ESTIMATING THE NUMBER AND COST OF IMPAIRMENT-RELATED TRAFFIC CRASHES IN CANADA: 1999 TO 2010

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EXECUTIVE SUMMARY

Between 1999 and 2010, traffic crashes involving alcohol and/or drugs resulted in an estimated 14,256 deaths, 841,004 injuries and damage to 2,779,458 vehicles in property-damage only (PDO) crashes alone. It is also estimated that there were 11,880 fatal impaired driving crashes, 574,872 injury-only impaired crashes and 1,828,589 PDO impaired crashes, totalling 2,415,341 crashes. Using a social cost model, these deaths, injuries and PDO crashes cost Canadians an estimated $246.1 billion. Based on a population of 33 million people, that represents a cost of about $7,457 per Canadian.

Given the relative stability of the impairment-related crash deaths, injuries, PDO crashes and costs during the twelve-year period, it seems reasonable to express the statistics in terms of an annual average. During this period, impairment-related crashes resulted in an average of 1,188 deaths, 70,084 injuries and damage to 231,622 vehicles in PDO crashes a year. On average, there were 990 fatal impaired driving crashes, 47,906 injury-only impaired crashes and 152,382 PDO impaired crashes a year, totalling an average of 201,278 impaired driving crashes. These deaths, injuries and PDO crashes cost Canadians an estimated average of $20.51 billion a year, or about $621 per Canadian.

In 2010, the most recent year for which there is data, impairment-related crashes resulted in an estimated 1,082 fatalities, 63,821 injuries and damage to 210,932 vehicles in PDO crashes. There were a total of 183,298 crashes, costing an estimated $20.62 billion.

SECTION I: THE MODEL[1]

The more serious a crash, the more likely it is that it will be reported or otherwise become known to the police, motor vehicle branches, insurance companies, the coroner, and other authorities. Serious crashes are also more likely to be investigated by one or more of those bodies. Consequently, Canadian data on whether a fatally-injured person had a measurable blood-alcohol concentration (BAC) is relatively reliable.[2] In contrast, the data on whether a fatally-injured person might have been impaired by drugs is incomplete, primarily due to a lack of testing and testing sensitivity.

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[1] In 2002, MADD Canada commissioned G. Mercer and M. Marshall of Applied Research and Evaluation Services (ARES) at the University of British Columbia to estimate the number and cost of impairment-related crashes in Canada for 1999: G. Mercer & M. Marshall, "Estimating the Presence of Alcohol and Drug Impairment in Traffic Crashes and their Cost to Canadians: A Discussion Paper" (Vancouver: ARES, December 2002). That paper contains a detailed discussion of the authors' methodology: see www.madd.ca/english/research/magnitude_report2k2.doc (accessed 29 March 2013). Some of the methodology and calculations for 1999 to 2006 in this Report are drawn from the 2002 paper and a subsequent related report: G. Mercer, "Estimating the Presence of Alcohol and Drug Impairment in Traffic Crashes and their Costs to Canadians: 1999 to 2006" (Vancouver: ARES, 2009).

[2] The model used in this Report relies on the Fatality Database developed and maintained by the Traffic Injury Research Foundation (TIRF). Given the inherent limitations in this database, it likely significantly understates the total number of alcohol-related deaths in Canada. For example, if an impaired driver crashes into a vehicle, killing its sober driver and two occupants, it is only the dead driver's BAC that would be reported in the Fatality Database. Unless the police recorded the crash as being due to the surviving driver's impairment, all three deaths would be recorded as being non-alcohol-related. Similar problems arise when intoxicated drivers survive crashes in which they kill sober passengers, pedestrians or bicyclists. See H. Simpson, *Drinking-Driving Statistics in Canada: does anyone really know how big the problem is?* (Ottawa: TIRF, 1997) at 53-56.

Moreover, research indicates that police frequently fail to detect and report the presence of alcohol. See for example E. Vingilis, E. Adlaf & L. Chung, "Comparison of Age and Sex Characteristics of Police-Suspected Impaired Drivers and Roadside-Surveyed Impaired Drivers" (1982) 14 Accid. Anal. and Prev. 425; and E. Vingilis & V. Vingilis, "The Importance of Roadside Screening for Impaired Drivers in Canada" (1987) 29 Can. J. Crim. 17 at 22-25. Although these sources are dated, police underreporting remains problematic, particularly in Québec.

Québec has a narrower definition of an "alcohol-related death" than the other provinces, excluding deaths among alcohol-impaired pedestrians, deaths in alcohol-related off-road crashes, and alcohol-related deaths involving snowmobiles, ATVs, bicycles and other non-principal vehicle types. See Canadian Council of Motor Transport Administrators (CCMTA), *Alcohol-Crash Problem in Canada: 2010* (Ottawa: TIRF, February 2013) at 131. Moreover, crashes in Québec are apparently only categorized as alcohol-related if the police list alcohol as "a probable cause" of the crash: *ibid.* at 9. Finally, the reported numbers of alcohol-related crash deaths in Québec appear to be somewhat anomalous. For example, the number of traffic deaths involving a drinking driver fell from 175 in 2006 to only 111 in 2007: *ibid.* at 132. Similarly, the CCMTA indictaed that the total number of alcohol-related crash deaths in Québec for 2009 was 153 (*Alcohol-Crash Problem in Canada: 2009* (Ottawa: TIRF, November 2011) at 126), whereas the Société de l'assurance automobile du Québec (SAAQ) reported the number in the same year to be 195 on its official website: www.saaq.gouv.qc.ca/en/accident_prevention/alcohol/index.php (accessed 28 November 2011). Unfortunately no comparable data are available from the SAAQ for 2010.

The less serious a crash, the less likely it is that it will be reported, recorded or investigated. In order to assess the magnitude of the traffic crash problem and the role of impairment, a method is needed to estimate the number of less serious crashes and whether they might have been impairment related.

Historically, crashes reported to the police have been used as a measure of crash frequencies and types, with the police forwarding reports to provincial motor vehicle branches for statistical analyses. However, estimates of the number of less serious crashes based on police reports are far lower than estimates based on insurance data.[3] This underreporting could be due to a lack of police resources, drivers' reluctance to involve the police (but a desire for financial compensation from insurance companies), or both. Certainly, some crashes will be resolved privately without any official report being made. Nevertheless, the insurance data appear to be far more comprehensive than the police data.

Insurance and other data suggest that there is a relatively stable relationship between the number of traffic fatalities and the number of both traffic injuries and vehicles damaged in property-damage only (PDO) crashes. For each fatality there appears to be about 118 injuries and 650 vehicles damaged in PDO crashes (PDO vehicles).[4] Using these ratios, one can estimate from the number of fatalities the number of non-fatal injuries and PDO vehicles.

Similarly, the BAC levels at different levels of injury severity can provide an estimate of the proportion of alcohol-related crash fatalities to alcohol-related crash injuries. These data indicate that as crash severity lessens, so does alcohol involvement. The BAC data suggest that for every 1% of crash deaths that are alcohol-related, 0.5% of crash injuries and 0.3% PDO vehicles are alcohol-related.[5] In other words, if alcohol-related crash deaths went up 10%, alcohol-related injuries would go up 5% and PDO vehicles would go up 3%. Again, using these ratios, one can estimate from the number of alcohol-related fatalities the number of alcohol-related injuries and PDO vehicles.

Finally, studies on drug and alcohol-related crashes indicate that where there is a positive BAC, about 75% of the cases involve alcohol alone and about 25% also involve drugs. In addition, there are another 10% of crashes that involve drugs alone.[6]

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[3] Mercer & Marshall, *supra* note 1 at 7-10.

[4] *Ibid*. at 16.

[5] *Ibid*. at 18-19.

[6] *Ibid*. at 23.

SECTION II: CALCULATION OF FREQUENCIES

To estimate the number of injuries and PDO vehicles, it was assumed that there were 118 injuries and 650 PDO vehicles for every fatality. Those ratios were applied to the known number of motor vehicle-related deaths in Canada as reported by the Traffic Injury Research Foundation of Canada.[7]

Table 1: Estimated Number of Fatalities, Injuries & PDO Vehicles: 1999 to 2010

Year	Fatalities	Injuries @ 118	PDO Veh. @ 650
1999	**3,315**	391,170	2,154,750
2000	**3,162**	373,116	2,055,300
2001	**3,021**	356,478	1,963,650
2002	**3,197**	377,246	2,078,050
2003	**3,124**	368,632	2,030,600
2004	**3,013**	355,534	1,958,450
2005	**3,226**	380,668	2,096,900
2006	**3,122**	368,396	2,029,300
2007	**3,045**	359,310	1,979,250
2008	**2,694**	317,892	1,751,100
2009	**2,575**	303,850	1,673,750
2010	**2,541**	299,838	1,651,650

[7] D. Mayhew, S. Brown & H. Simpson, *The Alcohol-Crash Problem in Canada: 1999* (Ottawa: TIRF, 2001); CCMTA, *The Alcohol-Crash Problem in Canada: 2000* (Ottawa: TIRF, December 2002); CCMTA, *The Alcohol-Crash Problem in Canada: 2001* (Ottawa: TIRF, July 2003); CCMTA, *The Alcohol-Crash Problem in Canada: 2002* (Ottawa: TIRF, October 2004); CCMTA, *The Alcohol-Crash Problem in Canada: 2003* (Ottawa: TIRF, October 2005); CCMTA, *The Alcohol-Crash Problem in Canada: 2004* (Ottawa: TIRF, November 2006); CCMTA, *The Alcohol-Crash Problem in Canada: 2005* (Ottawa: TIRF, January 2008); CCMTA, *The Alcohol-Crash Problem in Canada: 2006* (Ottawa: TIRF, January 2009); CCMTA, *The Alcohol-Crash Problem in Canada: 2007* (Ottawa: TIRF, March 2010); CCMTA, *The Alcohol-Crash Problem in Canada: 2008* (Ottawa: TIRF, December 2010); CCMTA, *Alcohol-Crash Problem in Canada: 2009* (Ottawa: TIRF, November 2011); and CCMTA, *Alcohol-Crash Problem in Canada: 2010* (Ottawa: TIRF, February 2013).

The percentage of people killed in alcohol-related traffic crashes can be used as a starting point for estimating the number of people injured and the number of PDO vehicles. As indicated, we estimated that for every 1% of crash deaths that are alcohol-related, 0.5% of crash injuries and 0.3% PDO vehicles are alcohol-related. These percentages are set out in Table 2.

Table 2: Estimated Percentage of Alcohol-Related Fatalities, Injuries & PDO Vehicles: 1999 to 2010

Year	Fatalities	Injuries @ 0.5	PDO Veh. @ 0.3
1999	**34.20%**	17.10%	10.26%
2000	**33.80%**	16.90%	10.14%
2001	**36.50%**	18.25%	10.95%
2002	**33.00%**	16.50%	9.90%
2003	**36.60%**	18.29%	10.98%
2004	**34.90%**	17.45%	10.47%
2005	**34.10%**	17.05%	10.23%
2006	**37.20%**	18.60%	11.16%
2007	**37.00%**	18.50%	11.10%
2008	**39.20%**	19.60%	11.76%
2009	**37.90%**	18.95%	11.37%
2010	**38.70%**	19.35%	11.61%

As noted, it has been estimated that another 10% of crashes involve drugs alone.[8] This estimate is now likely to be very conservative given the survey[9] and roadside[10] data documenting the sustained increases in driving after drug use. For example, the Canadian Centre on Substance

[8] Mercer & Marshall, *supra* note 1 at 23.

[9] See for example M Asbridge, C Poulin & A Donato, "Motor vehicle collision risk and driving under the influence of cannabis: Evidence from adolescents in Atlantic Canada" (2005) 37 Accid. Anal. and Prev. 1025 at 1029; DJ Beirness & CG Davis, *Driving Under the Influence of Cannabis: Analysis drawn from the 2004 Canadian Addiction Survey* (Ottawa: Canadian Centre on Substance Abuse (CCSA), 2006); and A Paglia-Boak, EM Adlaf & RE Mann, *Drug Use Among Ontario Students,1977-2011:OSDUHS Highlights* (Toronto: Centre for Addiction and Mental Health, 2011) at 15.

[10] See for example M Brault et al, "The Contribution of Alcohol, and Other Drugs Among Fatally Injured Drivers in Québec: Final Results" in P Williams & A Clayton, eds, *Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety, Glasgow, 8-13 August 2004*, CD-ROM (Glasgow: International Council on Alcohol, Drug and Traffic Safety (ICADTS), 2004); and DJ Beirness & EE Beasley, *Alcohol & Drug Use Among Drivers: British Columbia Roadside Survey 2010* (Ottawa: CCSA, 2011).

Abuse reported that Canadians make an estimated 15.6 million trips per year after using cannabis,[11] a figure that is more than double the most recent estimate of the number of trips made by drinking drivers.[12]

These patterns of driving after drug use are also reflected in the toxicology studies of fatally-injured drivers.[13] A 2011 study involving almost 6,000 drivers from across Canada who were fatally injured from 2000 to 2007 found that 54.6% were positive for alcohol and/or drugs.[14] Alcohol alone was present in 21.9% of the cases, drugs alone were present in 18.5%, and alcohol and drugs were present in 14.2%.[15] The study concluded that "the extent of drug use among fatally injured drivers (33%) is comparable to that of alcohol use (37%)."[16]

Nevertheless, the role of drugs in traffic crashes is more complex than that of alcohol. First, not all drugs necessarily or consistently cause impairment.[17] Second, the non-active metabolites of some drugs, particularly cannabis, remain in a driver's system long after their impairing effects have worn off.[18] Third, while there is a broad consensus on the impairing impact of alcohol at various BAC levels, views differ regarding the specific level at which the various drugs impair driving ability.[19] Presumably, a more accurate picture of the role of drugs will emerge as rates of

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[11] CCSA, *Drugs and Driving,* online: www. ccsa.ca/Eng/Priorities/ImpairedDriving/Pages/default.aspx (accessed 30 March 2013).

[12] W Vanlaar, P Emery & H Simpson, *The Road Safety Monitor 2007: Drinking and Driving* (Ottawa: TIRF, 2007) at 7.

[13] See generally, J Bouchard & M. Brault, "Link Between Driving Records and the Presence of Drugs and/or Alcohol in Fatally Injured Drivers" in P Williams and A Clayton, eds, *Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety*, *Glasgow, 8-13 August 2004*, CD ROM: (Glasgow: ICADTS, 2004); and E Beasley & D Beirness, *Drug Use By Fatally Injured Drivers in Canada (2000-2008)* (Ottawa: CCSA, 2011).

[14] EE Beasley, DJ Beirness & AJ Porath-Waller, *A Comparison of Drug- and Alcohol-involved Motor Vehicle Driver Fatalities* (Ottawa: CCSA, 2011) at 1.

[15] *Ibid* at 10.

[16] *Ibid* at 1.

[17] See generally D Beirness et al, *Drugs And Driving: Detection and Deterrence* (Paris: Organisation for Economic Co-operation and Development, Transport Research Centre, 2010) at 19-29; and EJD Ogden & H Moskowitz, "Effects of Alcohol and Other Drugs on Driver Performance" (2004) 5(3) Traffic Inj. Prev. 185.

[18] Ogden & Moskowitz, *ibid* at 191; and RA Rockerbie, *Alcohol and Drug Intoxication*, 2nd ed (Victoria, BC: Alco Trace Publications, 2001) at 328-30.

[19] For example, while an international working group suggested that the legal per se driving limit for cannabis should be set at 7-10 ng/ml (blood serum), a United Kingdom expert panel called for the limit to be set at 5 ng/ml. See respectively F Grotenhermen et al, "Developing limits for driving under cannabis" (2007) 102 Addiction 1910 at 1916 and K Wolff et al, *Driving Under The Influence Of*

drug testing among fatally and seriously-injured drivers and pedestrians increase. However, until there is a consensus, we will continue to use the 10% figure.

Accordingly, overall impairment can be estimated by multiplying the data in Table 2 by 1.1 to produce Table 3.

Table 3: Estimated Percentage of Impairment-Related Fatalities, Injuries & PDO Vehicles: 1999 to 2010

Year	Fatalities	Injuries	PDO Veh.
1999	37.62%	18.81%	11.29%
2000	37.18%	18.59%	11.15%
2001	40.15%	20.08%	12.05%
2002	36.30%	18.15%	10.89%
2003	40.25%	20.12%	12.07%
2004	38.39%	19.20%	11.52%
2005	37.51%	18.76%	11.25%
2006	40.92%	20.46%	12.28%
2007	40.70%	20.35%	12.21%
2008	43.12%	21.56%	12.94%
2009	41.69%	20.85%	12.51%
2010	42.57%	21.29%	12.77%

Drugs: Report from the Expert Panel on Drug Driving (London: Department for Transport, 2013) at 66-69.

Finally, applying the estimated percentages in Table 3 to the estimated number of fatalities, injuries, and PDO vehicles in Table 1 provides the estimated number of impairment-related fatalities, injuries and PDO vehicles in Table 4.

Table 4: Estimated Number of Impairment-Related Fatalities, Injuries & PDO Vehicles: 1999 to 2010

Year	Fatalities	Injuries	PDO Veh.
1999	1,247	73,579	243,185
2000	1,176	69,362	229,248
2001	1,213	71,563	236,522
2002	1,161	68,470	226,300
2003	1,257	74,181	245,174
2004	1,157	68,245	225,555
2005	1,210	71,413	235,901
2006	1,278	75,374	249,117
2007	1,239	73,120	241,666
2008	1,162	68,538	226,522
2009	1,074	63,338	209,336
2010	1,082	63,821	210,932
All	**14,256**	**841,004**	**2,779,458**
Average	**1,188**	**70,084**	**231,622**

The insurance company-generated ratios of 1.2 fatalities per fatal crash, 1.11 injuries per fatal crash, 1.44 injuries per injury crash and 1.52 vehicles per PDO crash can be used to move to crashes as the unit of analysis, as shown in Table 5.[20]

Table 5: Estimated Number of Impairment-Related Fatal, Injury & PDO Crashes: 1999 to 2010

Year	Fatal	Injury	PDO	Total
1999	1,039	50,295	159,990	**211,324**
2000	980	47,413	150,821	**199,214**
2001	1,011	48,917	155,606	**205,534**
2002	967	46,803	148,881	**196,651**
2003	1,048	50,707	161,298	**213,053**
2004	964	46,649	148,391	**196,004**
2005	1,008	48,815	155,198	**205,021**
2006	1,065	51,522	163,893	**216,480**
2007	1,033	49,982	158,991	**210,006**
2008	968	46,849	149,028	**196,845**
2009	895	43,295	137,721	**181,911**
2010	902	43,625	138,771	**183,298**
All	**11,880**	**574,872**	**1,828,589**	**2,415,341**
Average	**990**	**47,906**	**152,382**	**201,278**

[20] The number of fatalities divided by fatalities per fatal crash produces the number of fatal crashes. The number of injuries, less the number of fatal crashes multiplied by injuries per fatal crash, divided by injuries per injury crash produces the number of injury crashes. The number of PDO vehicles divided by vehicles per PDO crash produces the number of PDO crashes.

SECTION III: CALCULATION OF COSTS

Based on these crash estimates, different costing approaches including the Real Dollar Estimate, Discounted Future Earnings, and Willingness-to-Pay can be used to estimate the total cost of impairment-related crashes in Canada. This Report adopts the Social Cost Model of Vodden *et al*.[21] which is based on what is described as the "technically-preferred" Willingness-to-Pay approach.[22] This model is recent, is based on extensive analysis, and was prepared for the federal Ministry of Transportation. Under this model, the average social cost was estimated to be $13,600,000 per fatality, $44,000 per injury,[23] and $8,000 per PDO crash.[24] These costs are in 2004 dollars and have been adjusted for inflation in Table 6.[25]

Table 6: Social Costs Adjusted for Inflation (Base Year 2004)

Year	Fatalities	Injuries	PDO Crashes
1999	$12,053,135	$38,995	$7,090
2000	$12,440,019	$40,247	$7,318
2001	$12,517,628	$40,498	$7,363
2002	$13,071,876	$42,291	$7,689
2003	$13,277,680	$42,957	$7,810

[21] K. Vodden *et al*., *Analysis and Estimation of the Social Cost of Motor Vehicle Collisions in Ontario: Final Report* (Ottawa: Ministry of Transportation, 2007) at Executive Summary i and at 49. The major components of Vodden *et al.*'s Social Cost Model include: fatalities, injuries, property damage, traffic delays, out-of-pocket expenses, hospital/health costs, and police, fire and ambulance costs (*ibid.* at Executive Summary i). While numerous variables are taken into account, it is the human consequences of collisions that make up all but a small fraction of the total costs. For example, fatal and personal injury crashes constituted only 0.32% and 27% of total crashes in Ontario in 2004, but accounted for 64% and 28% respectively of total social costs. The remaining 73% of PDO crashes generated only 8% of the total social costs (*ibid.* at 24 and 3).

[22] Vodden *et al.* discuss at length different ways of valuing the human consequences of collisions and provide high, low and medium costing scenarios for the Willingness-to-Pay approach (*ibid.* at Appendix B). Ultimately, Vodden *et al.* use the medium costing scenario in their national, provincial and territorial estimates of the total social costs of collisions.

[23] Vodden *et al.*, *ibid*., separate injuries into three categories: major (average social cost of $280,000); minor (average social cost of $48,000); and minimal (average social cost of $18,000). Based on 5,279 major, 60,726 minor and 58,822 minimal injuries (*ibid*. at 24), the average social cost per injury is $43,675.

[24] It should be noted that this model estimates costs per death and per injury, but not per damaged vehicle. Rather, vehicle damage is estimated per crash.

[25] Based on www.bankofcanada.ca/rates/related/inflation-calculator (accessed 29 March 2013 for 2010).

2004	$13,600,000	$44,000	$8,000
2005	$13,870,640	$44,876	$8,159
2006	$14,063,442	$45,499	$8,273
2007	$14,410,809	$46,623	$8,477
2008	$14,694,702	$47,542	$8,644
2009	$14,815,209	$47,932	$8,715
2010	$15,049,289	$48,689	$8,853

These costs can then be multiplied by the annual number of fatalities (Table 4), injuries (Table 4) and PDO collisions (Table 5) to produce Table 7.

Table 7: Social Costs of Fatalities, Injuries and PDO Crashes: 1999 to 2010

Year	Fatalities	Injuries	PDO Crashes	Total
1999	$15,030,259,345	$2,869,213,105	$1,134,329,100	$19,033,801,550
2000	$14,629,462,344	$2,791,612,414	$1,103,708,078	$18,524,782,836
2001	$15,183,882,764	$2,898,158,374	$1,145,726,978	$19,227,768,116
2002	$15,176,448,036	$2,895,664,770	$1,144,746,009	$19,216,858,815
2003	$16,690,043,760	$3,186,593,217	$1,259,737,380	$21,136,374,357
2004	$15,735,200,000	$3,002,780,000	$1,187,128,000	$19,925,108,000
2005	$16,783,474,400	$3,204,729,788	$1,266,260,482	$21,254,464,670
2006	$17,973,078,876	$3,429,441,626	$1,355,886,789	$22,758,407,291
2007	$17,854,992,351	$3,409,073,760	$1,347,766,707	$22,611,832,818
2008	$17,075,243,724	$3,258,433,596	$1,288,198,032	$21,621,875,352
2009	$15,911,534,466	$3,035,917,016	$1,200,238,515	$20,147,689,997
2010	$16,283,330,698	$3,107,380,669	$1,228,539,663	$20,619,251,030
All	$194,326,950,764	$37,088,998,335	$14,662,265,733	$246,078,214,832
Average	$16,193,912,564	$3,090,749,861	$1,221,855,478	$20,506,517,903

CONCLUSION

Between 1999 and 2010, traffic crashes involving alcohol and/or drugs resulted in an estimated 14,256 deaths, 841,004 injuries and damage to 2,779,458 vehicles in PDO crashes alone. It is also estimated that there were 11,880 fatal impaired driving crashes, 574,872 injury-only impaired crashes and 1,828,589 PDO impaired crashes, totalling 2,415,341 crashes. Using a social cost model, these deaths, injuries and PDO crashes cost Canadians an estimated $246.1 billion. Based on a population of 33 million people, that represents a cost of about $7,457 per Canadian.

Given the relative stability of the impairment-related crash deaths, injuries, PDO crashes and costs during the twelve-year period, it seems reasonable to express the statistics in terms of an annual average. In an average year, impairment-related crashes resulted in an average of 1,188 deaths, 70,084 injuries and damage to 231,622 vehicles in PDO crashes a year. On average, there were 990 fatal impaired driving crashes, 47,906 injury-only impaired crashes and 152,382 PDO impaired crashes a year, totalling an average of 201,278 impaired driving crashes. These deaths, injuries and PDO crashes cost Canadians an estimated average of $20.51 billion a year, or about $621 per Canadian.

In 2010, the most recent year for which there is data, impairment-related crashes resulted in an estimated 1,082 fatalities, 63,821 injuries and damage to 210,932 vehicles in PDO crashes. There were a total of 183,298 crashes, costing an estimated $20.62 billion.

APPENDIX A: PROVINCIAL AND TERRITORIAL DATA

These figures should be viewed as order-of-magnitude approximations. Applied to the entire country, they can provide an idea of the scope and cost of impaired driving crashes. However, when applied at the provincial and territorial level, they become less reliable, as there are likely differences among the provinces and territories in the ratio of injuries to fatalities and in the medical, repair and other costs associated with crashes. Nonetheless, there is some benefit to providing provincial and territorial calculations. Consequently, the 2010 crash number and costing calculations described above are presented for each province and collectively for the territories.[26]

Table 8: Estimated Number of Fatalities, Injuries & PDO Vehicles: 2010

Jurisdiction	Fatalities	Injuries @ 118	PDO Veh. @ 650
British Columbia	**387**	45,666	251,550
Alberta	**382**	45,076	248,300
Saskatchewan	**186**	21,948	120,900
Manitoba	**98**	11,564	63,700
Ontario	**728**	85,904	473,200
Québec	**516**	60,888	335,400
New Brunswick	**105**	12,390	68,250
Nova Scotia	**74**	8,732	48,100
Prince Edward Island	**12**	1,416	7,800
Newfoundland & Labrador	**43**	5,074	27,950
Yukon, NW Territories & Nunavut	**10**	1,180	6,500
Canada	**2,541**	299,838	1,651,650

[26] The data for Canada is drawn from the earlier part of this Report. Due to rounding, the sum of the numbers for all provinces and territories may not precisely equal the numbers for Canada.

Table 9: Estimated Percentage of Alcohol-Related Fatalities, Injuries & PDO Vehicles: 2010

Jurisdiction	Fatalities	Injuries @ 0.5	PDO Veh. @ 0.3
British Columbia	**39.20%**	19.60%	11.76%
Alberta	**45.60%**	22.80%	13.68%
Saskatchewan	**49.70%**	24.85%	14.91%
Manitoba	**49.50%**	24.75%	14.85%
Ontario	**35.60%**	17.80%	10.68%
Québec	**30.40%**	15.20%	9.12%
New Brunswick	**47.10%**	23.55%	14.13%
Nova Scotia	**32.90%**	16.45%	9.87%
Prince Edward Island	**8.30%**	4.15%	2.49%
Newfoundland & Labrador	**30.00%**	15.00%	9.00%
Yukon, NW Territories & Nunavut	**60.00%**	30.00%	18.00%
Canada	**38.70%**	19.35%	11.61%

Table 10: Estimated Percentage of Impairment-Related Fatalities, Injuries & PDO Vehicles: 2010

Jurisdiction	Fatalities	Injuries	PDO Veh.
British Columbia	**43.12%**	21.56%	12.94%
Alberta	**50.16%**	25.08%	15.05%
Saskatchewan	**54.67%**	27.34%	16.40%
Manitoba	**54.45%**	27.23%	16.34%
Ontario	**39.16%**	19.58%	11.75%
Québec	**33.44%**	16.72%	10.03%
New Brunswick	**51.81%**	25.91%	15.54%
Nova Scotia	**36.19%**	18.10%	10.86%
Prince Edward Island	**9.13%**	4.57%	2.74%
Newfoundland & Labrador	**33.00%**	16.50%	9.90%
Yukon, NW Territories & Nunavut	**66.00%**	33.00%	19.80%
Canada	**42.57%**	21.29%	12.77%

Table 11: Estimated Number of Impairment-Related Fatalities, Injuries & PDO Vehicles: 2010

Jurisdiction	Fatalities	Injuries	PDO Veh.
British Columbia	**167**	9,846	32,541
Alberta	**192**	11,305	37,364
Saskatchewan	**102**	5,999	19,829
Manitoba	**53**	3,148	10,405
Ontario	**285**	16,820	55,592
Québec	**173**	10,180	33,647
New Brunswick	**54**	3,210	10,608
Nova Scotia	**27**	1,580	5,222
Prince Edward Island	**1**	65	214
Newfoundland & Labrador	**14**	837	2,767
Yukon, NW Territories & Nunavut	**7**	389	1,287
Canada	**1,082**	63,821	210,932

Table 12: Estimated Number of Impairment-Related Fatal, Injury & PDO Crashes: 2010

Jurisdiction	Fatal	Injury-only	PDO	Total
British Columbia	**139**	6,730	21,409	28,278
Alberta	**160**	7,727	24,582	32,469
Saskatchewan	**85**	4,101	13,045	17,231
Manitoba	**44**	2,152	6,845	9,041
Ontario	**238**	11,497	36,574	48,309
Québec	**144**	6,959	22,136	29,239
New Brunswick	**45**	2,194	6,979	9,218
Nova Scotia	**23**	1,080	3,436	4,539
Prince Edward Island	**1**	44	141	186
Newfoundland & Labrador	**12**	572	1,820	2,404
Yukon, NW Territories & Nunavut	**6**	266	847	1,119
Canada	**902**	43,625	138,771	183,298

Table 13: Social Costs of Fatalities, Injuries and PDO Crashes: 2010

Jurisdiction	Fatalities	Injuries	PDO Crashes	Total
British Columbia	$2,513,231,263	$479,391,894	$189,533,877	**$3,182,157,034**
Alberta	$2,889,463,488	$550,429,145	$217,624,446	**$3,657,517,079**
Saskatchewan	$1,535,027,478	$292,085,311	$115,487,385	**$1,942,600,174**
Manitoba	$797,612,317	$153,272,972	$60,598,785	**$1,011,484,074**
Ontario	$4,289,047,365	$818,948,980	$323,789,622	**$5,431,785,967**
Québec	$2,603,526,997	$495,654,020	$195,970,008	**$3,295,151,025**
New Brunswick	$812,661,606	$156,291,690	$61,785,087	**$1,030,738,383**
Nova Scotia	$406,330,803	$76,928,620	$30,418,908	**$513,678,331**
Prince Edward Island	$15,049,289	$3,164,785	$1,248,273	**$19,462,347**
Newfoundland & Labrador	$210,690,046	$40,752,693	$16,112,460	**$267,555,199**
Yukon, NW Territories & Nunavut	$105,345,023	$18,940,021	$7,498,491	**$131,783,535**
Canada	$16,283,330,698	$3,107,380,669	$1,228,539,663	**$20,619,251,030**