

Estimated Impact of ATV Helmet Use on Injuries and Direct Health Care System Costs

Purpose

In 2013, there were 683 hospital admissions and 5,374 ambulatory care (emergency department and outpatient) visits for all-terrain vehicle (ATV) use injuries (note: this excludes snowmobile injuries). Of the hospital admissions, 19 per cent had a head injury, and of ambulatory care visits, 17 per cent had a head injury.

In 2009, 52 per cent of ATV injuries recorded in the Alberta Trauma Registry occurred in individuals not wearing a helmet at the time of their injury and 60 per cent of those with major trauma were not wearing a helmet at the time of their injury (Alberta Health Services, 2009). The Canadian Community Health Survey (CCHS, 2007 to 2011) reported that approximately 60 per cent of ATV users responded that they wear helmets either always or most of the time.

The purpose of this *Public Health Surveillance Bulletin* is to estimate the impact on head injuries and direct health care system costs (costs that can be entirely attributed to providing the specific health care service) at varying levels of helmets use.

Key Findings

The direct health care system cost associated with ATV use injuries in Alberta in 2013 was approximately \$16 million (\$9.5 million for hospital admissions, \$3.8 million for ambulatory care visits and \$2.7 million for physician services).

In 2013, the average direct cost of a hospital admission for ATV injuries with a head injury was approximately 38 per cent higher than without a head injury (\$18,000 vs. \$13,000).

In 2013, the average direct cost of an ambulatory care visit for ATV injuries with a head injury was approximately \$1,300, while the average cost without a head injury was approximately \$590.

Applications

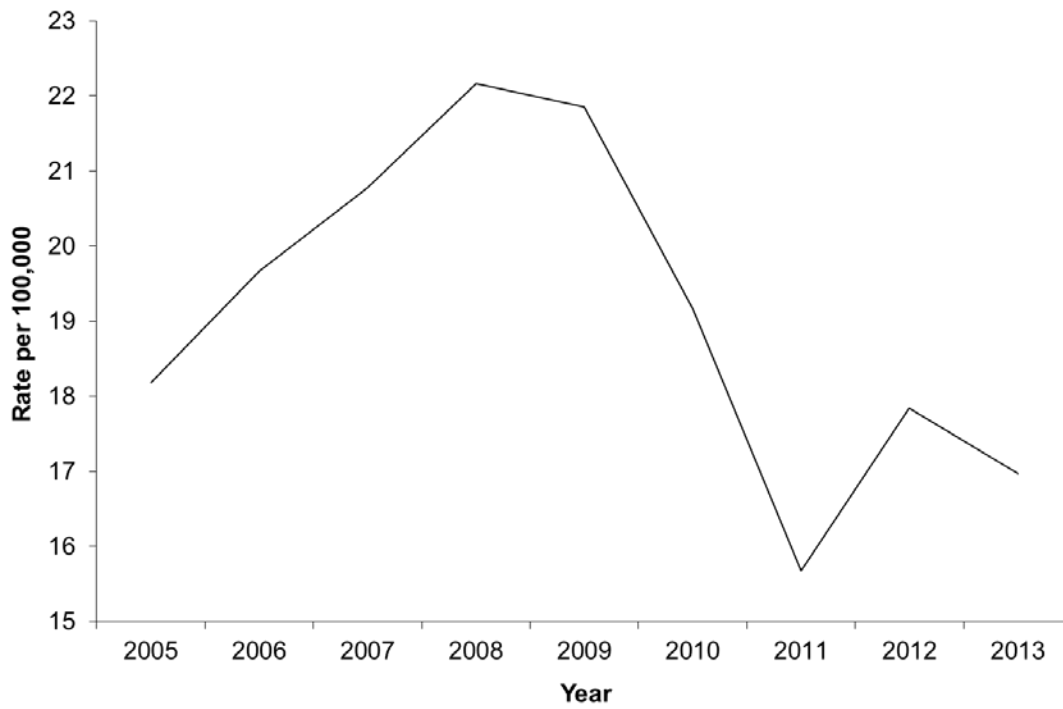
It has been shown that helmet use reduces the severity of ATV-related head injuries (Rodgers, 1990). If those using ATVs all wore helmets in 2013, approximately 509 hospital visits for ATV injuries with a head injury might have had the head injury prevented, avoiding approximately \$353,000 in hospital costs (a decrease from \$1,000,000 to \$647,000). Long-term health impacts may also have been avoided among those that suffered intracranial injuries.

Results

Descriptive Epidemiology

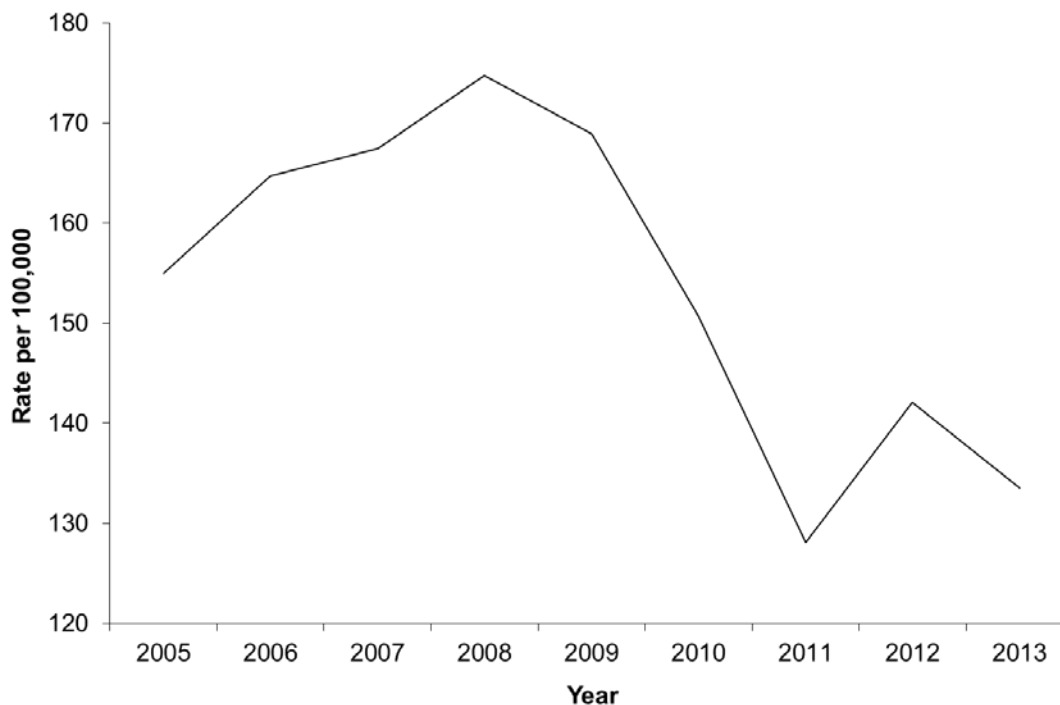
The rate of hospital admissions per 100,000 population for ATV injuries in Alberta peaked in 2008 and has been stable in recent years.

Figure 1: Rate of Hospital Admissions per 100,000 Population for ATV Injuries, 2005 to 2013



The rate of ambulatory care visits per 100,000 population for ATV injuries in Alberta also peaked in 2008 and has been stable in recent years.

Figure 2: Rate of Ambulatory Care Visits per 100,000 Population for ATV Injuries, 2005 to 2013



The lower hospital admission and ambulatory care visit rates in recent years are likely not due to a decreasing popularity of ATVs. Between 2003 and 2010, there was a 125 per cent increase in the number of ATV registrations, from 44,455 to 100,192 (ACICR, 2010).

The lower hospital admission and ambulatory care visit rates could be due to increased helmet use, safer ATV use or less time spent using ATVs. The declining rates in recent years may not signal a decreasing longer-term trend in hospital admission and ambulatory care visit rates.

Of those that had a hospital visit for ATV injuries in 2013, six died from the ATV injuries.

Cost of Hospital Admissions

The Information and Analysis Branch of Alberta Health works with Alberta Health Services and the Canadian Institute for Health Information to calculate the cost of hospital admissions. Each year, a sample of hospital admissions are used to derive cost estimates. Data from this project were used to estimate the cost of hospital admissions associated with ATV use injuries.

The average cost of a hospital admission for ATV injuries with a head injury was estimated based on 56 per cent actual costed cases and the average cost of a hospital admission for ATV injuries without a head injury was based on 50 per cent actual costed cases.

In 2013, the average cost of a hospital admission for ATV injuries with a head injury was estimated to be \$18,000, while the average cost of a hospital admission for ATV injuries without a head injury was estimated to be \$13,000.

The total cost of hospital admissions associated with ATV injuries in 2013 was approximately \$9.5 million, and \$2.3 million of that cost was for ATV injuries with a head injury.

Cost of Ambulatory Care

The Information and Analysis Branch of Alberta Health works with Alberta Health Services and the Canadian Institute for Health Information to calculate the cost of ambulatory care visits. Each year, a sample of ambulatory care visits are used to derive cost estimates. Data from this project were used to estimate the cost of an ambulatory care visit associated with ATV use injuries.

The average cost of an ambulatory care visit for ATV injuries with a head injury was estimated based on 23 per cent actual costed cases and the average cost of an ambulatory care visit for ATV injuries without a head injury was based on 20 per cent actual costed cases.

In 2013, the average cost of an ambulatory care visit for ATV use injuries with a head injury was estimated to be \$1,300, while the average cost of an ambulatory care visit for ATV injuries that did not include a head injury was estimated to be \$590.

The total cost of ambulatory care visits for ATV injuries in 2013 was approximately \$3.8 million, and \$1.2 million of that cost was for ATV injuries with a head injury.

Cost of Physician Services

The total cost of physician services in 2013 was estimated by calculating the total amount paid to physicians based on claims submitted for reimbursement for services provided within two weeks of the first hospital start date. The total cost of physician services for ATV use injuries was approximately \$2.7 million, and \$581,000 of that cost was for ATV injuries with a head injury.

Estimated Impact of Increasing Helmet Use

In 2013, there were 129 hospital admissions and 887 ambulatory care visits for ATV injuries with a head injury. If it is assumed that 50 per cent were not wearing helmets at the time of their injury (based on the Alberta Health Services Annual Trauma Report 2009), then approximately 65 of the 129 hospital admissions and 444 of the 887 ambulatory care visits for ATV injuries with a head injury were not wearing a helmet.

If 90 per cent of ATV users wore a helmet, and assuming a reduction in the risk of a nonfatal head injury by 65 per cent (Rodgers, 1990), then 38 of the 65 hospital admissions and 260 of the 444 ambulatory care visits for ATV injuries with a head injury might have avoided the head injury. The direct hospital cost for this group (using 2013 cost estimates) would have been reduced from approximately \$1 million to approximately \$647,000.

Long-Term Health Care Service Cost

Individuals who had a hospital admission or ambulatory care visit for ATV injuries in fiscal year 2006-2007 through 2008-2009 were compared to individuals with the same age group, sex and geography.

In the two years before the injury, the average annual cost of hospital admissions, ambulatory care visits and physician services was approximately \$240 higher in the ATV injuries group.

In the year of the injury, the average annual cost of hospital admissions, ambulatory care visits and physician services was approximately \$5800 higher in the ATV injuries group.

In the two years after the injury, the average annual cost of hospital admissions, ambulatory care visits and physician services was approximately \$790 higher in the ATV injuries group.

As shown above, individuals who had a hospital admission or ambulatory care visit for ATV injuries with a head injury did not have a much higher average annual cost of hospital admissions, ambulatory care visits and physician services than the comparison group in the two years after the injury, especially considering the difference in cost in the two years prior to the injury. However, the average annual cost of hospital admissions, ambulatory care visits and physician services was \$9,600 higher in the ATV injuries group with intracranial injuries in the year of the injury and \$2,300 higher in the following two years. This suggests that intracranial injuries result in significant and ongoing health impacts.

All costs have been adjusted to 2013 dollars.

Caveats

Actual versus Estimated Cost

The actual cost for every hospital admission and ambulatory care visit is not always known directly. The cost for each hospital admission and ambulatory care visit in this bulletin were inferred based upon average costs. The average costs were derived from a sample of all hospital admission and ambulatory care visits. The suitability of the average cost to reflect the actual cost of each particular hospital admission and ambulatory care visit will influence the accuracy of the estimated overall costs.

Attributable Injury and Cost

The difference in the cost of hospital visits for ATV injuries between those with and without a head injury may be due to other factors aside from the head injury, such as severity of the crash, alcohol use, and whether the individual was the driver or a passenger. If these or other factors were involved, the estimated impact of helmet use may be different from the actual impact.

An ATV head injury may not always occur in isolation of other injuries, making the portion of the cost attributable to the head injury itself difficult to measure. This bulletin made the assumption that the portion of the hospital visit cost attributable to head injuries was the difference between the average cost of a hospital visit for ATV injuries with a head injury and the average cost of a hospital visit for ATV injuries without a head injury.

Long Term Health Effects

This bulletin only considered direct hospital admission, ambulatory care visit and physician services costs, and these may not reflect the full long-term health impact of ATV injuries.

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