RHSCIR
Rick Hansen Spinal Cord Injury Registry

SPINAL CORD INJURY FACTS AND STATISTICS

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CANADA

Spinal Cord Injury Admissions by Province

2001/2002

PROVINCE	TOTAL ADMISSIONS - SCI
Alberta	199
British Columbia	190
Manitoba	50
New Brunswick	53
Newfoundland	14
Northwest Territory	3
Nova Scotia	14
Ontario	488
Prince Edward Island	2
Quebec	316
Saskatchewan	53
Territories	3
National	***1,382***

NOTE: This data refers to the number of SCI cases admitted to sites in Canada. (Some cases counted more than once).
Data Source: 2004 National Trauma Registry, Hospital Injury Admissions - All Provinces (Table 10 - Appendix F)
Date Prepared: February 24, 2005

History of Spinal Cord Injuries

1996/1997 - 1,507
1997/1998 - 1,545
1998/1999 - 1,347
1999/2000 - 1,505
2000/2001 - 1,463
2001/2002 - 1,382
Number of SCI in Canada 1996 to 2002: 8,749

Data Source: 2003/04 National Trauma Registry, Hospital Injury Admissions - All Provinces (Table 5 - Appendix F)

Incidence and Prevalence of SCI

INCIDENCE RATE IN CANADA: 35 PERSONS/MILLION OR 1,050/YR

Estimated Number of Canadians living with SCI: 36,000

On average, of the newly injured clients referred to CPA each year:
80% are male
- 50% are paraplegic
- 50% are quadriplegic

Causes of Spinal Cord Injury

Car Collision: 35%
Falls: 16.5%
Medical: 10.8%
Sports: 6.7%
Other Motor Vehicle Collision: 6.2%
Driving: 5.3%
Industrial: 5.3%
Other: 14.2%

Data Source: Incidence/Prevalence/Causes SCI - Canadian Paraplegic Association (CPA)

Cost of SCI

Paralysis, in terms of quality of life and lost opportunities, is devastating. Approximately 80% of all spinal cord injury (SCI) occurs to individuals under the age of 30, with many living a normal lifespan. Financial care requirements, over a disabled lifetime, can vary from $1.25 million for a low thoracic paraplegic to $25 million for a high cervical quadriplegic like Christopher Reeve (requiring continuous ventilator support and 24/7 care). With cervical SCI recently accounting for more than half of all injuries, care costs will only soar.

Data Source: Int. Collaboration On Repair Discoveries

90% of what we know about spinal cord injury has been discovered in the last 10 years. With the knowledge and technology that is available to us, now, we believe it can be possible to walk away.

Data Source: Rick Hansen Man In Motion Foundation

U.S.A.

Incidence

It is estimated that the annual incidence of spinal cord injury (SCI), not including those who die at the scene of the accident, is approximately 40 cases per million population in the U. S., or approximately 11,000 new cases each year. Since there have not been any overall incidence studies of SCI in the U.S. since the 1970's it is not known if incidence has changed in recent years.

Prevalence

The number of people in the United States who are alive in July 2004 who have SCI has been estimated to be approximately 247,000 persons, with a range of 222,000 to 285,000 persons. (Note: Incidence and prevalence statistics are estimates obtained from several studies. These statistics are not derived from the National SCI Database.)

The **National Spinal Cord Injury Database** has been in existence since 1973 and captures data from an estimated 13% of new SCI cases in the U.S. Since its inception, 25 federally funded Model SCI Care Systems have contributed data to the National SCI Database. As of July 2004 the database contained information on 22,992 persons who sustained traumatic spinal cord injuries. All the remaining statistics on this sheet are derived from this database or from collaborative studies conducted by the Model Systems.

Detailed discussions of all topics on this sheet may be found in a special issue of the journal, Archives of Physical Medicine and Rehabilitation, published in November, 1999 and November, 2004.

Age at Injury

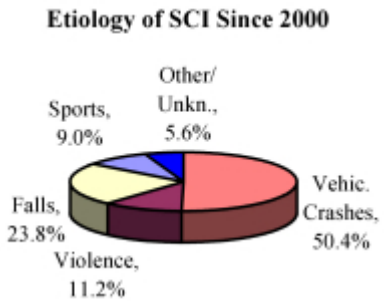
SCI primarily affects young adults. From 1973 to 1979, the average age at injury was 28.6 years, and most injuries occurred between the ages of 16 and 30. However, as the median age of the general population of the United States has increased by approximately 8 years since the mid-1970's, the average age at injury has also steadily increased over time. Since 2000, the average age at injury is 38.0 years. Moreover, the percentage of persons older than 60 years of age at injury has increased from 4.7% prior to 1980 to 10.9% among injuries occurring since 2000. Other possible reasons for the observed trend toward older age at injury might include changes in either referral patterns to model systems, the locations of model systems, survival rates of older persons at the scene of the accident, or age-specific incidence rates.

Gender

Since 2000, 78.2% of spinal cord injuries reported to the national database have occurred among males. Over the history of the database, there has been a slight trend toward a decreasing percentage of males. Prior to 1980, 81.8% of new spinal cord injuries occurred among males

Ethnic Groups

A significant trend over time has been observed in the racial distribution of persons in the database. Among persons injured between 1973 and 1979, 76.9% were Caucasian, 14.1% were African American, 6% were Hispanic, and 3% were from other racial/ethnic groups. However, among those injured since 2000, 67.5% are Caucasian, 19% are African American, 10.4% are Hispanic, and 3.1% are from other racial/ethnic groups. It is unknown whether changing locations of model systems, referral patterns to model systems, or race-specific incidence rates may be responsible for this trend.



Etiology

Since 2000, motor vehicle crashes account for 50.4% of reported SCI cases. The next most common cause of SCI is falls, followed by acts of violence (primarily gunshot wounds), and recreational sporting activities. The proportion of injuries that are due to sports has decreased over time while the proportion of injuries due to falls has increased. Acts of violence caused 13.3% of spinal cord injuries prior to 1980, and peaked between 1990 and 1999 at 21.8% before declining to only 11.2% since 2000.

Neurologic Level and Extent of Lesion

Persons with tetraplegia have sustained injuries to one of the eight cervical segments of the spinal cord; those with paraplegia have lesions in the thoracic, lumbar, or sacral regions of the spinal cord. Since 2000, the most frequent neurologic category at discharge of persons reported to the database is incomplete tetraplegia (34.3%), followed by complete paraplegia (25.1%), complete tetraplegia (22.1%), and incomplete paraplegia (17.5%). One percent of persons experienced complete neurologic recovery by hospital discharge. Over time, the percentage of persons with incomplete tetraplegia has increased slightly while both complete paraplegia and complete tetraplegia have decreased slightly.

Occupational Status

More than half (63.0%) of those persons with SCI admitted to a Model System reported being employed at the time of their injury. The post-injury employment picture is better among persons with paraplegia than among their tetraplegic counterparts. By post-injury year 10, 31.7% of persons with paraplegia are employed, while 26.4% of those with tetraplegia are employed during the same year.

Residence

Today 88.3% of all persons with SCI who are discharged alive from the system are sent to a private, noninstitutional residence (in most cases their homes before injury.) Only 5.1% are discharged to nursing homes. The remaining are discharged to hospitals, group living situations or other destinations.

Marital Status

Considering the youthful age of most persons with SCI, it is not surprising that most (53%) are single when injured. Among those who were married at the time of injury, as well as those who marry after injury, the likelihood of their marriage remaining intact is slightly lower when compared to the uninjured population. The likelihood of getting married after injury is also reduced.

Length of Stay

Overall, average days hospitalized in the acute care unit for those who enter a Model System immediately following injury has declined from 25 days in 1974 to 15 days in 2002. Similar downward trends are noted for days in the rehab unit (from 115 to 40 days). Overall, mean days hospitalized (during acute care and rehab) were greater for persons with neurologically complete injuries.

Lifetime Costs

The average yearly health care and living expenses and the estimated lifetime costs that are directly attributable to SCI vary greatly according to severity of injury.

Average Yearly Expenses (in 2004 dollars)

Severity of Injury	First Year	Each Subsequent Year
High Tetraplegia (C1-C4)	$682,957	$122,334
Low Tetraplegia (C5-C8)	$441,025	$50,110
Paraplegia	$249,549	$25,394
Incomplete Motor Functional at any level	$201,273	$14,106

Estimated lifetime costs by Age at Injury (discounted at 2%)

Severity of Injury	25 Years Old	50 Years Old
High Tetraplegia (C1-C4)	$2,693,887	$1,585,906
Low Tetraplegia (C5-C8)	$1,523,204	$964,608
Paraplegia	$900,085	$613,915
Incomplete Motor Functional at any level	$600,424	$435,139

These figures do not include any indirect costs such as losses in wages, fringe benefits and productivity which could average almost $56,964 per year but vary substantially based on education, severity of injury and pre-injury employment history.

Life Expectancy

Life expectancy is the average remaining years of life for an individual. Life expectancies for persons with SCI continue to increase, but are still somewhat below life expectancies for those with no spinal cord injury. Mortality rates are significantly higher during the first year after injury than during subsequent years, particularly for severely injured persons.

Life Expectancy for Persons who survive the first 24 hours

Age at Injury	No SCI	Motor Functional At any Level	Paraplegic	Low Tetraplegia (C5-C8)	High Tetraplegia (C1-C4)	Ventilator Dependant at any Level
20 yrs	58.1	53.1	45.7	40.8	36.4	16.6
40 yrs	39.2	34.6	28.1	23.9	20.5	7.1
60 yrs	21.9	18.0	13.0	10.2	8.0	1.4

Life Expectancy for Persons who survive at least 1 year post-injury

Age at Injury	No SCI	Motor Functional At any Level	Paraplegic	Low Tetraplegia (C5-C8)	High Tetraplegia (C1-C4)	Ventilator Dependant at any Level
20 yrs	58.1	53.6	46.4	42	38.5	23.8
40 yrs	39.2	35.1	28.7	25	22.1	11.4
60 yrs	21.9	18.4	13.5	10.9	9.0	3.1

Cause of Death

Years past, the leading cause of death among persons with SCI was renal failure. Today, however, significant advances in urologic management have resulted in dramatic shifts in the leading causes of death. Persons enrolled in the National SCI Database since its inception in 1973 have now been followed for 30 years after injury. During that time, the causes of death that appear to have the greatest impact on reduced life expectancy for this population are pneumonia, pulmonary emboli and septicemia.

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Data Source: National Spinal Cord Injury Statistical Center (NSCISC)

INTERNATIONAL

Global Summary of Spinal Cord Injury, Incidence and Economic Impact

Written and compiled for the ICCP March 2001 (Revised July 2004)

Spinal cord injury (SCI) is a global epidemic. Based on conservative average annual incidence of 22 people / million population in the western and developing world[1] it is estimated that over 130,000 people each year survive a traumatic spinal cord injury and begin a "new and different life" bound to a wheelchair for 40 years or more.

With an average age at injury of 33.4 years and most injuries occurring at the age of 19[2] and life expectancy diminished only by an average less than 10 %, and advances in health maintenance and emergency healthcare, it is clear that the population of people living with SCI is steadily increasing around the world.

By 2005, NEW injuries will swell the total world population of people living with spinal cord injury induced paralysis to over 2.5 million.

The economic impact on the community, in terms of the long term cost of care and cost of social welfare support reaches in excess of tens of billions of dollars each year. Reliable reports have estimated the cost in the United States alone at $ 7.7 billion dollars annually. In Canada that figure is $1.5 billion, over $500 million British Bounds in the United Kingdom and Australia around $1 billion

Until recently, the bleak prognosis for effective treatments to restore loss of function has caused the community and government to focus attention on the provision of basic and essential long term care services. Given the scientific understanding prior to the early 1990's that regeneration of the central nervous system tissue was impossible, this was an appropriate strategy.

Today however, we face a new horizon, and our strategy must change to address the opportunities to hasten the pace of discovery and develop effective treatments to find cures for the paralysis and loss of function caused by traumatic SCI.

Governments and communities must address the very real evidence of effective nervous tissue regeneration being demonstrated in the laboratories and turn these discoveries into effective therapies for young men and women whose recent injuries have devastated their lives and the lives of their families. Initiatives must be undertaken to step up the level of basic research, and commence programs to transform discoveries in laboratories to effective therapies in clinics, to restore lost function to the thousands who eagerly await treatment.

In some countries, particularly Canada, Australia and the United States of America, recognition of the direct relationship between spinal cord injuries and motor vehicle related road trauma (on average over 50 % of spinal injuries are road crash related) is initiating research funds created by levying traffic infringement fines. The funds allow greater emphasis and focus to be given to regeneration research and the development of effective treatments.

Spinal cord injury paralysis is a global pandemic. **Cures must be found in the next decade if we are to save 1 million people from ever experiencing the horror of paralysis.**

The following table summarises the epidemiological information presently available from published studies regarding the incidence and economic impact of Spinal Cord Injury. With approximately 200 independent nations around the globe, and published epidemiology studies for SCI limited to a handful of nations it is difficult to establish a completely accurate picture. Nonetheless, it is possible to extrapolate figures from published studies in order to develop some basis for a global SCI incidence.

Table Summarising Published Data on Spinal Cord Injury

Country/ population (millions)	Injuries/ annum and ratio/ million	Population estimated living with SCI	Estimated annual cost (Local Currency)	Direct Govt. investment in SCI cure related research
USA1[i] (260)	10000 (40)	250,000	$7.736 billion (USD)	70 million1[iii] (USD)
CANADA1[iii] (30)	843 (27)	30,000	$1.5 billion (CDN)	6 million (CDN)
UK1[iv] (59)	700 (12)	35,000	>500 Mill (GBP)	NYK*
AUSTRALIA1[v] (17)	241 (13.2)	10000	$1.0 Billion (AUS)	5 million (AUS)
JAPAN1[vi] (125)	2665 (21.3)			
TURKEY1[vii] (61)	1000 (16.9)			
TAIWAN1[viii]	1353 (16.6)			
GERMANY1[ix] (81)	1500 (18.5)			
NETHERLANDS11[xi] (16)	439[xi]	11,864		
ITALY (58)	700 (12)			
JORDAN1[xii] (4)	70 (18)			
FIJI1[xiii] (.75)	16 (18.7)			
RHONE ALPS FRANCE1[xiv] regional	(12.7)			
DENMARK1[xv] regional	(9.2)			
CHINA1[xvi] (1200)	10,000 (8.4)	420,000		
PORTUGAL1[xvii] CENTRAL REGION	(57.8)			
BRAZIL (175)	8750 (50)			
sub total (1757)	38,277 (22.01)	~760,000 (6 nations)		
REST OF WORLD1[xviii] (4243)	93,346 (14.23)			
TOTAL	**131,623 NEW CASES / YR**	**2.5 million conservatively**	**$10 billion in 4 of 200 nations**	**perhaps $150 million**

*** NYK = not yet known, no reliable data available.**

Whilst the data in this table is by no means comprehensive or conclusive it does establish a solid basis for the estimated totals shown. The endnote to this document references the many published studies which provide the basis for the estimates of incidence. Further reference can be obtained from "The Economic Consequences of Traumatic SCI" by M Berkowitz et al published in 1992 for the Paralysed Veterans of America or the more recent study by De Vivo referenced in the end note.

[1]Total world population is approaching 6 billion (Source United Nations Population Division).

[2] Based on injuries in the USA, statistics provided by National Spinal Cord Injury Association.

[i] DeVivo M.J. "Causes and costs of spinal cord injury in the US" Spinal Cord December 1997 35 (12)

[ii] NIH published 1999 budget for SCI research programs

[iii] National Trauma Registry Annual Report 1995/96

[iv] Zarb "SCI Incidents and prevalence survey" Letter to International Spinal Research Trust December 1991

[v] Cripps R. "National Spinal Cord Injury Register 1996/97" National Injuries surveillance unit, Flinders University.

[vi] Shingu "Spinal cord injuries in Japan…Survey in 1990" Paraplegia January 1994 32 (1)

[vii] Karamehmetoglu et al, "Traumatic spinal cord injuries in South east turkey…" Spinal Cord August 1997 35(8)

[viii] LiangShon Lee M.D. Head and Spinal Cord Research Group , Neurology Society, R.O.C. Taiwan 1994.

[ix] Exner & Meinecke, "Trends in the treatment of patients….period of 20 years in German centres". Spinal Cord July 1997 35(7)

[x] Dr Bas Blits, 1993, Amsterdam.

[xi] Schonherr MC, Groothoff JW, Mulder GA, Eisma WH. Spinal Cord 34(11):679-683, Nov 1996.

[xii] Otom et al "Traumatic Spinal Cord ijuries in Jordan…" Spinal Cord April 1997 35 (4)

[xiii] Maharaj J.C. "Epidemiology of SCP in Fiji….) Spinal Cord September 1996 34 (9)

[xiv] Minairre P, Casanier, Girard, Berard, Deidier, Bourret. Paraplegia 16:76-87, 1998-9

[xv] Biering-Sørensen F, Pedersen V, Clausen S. Paraplegia 28:105-118, 1990.

[xvi] Ju, G. Inst. Of Neurosciences. 4th Military Medical Univ. China. 1997 Health Ministry Estimate. Quoted via email to Luba Vikhanski, Dana Brain Foundation Oct 2000.

[xvii] Martins F, Freitas F, Martins L, Dartigues JF, Barat M. Spinal Cord 36:574-578, 1998.

[xviii] Present global population approx 6 billon. 1999 Estimate