the 2000 United States population) | - | - | 126.1  | 63.7 |
| Tiret, 1990 | 1986 (1-year) | France | All ages | Mild; Moderate; Severe | Unclear | Administrative Database; Other | Cannot Determine | 281 | - | 384  | 185 | - | - |
| Vasquez-Barquero, 1992 | 1988 (1-year) | Spain | All ages | Mild; Moderate; Severe | None | Other | Cannot Determine | Overall: 91.3<15yoa: 101.315-24yoa: 154.525-34yoa: 88.635-50yoa: 71.3>50: 63.9 | - | 136.8  | 47.6 | - | - |
| Ventsel, 2008 | 2001-2005 (annual) | Estonia | Pediatric | Mild; Moderate; Severe | ICD-10 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | Overall: 369 (337-403)Mild: 303 (274-334)Moderate: 30 (21-40)Severe: 36(27-47)0-4yoa: 566(493-643)5-9yoa: 34610-14yoa: 240 | - | 405  | 330 | - | - |
| von Wild, 2005 | 2000-2001 (1-year; Mar 2000 - Feb 2001) | Germany | All ages | Mild; Moderate; Severe | ICD-10 | Other | Health Care Professional; Administrative Data Codes | Overall: 321Hannover: 370Munster: 249 | - | - | - | - | - |

**Supplementary Table S3b.** Mild TBI incidence studies

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study, date, reference | Study interval (type of incidence) | Region | Population | Diagnostic criteria  | Data source | Diagnosis established by | Crude Mild TBI incidence (95% CI)/100,000 | Age-standardized Mild TBI incidence (95% CI)/100,000 | Crude Mild TBI incidence 95% CI)/100,000*males females*  | Standardized Mild TBI incidence (95% CI)/100,000*males females*  |
| Baldo, 2003 | 1996-2000 (annual) | Italy | All ages | ICD-9-CM | Administrative Database; Hospital/Clinic Review | Administrative Data Codes | 1996: 134.31997: 119.11998: 108.41999: 82.52000: 112.8 | - | - | - | - | - |
| Bazarian, 2005 | 1998-2000 (average annual) | United States | All ages | ICD-9 | Administrative Database; Other | Administrative Data Codes; Other | Per 100,000 person-yearsNortheast US: 464.7 (375.8-553.7)Midwest US: 578.4 (424.9-731.8)South US: 443.6 (353.1-534)West US: 552.4 (433.7-671.1)African: 624.6 (482.7-766.5)Asian: 239.6 (57.5-421.7)Indian: 1026.2 (198.6-1853.7)Hispanic: 342.3 (237.6-447.1)Non-Hispanic: 391.1 (336.5-445.7) White: 491 (426.4-555.7)<5yoa: 1115.2 (878.8-1351.6)5-14yoa: 733.3 (581-885.5)15-24yoa: 688.7 (518.2-859.1)25-34yoa: 430.8 (333.5-528.1)35-44yoa: 356.4 (270.7-442.1)45-54yoa: 299.7 (210.7-388.7)55-64yoa: 222.8 (125.2-320.4)65-74yoa: 217.9 (107.6-328.2)>74yoa: 480.1 (308.7-651.5)  | - | Per 100,000 person-yearsOverall: 590(512.1-667.9) | Per 100,000 person-yearsOverall: 1998-2000: 420.4 (358.2) | - | - |
| Cameron, 2012 | 1997-2007 (10-year) | United States | Adults | ICD-9-CM | Administrative Database | Administrative Data Codes | *Per 1000 person-years*Overall: 6.55 (6.51 – 6.59)1997: 3.221998: 4.021999: 4.652000: 6.682001: 7.212002: 7.382003: 6.992004: 7.102005: 5.992006: 8.422007: 10.77< 20: 12.48 (12.28 – 12.68)20-24: 9.55 (9.47-9.64)25 – 29: 5.81 (5.73-5.90)30 – 34: 3.89 (3.80 – 3.97)35 – 39: 2.95 (2.87 – 3.02)>40: 2.44 (2.36 – 2.52)White: 6.95 (6.90 – 7.00)Black: 5.44 (5.35 – 5.52)Other: 6.36 (6.27 – 6.45) |  | *Per 1000 person-years*6.68 (6.63 – 6.72) | *Per 1000 person-years*5.82 (5.72 – 5.92) |  |  |
| Chiu, 2007 | 1991; 2001 (annual) | Taiwan | All ages | ICD-9 | Registry | Administrative Data Codes; Chart Review; Other | Taipei: 138.6Hualien: 345.2 | - | - | - | - | - |
| Dahl, 2006 | 1999-2000 (average annual) | Sweden | Pediatric | ACRM | Administrative Database; Other; Registry | Chart Review; Other | 468 (402-535) | - | 550(504-595) | 410 (370-449) | - | - |
| Gordon, 2006 | 1996-1997 (2-year) | Canada | All ages | None | Other; Telephone Survey  | Undiagnosed Self Report; Diagnosed Self Report | Overall: 110(80-140)0-14yoa: 200 (120-300) 15-34yoa: 160 (110-230) >35yoa: 50 (30-80) | - | 140(100-190) | - | - | - |
| Guerrero, 2000 | 1995-1996 (average annual) | United States | All ages | ICD-9-CM | Other | Administrative Data Codes; Chart Review; Other | Overall: 392(341-443)All other races: 358(256-465)White: 397(342-453)0-14yoa: 692 (562-821) 15-24yoa: 567 (421-715)  25-44yoa: 313 (241-386) >45yoa: 180 (126-233) | - | 479(403-558) | 306(248-364) | - | - |
| Mackenzie, 1989 | 1986 (1-year) | United States | All ages | ICD-9-CM | Administrative Database; Other | Administrative Data Codes | 92 | - | - | - | - | - |
| MacKenzie, 1990 | 1985-6 (annual) | United States | All ages | ICD-9-CM | Administrative Database | Administrative Data Codes | 1985: 95.251986: 94.3 | - | - | - | - | - |
| Murgio, 1999 | 1992-1994 (average annual) | Argentina | Pediatric | None | Other; Registry | Other | Overall: 5660-2yoa: 830.833-9yoa: 1093.9910-15yoa: 568.18 | - | 1545.04 | 946.04 | - | - |
| Peloso, 2004 | 1987-2000 (average annual) | Sweden | All ages | ICD-10; ICD-9 | 175 | Administrative Data Codes | 316.42 | - | Overall: 209 1987: 208 1988: 204 1989: 217 1990: 203 1991: 196 1992: 198 1993: 210 1994: 224 1995: 228 1996: 219 1997: 217 1998: 205 1999: 200 2000: 192  | Overall: 1431138133141142132136154228157152146145143135 | - | - |
| Rickels, 2010 | 2000-2001 (1-year; Mar 2000 - Feb 2001) | Germany | All ages | ICD-10 | Hospital/Clinic Review | Administrative Data Codes; Chart Review | 302 | - | - | - | - | - |
| Styrke, 2007 | 2001 (1-year) | Sweden | All ages | ICD-10 | Administrative Database | Administrative Data Codes; Chart Review | 342 | - | - | - | - | - |
| Tate, 1998 | 1988 (1-year) | New South Wales | Adolescent; Adult; Pediatric | ICD-9  | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 64 (55.6-72.4) | - | - | - | - | - |
| Thurman, 1999 | 1994-1995 (average annual) | United States | All ages | ICD-9-CM | Other | Administrative Data Codes | 51 (43-59) | - | - | - | - | - |
| Ventsel, 2008 | 2001-2005 (annual) | Estonia | Pediatric | ICD-10 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 303 (274-334) | - | - | - | - | - |
| Willer, 2004 | 2000 (1-year) | Canada | Adolescent; Pediatric | None | Other | Other | Overall per 100: 0.81 Per 10,000:6yoa: 13.0997yoa: 12.4438yoa: 10.939yoa: 14.40410yoa: 14.2111yoa: 15.98812yoa: 16.76813yoa: 15.0514yoa: 9.62315yoa: 11.81916yoa: 6.113 | - | Per 10,000: 18.47 | Per 10,000: 8.34 | - | - |

**Supplementary Table S3c.** Moderate TBI incidence studies

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study, date, reference | Study interval (type of incidence) | Region | Population | Diagnostic criteria  | Data source | Diagnosis established by | Crude Moderate TBI incidence (95% CI)/ 100,000 | Age-standardized Moderate TBI incidence (95% CI)/ 100,000 | Crude Moderate TBI incidence (95% CI)/100,000*males females*  | Standardized Moderate TBI incidence (95% CI)/100,000*males females*  |
| Baldo, 2003 | 1996-2000 (annual) | Italy | All ages | ICD-9-CM | Administrative Database; Hospital/Clinic Review | Administrative Data Codes | 1996: 42.71997: 39.91998: 40.81999: 43.1 2000: 28.1 | - | - | - | - | - |
| Chiu, 2007 | 1991; 2001 (annual) | Taiwan | All ages | ICD-9 | Registry | Administrative Data Codes; Chart Review; Other | Taipei: 17.2Hualien: 4.9 | - | - | - | - | - |
| Mackenzie, 1989 | 1986 (1-year) | United States | All ages | ICD-9-CM | Administrative Database; Other | Administrative Data Codes | 23 | - | - | - | - | - |
| MacKenzie, 1990 | 1985-6 (annual) | United States | All ages | ICD-9-CM | Administrative Database | Administrative Data Codes | 1985: 20.81986: 23.1 | - | - | - | - | - |
| Rickels, 2010 | 2000-2001 (1-year; Mar 2000 - Feb 2001) | Germany | All ages | ICD-10 | Hospital/Clinic Review | Administrative Data Codes; Chart Review | 13 | - | - | - | - | - |
| Tate, 1998 | 1988 (1-year) | New South Wales | Adolescent; Adult; Pediatric | ICD-9  | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 20 (15.2-24.8) | - | - | - | - | - |
| Thurman, 1999 | 1994-1995 (average annual) | United States | All ages | ICD-9-CM | Other | Administrative Data Codes | 21 (15-27) | - | - | - | - | - |
| Ventsel, 2008 | 2001-2005 (annual) | Estonia | Pediatric | ICD-10 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 30 (21-40) | - | - | - | - | - |

**Supplementary Table S3d.** Severe TBI incidence studies

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  Study, date, reference | Study interval (type of incidence) | Region | Population | Diagnostic criteria  | Data source | Diagnosis established by | Crude Severe TBI incidence (95% CI)/100,000 | Age-standardized Severe TBI incidence (95% CI)/100,000 | Crude Severe TBI incidence (95% CI)/100,000*males females*  | Standardized Severe TBI incidence (95% CI)/100,000*males females*  |
| Andelic, 2012 | 2009-2010 (2-year) | Norway | Adults | ICD-10 | Registry | Administrative Data Codes | Rural2009: 5.92010: 4.3Urban2009: 5.02010: 4.1  | 2009: 5.22010: 4.1(Adjusted to the adult Norwegian population in 2009 and 2010) |  |  | 2009: 8.42010: 5.6 | 2009: 2.02010: 2.0 |
| Baldo, 2003 | 1996-2000 (annual) | Italy | All ages | ICD-9-CM | Administrative Database; Hospital/Clinic Review | Administrative Data Codes | 1996: 171997: 18.81998: 18.61999: 16.52000: 37.7 | - | - | - | - | - |
| Bouillon, 1999 | 1990-6 (average annual) | Germany | All ages | AISHEAD; GCS | Hospital/Clinic Review | Chart Review | 10  | - | - | - | - | - |
| Chiu, 2007 | 1991; 2001 (annual) | Taiwan | All ages | ICD-9 | Registry | Administrative Data Codes; Chart Review; Other | Taipei: 21.9Hualein: 35.4 | - | - | - | - | - |
| Mackenzie, 1989 | 1986 (1-year) | United States | All ages | ICD-9-CM | Administrative Database; Other | Administrative Data Codes | 5 | - | - | - | - | - |
| MacKenzie, 1990 | 1985-6 (annual) | United States | All ages | ICD-9-CM | Administrative Database | Administrative Data Codes | 1985: 5.71986: 5 | - | - | - | - | - |
| Maegele, 2007 | 1990-1999 (average) | Germany | All ages | AISHEAD; GCS | Hospital/Clinic Review | Health Care Professional; Chart Review | 7.3 | - | - | - | - | - |
| Masson, 2001 | 1996 (1-year) | France | All ages | AISHEAD | Registry; Other | Health Care Professional; Chart Review; Other | Overall: 17.3(15.8-18.8)0-14yoa: 8.4 15-29yoa: 20.9 30-44yoa: 13.7 45-59yoa: 15.4 60-74yoa: 17.7 >74yoa: 42.6 | - | 25.6 | 9.6 | - | - |
| Rickels, 2010 | 2000-2001 (1-year; Mar 2000 - Feb 2001) | Germany | All ages | ICD-10 | Hospital/Clinic Review | Administrative Data Codes; Chart Review | 17 | - | - | - | - | - |
| Tate, 1998 | 1988 (1-year) | New South Wales | Adolescent; Adult; Pediatric | ICD-9  | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 12 (8.3-15.7) | - | - | - | - | - |
| Thurman, 1999 | 1994-1995 (average annual) | United States | All ages | ICD-9-CM | Other | Administrative Data Codes | 19 (13-25) | - | - | - | - | - |
| Ventsel, 2008 | 2001-2005 (annual) | Estonia | Pediatric | ICD-10 | Administrative Database; Hospital/Clinic Review | Administrative Data Codes; Chart Review | 36 (27-47) | - | - | - | - | - |
| von Elm, 2008 | 2005 (1-year) | Switzerland | All ages | AISHEAD; GCS | Hospital/Clinic Review; Other | Health Care Professional; Chart Review | 8.2 | - | - | - | - | - |
| Walder, 2013 | 2007-2010 (3-years) | Switzerland | Adolescent; Adults; Elderly | ICD-10 | Hospital/Clinic Review | Health Professional; Chart Review; Imaging | Overall: 10.58< 65 yoa: 7.90> 65 yoa: 22.40 |  |  |  |  |  |
| Zygun, 2005 | 1999-2002 (average annual) | Canada | Adult; Elderly | sTBI | Administrative Database; Other | Chart Review | 11.4 | - | 17.1 | 5.9 | - | - |

Abbreviations

ACRM: American Congress of Rehabilitation Medicine

AISHEAD: [Abbreviated Injury Score (Head](http://allie.dbcls.jp/pair/AISHead;Abbreviated+Injury+Score-Head.html))

BSRM: British Society of Rehabilitation Medicine Classification of Severity

CDCTBI: Centers for Disease Control and Prevention (Traumatic Brain Injury)

GCS: Glasgow Coma Scale

ICD: International Classification of Diseases

moa: Months of age

sTBI: severe traumatic brain injury

yoa: Years of age

Supplementary Table S4a. Quality assessment scores for included studies with

corresponding response rates

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Q1** | **Q2** | **Q3** | **Q4** | **Q5** | **Q6** | **Q7** | **Q8** | **Total Score** |
| Alaranta, 2000 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Andelic, 2008 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Andersson, 2003 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Arnarson, 1995 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Baldo, 20033 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Bazarian, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Bener, 2010 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Bouillon, 1999 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Bowman, 2008 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| CDC, 1997 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| CDC, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| CDC, 2007 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Chiu, 1995 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Chiu, 2007 | Unclear | Yes | Yes | Yes | Unclear | Yes | No | No | 4/8 |
| Coronado, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Dahl, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Day, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Diamond, 1996 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Eisele, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Emanuelson, 1997 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 6/8 |
| Engberg, 2001 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Fletcher, 2007 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Gabella, 1997 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Gordon, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Guerrero, 2000 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Hawley, 2003 | Unclear | Yes | Yes | Yes | Yes | Yes | No | No | 5/8 |
| Heskestad, 2009 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Hillier, 1997 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Ingebrigtsen, 1998 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Jager, 2000 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Kim, 2009 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Kleiven, 2003 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Koepsell, 2011 | Yes | Yes | NR | NR | NR | Yes | Yes | Yes | 5/8 |
| Koskinen, 2008 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Langlois, 2003 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Langlois, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Mackenzie, 1989 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| MacKenzie, 1990 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Maegele, 2007 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Masson, 2001 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| McCarthy, 2002 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 7/8 |
| McKinlay, 2008 | Yes | Yes | Yes | Yes | Unclear | Yes | Unclear | No | 5/8 |
| Murgio, 1999 | Unclear | Yes | Yes | Yes | Yes | Yes | No | No | 5/8 |
| Nell, 1991 | Yes | Yes | Unclear | Unclear | Yes | Yes | No | No | 4/8 |
| Numminen, 2011 | Yes | Yes | NR | No | NR | Yes | Yes | Yes | 5/8 |
| Peloso, 2004 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Perez, 2012 | Yes | Yes | N/A | N/A | Unclear | Yes | Yes | Yes | 5/8 |
| Polinder, 2005 | No | Yes | Yes | Yes | Yes | Yes | No | No | 5/8 |
| Reid, 2001 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Rickels, 2010 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Rutland-Brown, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Sallee, 2000 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Schneier, 2006 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Servadei, 2002 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Sills, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Sosin, 1996 | Yes | Yes | Unclear | Yes | Yes | Yes | No | Yes | 6/8 |
| Steudel, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Styrke, 2007 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Tate, 1998 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Thurman, 1996 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Thurman, 1999 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| Tieves, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Tiret, 1990 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Vasquez-Barquero, 1992 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Ventsel, 2008 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |
| von Elm, 2008 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | 7/8 |
| von Wild, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Willer, 2004 | Yes | Yes | Yes | Yes | Yes | Yes | No | No | 6/8 |
| Zygun, 2005 | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | 7/8 |

Supplementary Table S4b. Quality assessment scores for included studies using study

designs without response rates

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Q1** | **Q2** | **Q3** | **Q4** | **Q5** | **Q6** | **Q7** | **Q8** | **Total Score** |
| Andelic, 2012 | Yes | Yes | N/A | N/A | NR | Yes | Yes | No | 4/6 |
| Asemota, 2013 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Cameron, 2012 | Yes | Yes | N/A | N/A | NR | Yes | Yes | Yes | 5/6 |
| Coronado, 2012 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| DiMaggio, 2013 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Feigin, 2013 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Harrison, 2012 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Harvey, 2012 | Yes | Yes | N/A | N/A | Unclear | Yes | Yes | No | 4/6 |
| Kerr, 2014 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Leibson, 2011 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Mauritz, 2014 | Yes | Yes | N/A | N/A | Unclear | Yes | Yes | Yes | 5/6 |
| Piatt, Jr., 2012 | Yes | Yes | N/A | N/A | Yes | Yes | Yes | Yes | 6/6 |
| Walder, 2013 | Yes | Yes | N/A | N/A | NR | Yes | Yes | No | 4/6 |

Abbreviations

N/A: not applicable

NR: not reported

Study Assessment Questions

Q1: Is the target population clearly defined?

Q2: Was probability sampling used or was the entire population surveyed?
Q3: Is the response rate >70%?

Q4: Are non-responders clearly described?

Q5: Is the sample representative of the target population?

Q6: Were data collection methods standardized?

Q7: Were validated criteria used to assess for the presence/absence of TBI?

Q8: Are the estimates of incidence given with confidence intervals and in detail by subgroup (if applicable)?

**Figure Legend**

**Figure 1.** Flow chart of search strategy for traumatic brain injury (TBI). Four thousand and ninety-four citations were originally identified. Two hundred and sixteen full-text articles were assessed for eligibility. Ten studies were identified through hand searching; ultimately 82 studies were included in the systematic review.

**Figure 2.** Incidence proportion of TBI, across age groups. Forest plot comparison of TBI incidence proportion by age subgroup. The horizontal bars depict corresponding 95% confidence intervals for each estimate. The incidence proportion of TBI in pediatric populations (110.26, CI: 33.98-357.84), elderly populations (166.42, CI: 142.84-193.89), and all ages (294.74, CI: 273.70-317.40) is shown.

**Figure 3.** Incidence rate of TBI, across age groups. Forest plot comparison of TBI incidence rate by age subgroup. The horizontal bars depict corresponding 95% confidence intervals for each estimate. The incidence rate for combined adolescent and adult studies was significantly higher than that of pediatric populations and combined adult, adolescent, and elderly populations

**Figure 4.** Incidence proportion of TBI, across continents. Forest plot comparison of TBI incidence proportion by continent subgroup. The horizontal bars depict corresponding 95% confidence intervals for each estimate. The incidence proportion of TBI was lower in Europe (227.74, CI: 157.71-328.87) than North America (331.29, CI: 305.30-359.49), Asia (380.35, CI: 360.59-401.19) or Australasia (414.56, CI: 25.08-6853.12).

**Supplementary Material**

**Supplementary Appendix S1.** Search strategy methods. The Medline and Embase databases were searched using terms related to brain injury and epidemiology.

**Supplementary Appendix S2**. Study quality assessment tool. Each included study was given a score from 0 to 8, with a score of “8” denoting a high quality population-based study. For those studies in which a response rate was not applicable (e.g., registry data sources), a total quality denominator of 6 was used.

**Supplementary Table S3**. Characteristics of Incidence Studies of Traumatic Brain Injury. Table S3a presents the characteristics of all included incidence studies (e.g., data source, method of diagnosis, and crude and standardized incidence estimates). Characteristics of studies exclusively on mild TBI (3b), moderate TBI (3c), and severe TBI (3d) are shown separately.

**Supplementary Table S4.**  Quality assessment results. Each included study was assigned a quality score out of 8 (or 6, if a response rate was not applicable). Higher quality studies tended to have representative samples, standardized data collection methods, and have high response rates.