**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-years  1991: 99.5  1992: 95.5  1993: 94.6  1994: 95.2  1995: 99 | - | Per 100,000 person-years  124.2  113.9  114  114  117.5 | Per 100,000 person-years  76.2  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: 66.8  2005: 75.5  2006: 73.7  2007: 67.7  2008: 57.9  2009: 59.3  Mild  2005: 33.8  2009: 27.4  Moderate  2005: 30.1  2009: 22.5  Severe  2005: 11.7  2009: 9.4 |  |  |  |  |  |
| Baldo, 2003 | 1996-2000 (annual) | Italy | All ages | Mild; Moderate; Severe | ICD-9-CM | Administrative Database; Hospital/Clinic Review | Administrative Data Codes | 1996  Overall: 301  Mild: 134.3  Moderate: 42.7  Severe: 17  0-4yoa:  617.1  5-14yoa:  315.8  15-24yoa: 526.4  25-44yoa: 205.9  45-64yoa: 197.8  65-84yoa: 347.7  >85yoa: 686.9  1997  Overall: 269.9  Mild: 119.1  Moderate: 39.9  Severe: 18.8  0-4yoa:  543.1  5-14yoa:  238.4  15-24yoa: 445.7  25-44yoa: 184.1  45-64yoa: 179.2  65-84yoa: 341.6  >85yoa: 759.6  1998  Overall: 249.3  Mild: 108.4  Moderate: 40.8  Severe: 18.6  0-4yoa:  538.6  5-14yoa:  235.9  15-24yoa: 377.4  25-44yoa: 175  45-64yoa: 155.4  65-84yoa: 323.7  >85yoa: 733.9  1999  Overall: 207.2  Mild: 82.5  Moderate: 43.1  Severe: 16.5  0-4yoa:  443.6  5-14yoa:  186.7  15-24yoa: 298.5  25-44yoa: 141.1  45-64yoa: 133  65-84yoa: 278.5  >85yoa: 692.3  2000  Overall: 212.4  Mild: 112.8  Moderate: 28.1  Severe: 37.7  0-4yoa:  465.6  5-14yoa:  202.4  15-24yoa: 294.4  25-44yoa: 143.1  45-64yoa: 137.4  65-84yoa: 287.6  >85yoa:  698.7 | - | 1996  375.1  1997  331.6  1998  311.9  1999  262.4  2000  273.2 | 1996  230.7  1997  211.3  1998  189.9  1999  154.8  2000  154.7 | - | - |
| 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: 4.2  2004: 4.1  2005: 4.6  2006: 4.9  2007: 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 | 1991  Overall: 119.4  1991-1993  Overall: 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)  1994-1996  Overall: 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)  1997-1999  Overall: 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)  2000-2002  Overall: 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)  2003-2005  Overall: 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)  2005  Overall: 72.7 | - | 1991-1993  140  (130.3-149.7)  1994-1996  109  (101.2-116.7)  1997-1999  101.1  (93.2-109)  2000-2002  88.1  (80.7-95.5)  2003-2005  98  (89.6-106.5) | 1991-1993  72.7  (67.5-78)  1994-1996  55.6  (51.7-59.6)  1997-1999  53.7  (49.3-58.1)  2000-2002  45.9  (41.8-50)  2003-2005  51.4  (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: 102.1  Colorado: 101.9  Missouri: 103  Oklahoma: 97.7  Utah: 108  <5yoa: 101  5-14yoa: 69.7  15-24yoa: 176.7  25-34yoa: 105.7  35-44yoa: 84.1  45-54yoa: 68.4  55-64yoa: 67  65-74yoa: 82.2  >75yoa: 186.2 | Colorado: 104.8  Missouri: 104.1  Oklahoma: 98.1  Utah: 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: 79  Alaska:  92.8  Arizona:  96.9  California:  75.8  Colorado:  90.9  Maryland:  92.8  Minnesota:  87.7  Nebraska:  50.6  New Jersey:  81.2  New York:  74.4  Oklahoma:  83.4  South Carolina: 65.2  Utah:  79.8  0-4yoa: 61.2  5-14yoa: 42  15-24yoa: 103.3  25-34yoa: 62.9  35-64yoa: 60.9  65-74yoa: 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: 87.9  Alaska:  93.9  Arizona:  105  Colorado:  91.8  Maryland:  91.8  Minnesota:  89.5  Nebraska:  51.8  Oklahoma:  90.5  South Carolina: 69.6  Utah:  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: 218  Hualien 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: 154.5  African: 103.1  Asian: 122  Indian: 110.6  White: 150.3  65-74yoa: 85.1  75-84yoa: 187.4  >84yoa: 366.6 | Overall: 155.9  African: 107.4  Asian: 138.8  Indian: 118.9  White: 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: 549.6  1996: 425.6  1997: 451.9  1998: 540.7  1999: 555.8  2000: 560.0  2001: 523.0  2002: 540.2  2003: 534.1  2004: 604.0  2005: 618.5  2006: 594.4  2007: 565.2  2008: 728.7  2009: 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: 237  40-69yoa: 56  70-79yoa: 93  >80yoa: 123 | - | - | - | - | - |
| Eisele, 2006 | 1999 (1-year) | United States | Infant; Pediatric | Mild; Moderate; Severe | ICD-9-CM | Other | Administrative Data Codes; Other | 1moa: 178  8moa: 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: 8  5-9yoa: 10  10-14yoa: 11  15-17yoa: 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: 224  1991-1993: 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)  Mild  Overall: 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-Severe  Overall: 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)  Mild  Overall: 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-severe  Overall: 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)  Mild  980 (915-1051)  Moderate-severe  60 (46-80) | Overall: 589 (539-642)  Mild  568 (519-620)  Moderate-severe  21 (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: 180.6  African: 130.4  Indian: 90.7  White: 185.2  65-74yoa: 99.8  75-84yoa: 219.4  >85yoa: 566.2  1992-1994:  Overall: 133.3  African: 118.3  Indian: 93.3  White: 134.5  65-74yoa: 81.3  75-84yoa: 158.7  >85: 308.4  2001-2003  Overall: 238.4  African: 159.8  Indian: 120.4  White: 245.1  65-74yoa:  123  75-84yoa:  294.1  >85yoa:  566.2 | - | 1992-2003  203.8  1992-1994  163.2    2001-2003  253 | 1992-2003  164.5  1992-1994  113.1  2001-2003  228 | - | - |
| 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: 19.3  2010-2011: 72.2  (Adjusted to the New South Wales population in each year estimated) |  |  | 1998-1999: 24.6  2010-2011: 86.5 | 1998-1999: 15.3  2010-2011:61.2 |
| 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: 207  15-19yoa: 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-years  322 (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: 7.3  0-4: 13.1  5-9: 6.4  10-14: 7.3  15-19: 10.6  20-24: 9.0  25-29: 7.0  30-34: 5.7  35-39: 5.0  40-44: 4.7  45-49: 4.7  50-54: 4.4  55-59: 4.3  60-64: 4.3  65-69: 5.3  70-74: 7.3  75-79: 11.3  80-84: 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)  Age  0 – 4 yoa: 421 (303-581)  5 – 9 yoa: 213 (147 – 290)  10 – 14 yoa: 267 (173 – 360)  15 – 17 yoa: 316 (206 – 458)  Severity  Mild: 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)  Age  0 – 4 yoa: 482 (339-666)  5 – 9 yoa: 265 (177-373)  10 – 14 yoa: 373 (236-518)  15 – 17 yoa: 444 (270-674)  Severity  Mild: 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)  Age  0 – 4 yoa: 357 (244-503)  5 – 9 yoa: 158 (102-228)  10 – 14 yoa: 156 (93-225)  15 – 17 yoa: 184 (107-271)  Severity  Mild: 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 | 1991-2005  101  1991-5  97  1996-2000  102  2001-5  104 | - | 1991-2005  122 | 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: 69.4  African: 74.2  Asian: 30.9  Indian: 76.7  White: 63  Alaska:  79.1  Arizona:  89.9  California:  60.4  Colorado:  87.8  Louisiana:  57.8  Maryland:  97.7  Minnesota:  56.8  Missouri:  88.2  Nebraska:  65.2  New York:  72.1  Oklahoma:  65.3  Rhode Island:  53.8  South Carolina:  58.7  Utah:  72.1  0-4yoa: 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: 69.7  African: 74.4  Asian: 34.8  Indian: 75.3  White: 62.9  Alaska:  81.4  Arizona:  89.4  California:  61.4  Colorado:  89.4  Louisiana:  57.7  Maryland:  99.2  Minnesota:  56.7  Missouri:  87  Nebraska:  64  New York:  71.9  Oklahoma:  64.2  Rhode Island:  52.1  South Carolina:  58.7  Utah:  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: 798.8  African: 801.4  White: 803.2  0-4yoa: 1120.7  5-9yoa: 659.3  10-14yoa: 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: 131.7  Mild: 92  Moderate: 23  Serious: 12  Severe: 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: 133.7  White: 135.4  Other: 132.3  Mild: 95.25  Moderate: 20.8  Serious: 12  Severe: 5.7  1986  Overall: 134.2  White: 134  Other: 137.7  Mild: 94.3  Moderate: 23.1  Serious: 11.8  Severe: 5  1986 0-4yoa:  140  1986 15-24yoa: 236  (Adjusted to the 1980 United States population) | - | - | 1985  147  1986  144.2 | 1985  68.1  1986  67.4 |
| Mauritz, 2014 | 2009-2011 (2-year) | Austria | All Ages | Mild; Moderate; Severe | ICD-10 | Registry; Administrative Database | Chart Review; Administrative Data Codes | Overall: 303  0-4 yoa: 470  5-9 yoa: 335  10-14 yoa: 348  15-19 yoa: 469  20-24 yoa: 355  25-29 yoa: 220  30-34 yoa: 170  35-39 yoa: 150  40-44 yoa: 149  45-49 yoa: 169  50-54 yoa: 198  55-59 yoa: 202  60-64 yoa: 214  65-69 yoa: 256  70-74 yoa: 362  75-79 yoa: 473  80-84 yoa: 721  85-89 yoa: 1213  90-94 yoa: 2210  > 95 yoa: 2538 |  | Overall: 364  0-4 yoa: 473  5-9 yoa: 393  10-14 yoa: 439  15-19 yoa: 558  20-24 yoa: 483  25-29 yoa: 306  30-34 yoa: 235  35-39 yoa: 208  40-44 yoa: 200  45-49 yoa: 224  50-54 yoa: 262  55-59 yoa: 272  60-64 yoa: 302  65-69 yoa: 355  70-74 yoa: 479  75-79 yoa: 588  80-84 yoa: 859  85-89 yoa: 1389  90-94 yoa: 2576  > 95 yoa: 2991 | Overall: 245  0-4 yoa: 467  5-9 yoa: 276  10-14 yoa: 248  15-19 yoa: 373  20-24 yoa: 225  25-29 yoa: 135  30-34 yoa: 102  35-39 yoa: 92  40-44 yoa: 93  45-49 yoa: 113  50-54 yoa: 136  55-59 yoa: 142  60-64 yoa: 131  65-69 yoa: 168  70-74 yoa: 263  75-79 yoa: 387  80-84 yoa: 638  85-89 yoa: 1143  90-94 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: 666  African:  616.4  Non-African and Non-White: 620.4  White: 690.2  <1yoa: 1268.9  1-4yoa: 865.1  5-9yoa: 484.7  10-14yoa: 493.3  15-19yoa: 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 100  Overall: 1.75  0-5yoa: 1.85  5-10yoa: 1.1  10-15yoa: 1.17  15-20yoa: 2.36  20-25yoa: 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-years  Overall: 316.42  African: 355.3  Asian: 208.97  Colored: 298.26  White: 109.38  15-24yoa: 359.16  25-44yoa: 408.79  45-64yoa: 227.05  >64yoa: 63.4 | - | Per 100,000 person-years  523.64 | Per 100,000 person-years  109 | - | - |
| 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 circumstances  0-17 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 circumstances  0-17 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: 630.1  2000: 775.9  2001: 737.3  2002: 682.3  2003: 644.3  2004: 626  2005: 611.1  2006: 583.7  2007: 574.7  2008: 534.8  2009: 545.3  Traffic-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: 319.2  2000: 360.5  2001: 352.7  2002: 324.5  2003: 311  2004: 313  2005: 309.5  2006: 300  2007: 295.1  2008: 299.8  2009: 316  Traffic-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:76.7  5 – 9 yoa: 53.0  10 – 14 yoa:62.2  15 – 18 yoa: 137.9  Overall 2000: 63.8  < 5 yoa: 66.4  5 – 9 yoa: 39.2  10 – 14 yoa: 40.0  15 – 18 yoa: 110.6  Overall 2003: 59.8  < 5 yoa: 61.4  5 – 9 yoa: 34.0  10 – 14 yoa: 47.0  15 – 18 yoa: 104.4  Overall 2006: 60.2  < 5 yoa: 63.2  5 – 9 yoa: 31.5  10 – 14 yoa: 44.5  15 – 18 yoa: 108.9  Overall 2009: 55.0  < 5 yoa: 66.9  5 – 9 yoa: 26.9  10 – 14 yoa: 40.4  15 – 18 yoa: 90.8  Severe Head Injuries  1997: 8.11  < 5 yoa: 6.23  5 – 9 yoa: 4.78  10 – 14 yoa: 6.34  15 – 18 yoa: 16.98  2000: 7.57  < 5 yoa: 5.78  5 – 9 yoa: 4.08  10 – 14 yoa: 5.33  15 – 18 yoa: 16.92  2003: 6.95  < 5 yoa: 5.17  5 – 9 yoa: 3.93  10 – 14 yoa: 5.28  15 – 18 yoa: 14.90  2006: 6.70  < 5 yoa: 4.50  5 – 9 yoa:3.34  10 – 14 yoa:4.62  15 – 18 yoa: 15.73  2009: 5.58  < 5 yoa: 4.88  5 – 9 yoa: 2.24  10 – 14 yoa: 4.03  15 – 18 yoa: 12.22 |  | Overall 1997: 101.0  < 5 yoa: 87.1  5 – 9 yoa: 68.1  10 – 14 yoa: 85.6  15 – 18 yoa: 179.7  Overall 2000: 82.3  < 5 yoa: 75.4  5 – 9 yoa: 50.0  10 – 14 yoa: 67.6  15 – 18 yoa: 150.0  Overall 2003: 76.1  < 5 yoa: 70.0  5 – 9 yoa: 42.3  10 – 14 yoa: 63.6  15 – 18 yoa: 140.1  Overall 2006: 78.2  < 5 yoa: 73.5  5 – 9 yoa: 40.0  10 – 14 yoa: 61.6  15 – 18 yoa: 147.8  Overall 2009: 70.8  < 5 yoa: 77.6  5 – 9 yoa: 33.6  10 – 14 yoa: 55.7  15 – 18 yoa: 124.3  Severe Head Injuries  1997: 10.58  < 5 yoa: 7.36  5 – 9 yoa: 5.94  10 – 14 yoa: 8.14  15 – 18 yoa: 23.56  2000: 10.08  < 5 yoa: 6.97  5 – 9 yoa: 5.04  10 – 14 yoa: 6.96  15 – 18 yoa: 24.03  2003: 9.12  < 5 yoa: 5.99  5 – 9 yoa: 5.04  10 – 14 yoa: 7.07  15 – 18 yoa: 20.39  2006: 8.76  < 5 yoa: 5.04  5 – 9 yoa: 3.95  10 – 14 yoa: 6.02  15 – 18 yoa: 22.07  2009: 7.33  < 5 yoa: 5.59  5 – 9 yoa: 2.86  10 – 14 yoa:5.24  15 – 18 yoa:17.20 | Overall 1997: 56.6  < 5 yoa: 65.9  5 – 9 yoa: 37.2  10 – 14 yoa:37.5  15 – 18 yoa: 93.7  Overall 2000: 44.3  < 5 yoa: 57.0  5 – 9 yoa: 28.1  10 – 14 yoa: 29.3  15 – 18 yoa: 68.9  Overall 2003: 42.6  < 5 yoa: 52.3  5 – 9 yoa: 25.3  10 – 14 yoa: 29.6  15 – 18 yoa: 68.5  Overall 2006: 41.4  < 5 yoa: 52.5  5 – 9 yoa: 22.5  10 – 14 yoa: 26.6  15 – 18 yoa: 67.9  Overall 2009: 38.4  < 5 yoa: 55.8  5 – 9 yoa: 19.9  10 – 14 yoa: 24.3  15 – 18 yoa: 55.6  Severe Head Injuries  1997: 5.53  < 5 yoa: 5.02  5 – 9 yoa: 3.57  10 – 14 yoa: 4.48  15 – 18 yoa: 10.02  2000: 4.92  < 5 yoa: 4.54  5 – 9 yoa: 3.06  10 – 14 yoa: 3.63  15 – 18 yoa: 9.39  2003: 4.66  < 5 yoa: 4.24  5 – 9 yoa: 2.77  10 – 14 yoa: 3.42  15 – 18 yoa: 9.09  2006: 4.52  < 5 yoa: 3.92  5 – 9 yoa: 2.70  10 – 14 yoa: 3.15  15 – 18 yoa: 9.04  2009: 2.97  < 5 yoa: 4.15  5 – 9 yoa: 1.61  10 – 14 yoa: 2.76  15 – 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:  73.5  Metropolitan 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: 581  Cases 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: 538.4  1999: 549.9  2000: 555.8  2001: 517.3  2002: 538.9  2003: 538.2  0-4yoa:  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: 105.2  African:  58.4  Alaska Native: 214.3  Asian:  52.7  Hispanic:  29.1  White:  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: 70  African: 51  White: 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: 250.4  1-4yoa:  732.6  5-9yoa:  231.3  10-14yoa:  247.3  15-24yoa:  453.6  25-34yoa:  179.1  35-44yoa:  115.4  45-54yoa:  145.9  55-64yoa:  173.4  65-74yoa:  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: 63.1  Intentional 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-years  Overall: 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-years  579  (510-648) | Per 100,000 person-years  357  (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: 354  Mild: 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: 108.8  0-4yoa:  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: 101.3  15-24yoa: 154.5  25-34yoa: 88.6  35-50yoa: 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: 346  10-14yoa: 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: 321  Hannover: 370  Munster: 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: 134.3  1997: 119.1  1998: 108.4  1999: 82.5  2000: 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-years  Northeast 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-years  Overall: 590  (512.1-667.9) | Per 100,000 person-years  Overall: 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: 3.22  1998: 4.02  1999: 4.65  2000: 6.68  2001: 7.21  2002: 7.38  2003: 6.99  2004: 7.10  2005: 5.99  2006: 8.42  2007: 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: 138.6  Hualien: 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: 95.25  1986: 94.3 | - | - | - | - | - |
| Murgio, 1999 | 1992-1994 (average annual) | Argentina | Pediatric | | None | Other; Registry | | Other | Overall: 566  0-2yoa: 830.83  3-9yoa: 1093.99  10-15yoa: 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: 143  1138  133  141  142  132  136  154  228  157  152  146  145  143  135 | - | - |
| 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: 13.099  7yoa: 12.443  8yoa: 10.93  9yoa: 14.404  10yoa: 14.21  11yoa: 15.988  12yoa: 16.768  13yoa: 15.05  14yoa: 9.623  15yoa: 11.819  16yoa: 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: 42.7  1997: 39.9  1998: 40.8  1999: 43.1  2000: 28.1 | - | - | - | - | - |
| Chiu, 2007 | 1991; 2001 (annual) | Taiwan | All ages | ICD-9 | Registry | Administrative Data Codes; Chart Review; Other | Taipei: 17.2  Hualien: 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: 20.8  1986: 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 | Rural  2009: 5.9  2010: 4.3  Urban  2009: 5.0  2010: 4.1 | 2009: 5.2  2010: 4.1  (Adjusted to the adult Norwegian population in 2009 and 2010) |  |  | 2009: 8.4  2010: 5.6 | 2009: 2.0  2010: 2.0 |
| Baldo, 2003 | 1996-2000 (annual) | Italy | All ages | ICD-9-CM | Administrative Database; Hospital/Clinic Review | Administrative Data Codes | 1996: 17  1997: 18.8  1998: 18.6  1999: 16.5  2000: 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: 21.9  Hualein: 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: 5.7  1986: 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.