

**Table 2a: Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
<b>Asia Pacific, High Income</b>						
	Japan	Shingu <sup>1</sup>	1990–1992	40.2 (Estimated number 9,752; Males, n=7,843, Females, n=1909)	75%	25%
	Japan (Okayama Prefecture)	Ide <sup>2</sup>	1988-1989	28.6 (n=55; Males, n=45, Females, n=10)	69%	31%
<b>Asia, East</b>						
	China	Zhao <sup>3</sup>	1983 and 1985	n/r*	31.4%-38.9%	68.6%
	Taiwan	Yeh <sup>4</sup>	1977-1989	250 cases annually** (total cases n=1,617 ; Males, n=1,295, Females n=322)	41.3%	58.7%
	Taiwan	Chen <sup>5</sup>	1992–1996	18.8 (n=1,232 ; Males, n=958, Females, n=274)	42.8	57.2%
	Taiwan	Chen <sup>5</sup>	1992–1996	47.5 (Geriatric population, n=297 ; Males, n=186, Females, n=111)	54.1%	45.3%
	Taiwan	Yang <sup>6</sup>	2000-2003	73.0 (n=6455) ; Males, n=3058, Females*, n=3397) *ICD9 806.X (Fractured vertebra with SCI and assuming male to female ratio 0.9	n/r	n/r
	Taiwan (Taipei)	Chen <sup>7</sup>	1978-1981	14.6 (n=560 ; Males, n=465, Females, n=95)	47%	53%

*continued*

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Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	Taiwan (Hualien County)	Lan <sup>8</sup>	1986-1990	56.1 (n=99 ; Males, n=79, Females, n=20)	69.7%	30.3%
<b>Asia, South</b>	Bangladesh	Hoque <sup>9</sup>	1994-1995	n/r (n=179; Males, n=158, Females, n=21)	40%	60%
	Nepal	Mukhida <sup>10</sup>	2001-2004	5 cases annually (Estimate, ages <19 years)(n=14 during study period ; Males, n=9, Females, n=5)	35%	65%
	Nepal (East)	Lakhey <sup>11</sup>	1997-2001	n/r (n=233 ; Males, n=169, Females, n=64)	37.8%	62.2%
	Pakistan	Raja <sup>12</sup>	1995-1999	5.1* (n=2,654 ; Males, n=1,922, Females, n=732) *	68%	32%
	Pakistan	Masood <sup>13</sup>	2003-2007	n/r (n=214 ; Males, n=189, Females, n=25)	47.2%	52.8%
	Pakistan	Rathore <sup>14</sup>	2006	n/r (n=83 ; Males, n=68, Females 15)	26.5%	71.1%
<b>Asia, Southeast</b>	Thailand (Chiang Mai)	Kovindha <sup>15</sup>	1985-1991	23 (n=398; Males, n=365, Females, n=33)	53%	47%
	Thailand (Bangkok)	Parajareya <sup>16</sup>	1989-1994	5.8 (Estimate based on 1992 population of 6,250,000; n=219; Males, n=186, Females, n=33)	50.2%	49.8%

*continued*

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Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
<b>Australasia</b>	Viet Nam	Weerts <sup>17, 18</sup>	2006-2007	13.9 (Estimate based on 2008 population of 86,116,560; n=247)	n/r	n/r
	Australia	O'Connor <sup>19</sup>	1998-1999	14.5 (Age-standardised, n=265; Males, n=201, Females, n=64)	57%	43%
	Australia	Cripps <sup>20</sup>	2006-2007	14.9 (Age-standardised, n=272; Males, n=226, Females, n=46)	50%	50%
	Australia (Victoria)	Cheshire <sup>21</sup>	1959-1966	11.6 (Based on Victorian population of 4 million ; n=390 ; Males, n=328, Females, n=62)	53%	47%
	Australia (Queensland)	Sutton <sup>22</sup>	1962-1971	16.6 (cases >9 years of age ; estimated incidence based on 1.75 million population, n=232 ; Males, n=202, Females n=30)	55%	45%
	Australia (Victoria)	Burke <sup>23</sup>	1978-1982	325 cases during reporting period, Males, n=254, Females, n=71	51.8%	48.2%
	New Zealand	Dixon <sup>24</sup>	1988	49.1 (n=164 ; Males, n=120, Females, n=44)	52%	48%
<b>Europe, Central</b>	Poland (Poznan)	Jankowski <sup>25</sup>	1979-1992	n/r (n=511 ; Males, n=449, Females, n=62)	50.3%	49.7%

*continued*

**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
Europe, Eastern	Romania (Bucharest)	Soopramanien <sup>26</sup>	1975-1992	28.5 (n=400/yr approx ; Male, n=317, Females, n=95)	60%	40%
	Estonia	Sabre <sup>27</sup>	2003-2007	27.9 (n=191; Males, n=159, Females, n=32)	50.2%	49.8%
	Russia (Novosibirsk)	Silberstein <sup>28</sup>	1989-1993	29.7 (n=196 over period 5 yrs ; Males, n=153, Females, n=43)	49%	51%
Europe, Western	Russia (Saint Petersburg)	Kondakov <sup>29</sup>	1994-1996	44 (n=105; Males, n=68, Females, n=37).	37% (neurological level not reported for 23%)	33%
	Denmark	Biering-Sorensen <sup>30</sup>	1975-1984	9.2 (n=360 over this period ; Males, n=262, Females=98)	51%	49%
	Finland	Kannus <sup>31</sup>	1970-1995	50 (Fall-related SCI in 50 years and above in 1970) ; 270 (Fall-related SCI in 50 years and above in 1995)	n/r	n/r
	Finland (Helsinki)	Dahlberg <sup>32</sup>	1978-1997	13-15 (n=55 cases per year ; Males 76%, Females 24%)	46%	54%
	Finland	Ahoniemi <sup>33</sup>	1976-2005	13.8 (n=1,647 >16yrs ; Males, n=1,362, Females, n=285)	51%	49%
	France	Albert <sup>34</sup>	2000	19.4 (n=934 Ages>15 years)	n/r	n/r

*continued*

**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	France (Rhone-Alpes Region)	Minaire <sup>10</sup>	1970-1975	12.7 (n=351 ; Males, n=276, Females, n=75)	28%	72%
	Germany	Exner <sup>35</sup>	1976-1996	10.7 (Based on 1985 pop of 77,685,000; n=16,559 over the reporting period ; Males, n=11,827, Females, n=4,732)***	38%	62%
	Germany	Koning <sup>36</sup>	1983	36 (n=2,213)	n/r	n/r
	Greece (Thessaloniki)	Divanoglou <sup>37</sup>	2006-2007	33.6 (n=87 >15 yrs ; Males, n=77, females, n=10)	48%	52%
	Greenland	Pedersen <sup>38</sup>	1965-1986	26 (n=27 ; Males, n=20, Females, n=7)	33.3%	66.7%
	Iceland	Knutsdottir <sup>39</sup>	1973-1989	24 (1973-82) ; 18 (1983-89) (n=79) ; Males, n=43, Females, n=16 were living)	55.6%	44.4%
	Ireland	O'Connor <sup>40</sup>	2000	13.1 (n=46 ; Males, n=40, Females, n=6)	50%	50%
	Ireland (West Ireland)	Roche <sup>41</sup>	4-year study	195.4 <b>check</b> (n=285 ; Males, n=175, Females, n=111)	43%	57%
	Israel	Catz <sup>42</sup>	1959-1992	15.9 (n=250 consecutive patients; Males, n=189, Females, n=61) (Based on 1989 pop)***	36.4%	63.6%
	Israel	Ohry <sup>43</sup>	1974-1984	1 (Approx., paediatric SCI. n=23; Males, n=15, Females, n=8)	52%	48%
	Italy (7 Rehabilitation Centres)	Celani <sup>44</sup>	1989-1994	2.3 (n=642; Males, n=509, Females, n=133) (Based on 1990 population)***	35.7%	64.3%

*continued*

**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	Italy	Pagliacci <sup>45</sup>	1997-1999	Estimated to be 18-20 (n=684; Males, n=548, Females, n=136)	39.9%	56.6%
	Italy (Veneto)	Caldana <sup>46</sup>	1994-1995	14.3 (n=127; Males, n=106, Females, n=21)	48.8%	48.0%
	Netherlands	Schonherr <sup>47</sup>	1982-1993	7.7 (n=142; Males, n=109, Females, n=33)	46%	54%
	Netherlands	van Asbeck <sup>48</sup>	1994	7.5 (n=113; Males, n=87, Females, n=26)	57.5%	42.5
	Netherlands and Belgium (Flanders)	Osterthun <sup>49</sup>	2002-2007	n/r (n=503; Males, n=371, Females, n=132)	49.6%	50.4%
	Norway	Lidal <sup>50</sup>	1961-1982	4.5 approx (n=387; Males, n=321, Females, n=66)	47%	53%
	Norway	Gjone <sup>51</sup>	1974-1975	16.5 (n=131; Males, n=109, Females, n=22)	53%	47%
	Norway	Augutis <sup>52</sup>	2002-2004	1.5 (Paediatric SCI aged 0-15 yrs, n=42)	n/r	n/r
	Norway (Western)	Hagen <sup>53</sup>	1952-2001	26.3 (Annual incidence in 1997-2001; n=71; Males, n=277, Females, n=59)	52.4%	47.6%
	Portugal (Coimbra)	Martins <sup>54</sup>	1989-1992	57.8 (Survivors plus those who died, n=398 ; Males, n=306, Females, n=92))	51.2%	48.8%
	Portugal	Augutis <sup>52</sup>	2002-2004	27 (Paediatric SCI aged 0-14 yrs, n=138)	n/r	n/r

*continued*

**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	Spain	Herruzo-Cabrera <sup>55</sup>	1984-1985	8.1*** (n=208)	n/r	n/r
	Sweden	Augutis <sup>52</sup>	2002-2004	4.6 (Paediatric SCI aged 0-15 yrs, n=21)	n/r	n/r
	Sweden (Stockholm)	Divanoglou <sup>37</sup>	2006-2007	19.6 (n=49; Males, n=36, Females, n=11 [consenting cases])	45%	55%
	Sweden	Augutis <sup>56</sup>	1985-1996	4.6 (Paediatric SCI aged 0-15 yrs, n=92; Males, n=47, Females, n=45)	43%	57%
	Switzerland	Gehrig <sup>57</sup>	1960-1967	15 (n=584; Males, n=461, Females, n=123)	33%	66%
	UK	Augutis <sup>52</sup>	2002-2004	5.2 (Paediatric SCI aged 0-14 yrs, n=180)	n/r	n/r
	UK (Midlands, Nth Wales, Mid Wales, South Mersey)	Aung <sup>58</sup>	1985-1988	7.3 (n=219; Males, n=173, Females, n=46)	53%	47%
Latin America, Tropical	Brazil	Brasil <sup>59</sup>	1986-1995	n/r (n=164; Males, n=134, Females, n=30)	52%	48%
	Brazil	Greve <sup>60</sup>	1986-2007	Estimated 17.3*** (n=3,289; Males, n=2,741, Females, n=548)	n/r	n/r
	Brazil (San Paulo)	Barros <sup>61</sup>	1982-1987	10.1 (Estimated using 1981 population of San Paulo)**** (n=428; Males, n=404, Females, n=24)	49.8%	50.2%

*continued*

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Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
North Africa/Middle East	Brazil (7 Brazilian capitals)	Campos da Paz <sup>62</sup>	1988	n/r (n=108; Males, n=87, Females, n=21)	35.1%	64.9%
	Jordan	Otom <sup>63</sup>	1988-1993	18 (n=151; Males, n=129, Females, n=22)	31.8%	68.2%
	Saudi Arabia	Alshahri <sup>64</sup>	2003-2008	2.1 (based on a population of 24 million ; n=307 over the 6-year period ; Males 271, Females 36)	52%	48%
	Turkey	Dincer <sup>65</sup>	1974-1985	n/r (n=1,694 ; Males, n=1,282, Females, n=412)	92%	8%
	Turkey	Karacan <sup>66</sup>	1992	12.7 (n=581 ; Males, n=415, Females, n=166)	32.2%	67.8%
	Turkey (SE Anatolia)	Gur <sup>67</sup>	1990-1999	12.06 (Average incidence) (n=539 ; Males, n=416, Females, n=123)	28%	72%
	Turkey (Istanbul)	Karamehmetoglu <sup>68</sup>	1992	21.1 (n=152 ; Males, n=114, Females, n=38)	33%	67%
	Turkey (Rural areas)	Karamehmetoglu <sup>69</sup>	1994	16.9 (n=75; Males, n=64, Females, n=11)	41.3%	58.7%
North America, High Income	Canada	Rick Hansen SCI Register <sup>70</sup>	2001-2002	35 (n=1,050; Males, n=840, Females, n=210)	50%	50%
	Canada (Toronto)	Tator <sup>71</sup>	1947-1973	2.3 (n=351; Males, n=287, Females, n=64)	56.7%	43.3%

*continued*



**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	Canada (Quebec)	Barss <sup>72</sup>	1961-2004	0.64 (Diving related SCI, n=171) Males, n=82, Females 7, based on 89 survivors	100% (n=171)	n/r
	Canada (British Columbia)	Andrews <sup>73</sup>	1964-1977	0.66 (Paediatric cases, n=15; Males, n=9, Females, n=6)	6.6%	93.4%
	Canada (Toronto)	Tator <sup>71</sup>	1974-1981	3.6 (n=201; Males, n=160, Females, n=41)	63.2	36.8%
	Canada (Alberta)	Hamilton <sup>74</sup>	1975-1988	9.9 (Paediatric cases 17 yrs and below, based on 1988 population of 1.25 million; n=174, Males, n=115, Females, n=59)	42%	58%
	Canada (Manitoba)	Hu <sup>75</sup>	1981-1984	290 (n=944; Males, n=570, Females, n=374)	33%	67%
	Canada (Ontario)	Pickett <sup>76</sup>	1994–1999	From 37.2–46.2 age standardised rates (n=2,385; Males, n=1,632, Females, n=753)	n/r	n/r
	Canada (Alberta)	Dryden <sup>77</sup>	1997–2000	52.5 (n=450 ; Males, n=322, Females, n=128)	52%	48%
	Canada (Southwest Ontario)	Pickett <sup>78</sup>	1997-2001	40.8 ( n=151; Males, n=112, Females, n=39)	75%	25%
	USA	Samsa <sup>79</sup>	1940-1987	n/r (n=5,545 ; Male veterans)	38%	62%
	USA	Bracken <sup>80</sup>	1970-1977	40.1 (8-year incidence)	n/r	n/r

*continued*

**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	USA	Nobunaga <sup>81</sup>	1973-1998	n/r (n=25,054 ; Males, n=20,419, Females, n=4,635)	54%	46%
	USA	Jackson <sup>82</sup>	1973-2003	40 (n=30,532 ; Males, n=24,426, Females, n=6,106)	54%	46%
	USA	Kalsbeek <sup>83</sup>	1974	50 (estimated n=10,000 ; Males, n=5,000, Females, n=5,000)	n/r	n/r
	USA	Burney <sup>84</sup>	1982-1989	n/r (n=2,741 ; Males, n=2,165, Females, n=576)	55%	45%
	USA	Stover <sup>85</sup>	1984	30.0 (n=10,000+ ; Males, n=8,000, Females, n=2,000)	52%	48%
	USA	Harvey <sup>86</sup>	October 1988 to May 1989	n/r (n=758 ; Males, n=538, Females, n=220)	44%	56%
	USA	Ditunno <sup>87</sup>	1993	38.8 (Estimated)	n/r	n/r
	USA	Lasfargues <sup>88</sup>	1994	38 (n=11,500 estimated ; Males, n=8,015, Females, n=3,485)	n/r	n/r
	USA	Vitale <sup>89</sup>	1997-2000	19.9 (Paediatric SCI, ages 0-18 years; n=2,909; Males, n=2,088, Females, n=821)	n/r	n/r
	USA	Ho <sup>90</sup>	2000-2003	n/r	53%	47%

*continued*

**Table 2a (continued): Incidence and neurological level of traumatic spinal cord injury by Region and Author(s) of published data**

Region	Country	Author(s) of published data	Observation period	Incidence per million population per year	Neurological level of injury	
					Tetraplegia %	Paraplegia %
	USA	NSCISC <sup>91</sup>	2005	40 (n=11,000 approx. ; Males, n=8,756, Females, n=2,244)	53%	47%
	USA (Olmsted County, Minnesota)	Griffin <sup>92</sup>	1935-1981	54.8 (age-standardised rate ; n=154 ; Males, n=111, Females, n=43)	51% (1950-1981)	49% (1950-1981)
	USA (California)	Kraus <sup>93</sup>	1970-1971	53.4 (n=619 ; Males, n=457, Females, n=162)	38%	62%
	USA (Arkansas)	Acton <sup>94</sup>	1980-1989	28.5 (age-adjusted incidence ; n=644 ; Males, n=518, Females, n=126)	43.9%	56.1%
	USA (New York)	MMWR <sup>95</sup>	1982-1988	43 (n=5,384)	n/r	n/r
	USA (Hawaii)	Goebert <sup>96</sup>	1987-1989	23.7 (Based on 1989 population of 1,245,600 ; n=59 ; Males, n=50, Females, n=9)	62.1%	37.9
	USA (Oklahoma)	Price <sup>97</sup>	1988-1990	40 (n=376 ; Males, n=300, Females, n=76)	57%	43%
	USA (Utah)	Thurman <sup>98</sup>	1989-1991	43 (47 cases per million, age adjusted to 1980 US pop ; n=223, Males, n=169, Females, n=54)	57%	43%
	USA (Alaska)	Warren <sup>99</sup>	1991-1993	83 (n=139 ; Males, n=116, Females, n=23)	39.4%	60.6%
	USA (Mississippi)	Surkin <sup>100</sup>	1992-1994	77 (n=395 ; Males, n=316, Females, n=79)	52.3%	47.7%
	USA (Colorado)	Johnson <sup>101</sup>	1994	45.1-46.3 (n=165-169)	n/r	n/r

*continued*

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					Tetraplegia %	Paraplegia %
	USA (Kentucky, Indiana)	Burke <sup>102</sup>	1993-1998	27.1 (n=161; Males, n=121, Females, n=40)	49.7%	50.3%
	USA (Rhode Island)	Buechner <sup>103</sup>	1994-1998	56 (n=277; Males, n=185, Females, n=92)	n/r	n/r
	USA (Dade County)	Calancie <sup>104</sup>	1997-2000	n/r (n=229; Males, n=175, Females, n=54)	62%	38%
<b>Oceania</b>						
	Fiji Islands	Maharaj <sup>105</sup>	1985-1994	10.0 (n=75; Males, n=65, Females, n=10)	53%	47%
<b>Sub-Saharan Africa, Southern</b>						
	South Africa (Cape Province)	Key <sup>106</sup>	1963-1967	n/r (n=300; Males, n=270, Females, n=30)	45%	55%
	South Africa (Johannesburg)	Velmahos <sup>107</sup>	1988-1992	48.5 (Median based on 1990 population of 2,554,726; n=551; Males, n=428, Females, n=123)	10%	90%
	South African (Southern Transvaal)	Hart <sup>108</sup>	1988-1993	n/r (n=546; Males, n=437, Females, n=109)	25%	75%
	Zimbabwe	Levy <sup>109</sup>	1988-1994	11.7 (Based on estimated population of 11.6 million; n=136; Males, n=121, Females, n=15)	51%	49%
<b>Sub-Saharan Africa, West</b>						
	Nigeria (Zaria)	Iwegbu <sup>110</sup>	1973-1982	n/r (n=48; Males, n=42, Females, n=6)	15.8%	84.2%

*continued*

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					Tetraplegia %	Paraplegia %
	Nigeria (Plateau State)	Igun <sup>111</sup>	1984-1997	<i>5 cases per year (n=68; Males, n=62, Females, n=6)</i>	63%	37%
	Nigeria (Lagos)	Obalum <sup>112</sup>	1992-2006	n/r (n=468; Males, n=328, Females, n=140)	30.3%	69.7%
	Nigeria (Ilorin)	Solagberu <sup>113</sup>	1995-1999	n/r (n=39; Males, n=36, Females, n=3)	46%	54%
	Nigeria (Enugu)	Nwankwo <sup>114</sup>	1996-2000	n/r (n=74)	51.4%	48.6%
	Nigeria (Enugu)	Nwadinigwe <sup>115</sup>	1996-2001	n/r (n=104; Males, n=88, Females, n=16)	67%	33%
	Nigeria (Ile-Ife)	Olasode <sup>116</sup>	Estimate: 2004-2006	n/r (n=71; Males, n=47, Females, n=24)	59.1%	19.7%
	Senegal	Seye <sup>117</sup>				
	Sierra Leone	Gosselin <sup>118</sup>	2002-2004	3.4*** (n=24; Males, n=22, Females, n=2)	42%	58%

\* n/r: Not reported

\*\* Figures in italics indicate 'Incidence per million population per year' was not available

\*\*\* Source/: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, /World Population Prospects: The 2008 Revision/, <http://esa.un.org/unpp>

\*\*\*\* Source: [http://en.wikipedia.org/wiki/São\\_Paulo#Population\\_growth](http://en.wikipedia.org/wiki/São_Paulo#Population_growth)

\*\*\*\*\* Estimated incidence based on 1986-2007 case counts (3,289) and 2007 Brazilian population of 190,010,647.

\*\*\*\*\* Source: People and Place. Volume 12, No. 1, 2004, pg 7

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