

### Emergency Department Encounters and Inpatient Admissions for Injuries from Outdoor Recreational Activities<sup>1</sup>

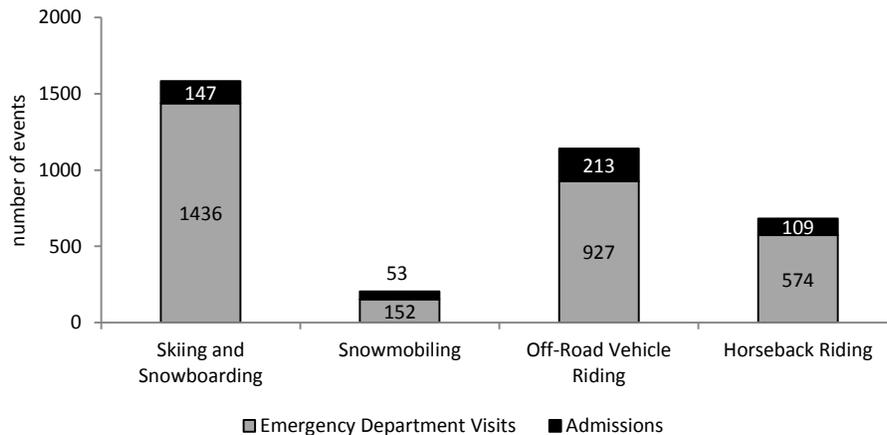
Cody L. Custis, MS, Montana Hospital Discharge Data System

#### Introduction

Outdoor recreation and tourism are major contributors to the Montana economy. Residents and visitors spend approximately \$5.8 billion each year on recreation.<sup>2</sup> Approximately one third of outdoor recreational participants are out-of-state visitors. The most popular recreational activities such as skiing and snowboarding, snowmobiling, off-road vehicle riding, and horseback riding are inherently risky. We looked at recreational injuries treated at Montana emergency departments (EDs) or requiring inpatient admission to Montana hospitals from 2011 to 2013 from these four activities.<sup>3</sup>

The most common recreational activity resulting in injury that we examined was skiing and snowboarding, followed by off-road vehicle riding, horseback riding, and snowmobile riding. Over 90% of injuries from skiing were treated at EDs; a higher proportion of injures from snowmobiling and off-road vehicle riding (26% and 19%) required admissions as inpatients (Figure 1).

Figure 1. Most Common Causes of Recreational Injuries Treated in Montana Emergency Departments and Hospitals, 2011-2013



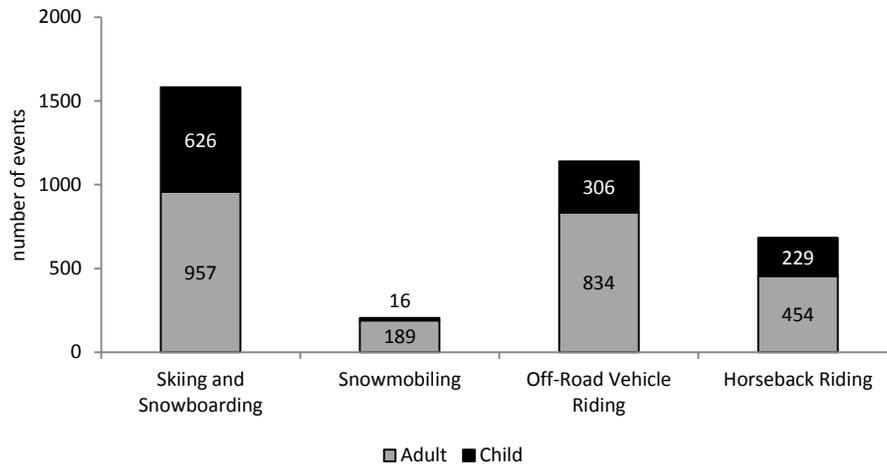
<sup>1</sup> The Montana Hospital Discharge Data System (MHDDS) receives annual de-identified hospital discharge data sets through a Memorandum of Agreement with the Montana Hospital Association. Most hospitals in Montana participate in voluntary reporting from their Uniform Billing forms, version 2004. The MHDDS receives information on more than 90% of inpatient admissions and emergency department encounters in Montana. It does not receive data about outpatient procedures at this time.

<sup>2</sup> The Outdoor Recreation Economy. Outdoor Industry Association 2011-2012 [http://outdoorindustry.org/images/ore\\_reports/MT-montana-outdoorrecreationconomy-oia.pdf](http://outdoorindustry.org/images/ore_reports/MT-montana-outdoorrecreationconomy-oia.pdf)

<sup>3</sup> Gold RS, McCall SE. 2009. *Understanding and Applying the 2010 ICD-9-CM Codes*. Marblehead, MA: HCPro. <http://www.hcpro.com/content/239630.pdf>

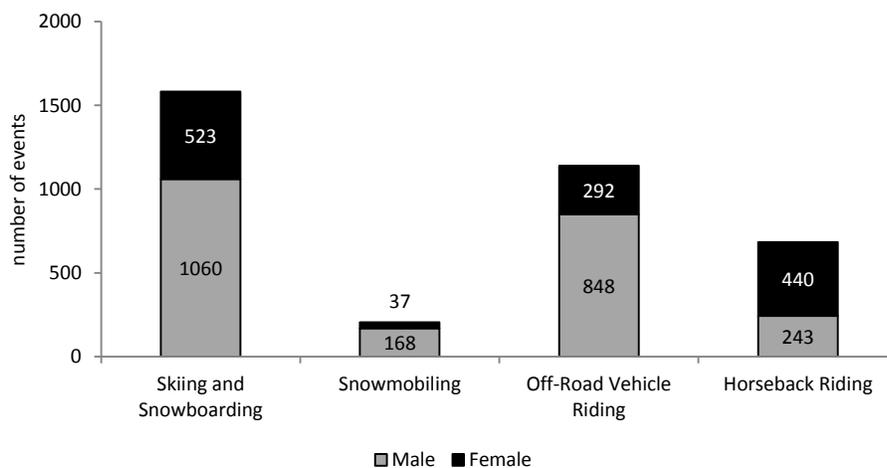
The majority of recreational injuries were to adults, although 33% of skiing and snowboarding injuries were to children ages 17 years or younger (Figure 2). Twenty seven percent of off-road vehicle riding injuries were to children ages 17 years or younger, 14% were to children ages 11 through 15 years, and 9% were to children aged ten years or younger. Snowmobiling injuries were mostly to adults; this may be because snowmobile riders must either possess a valid driver’s license or complete an approved safety course before operating snowmobiles on Montana public lands.<sup>4</sup>

Figure 2. Age Distribution of Recreational Injuries Treated in Montana Emergency Departments and Hospitals, 2011-2103



For skiing and snowboarding, snowmobiling, and off-road vehicle riding, the majority of injuries were to males. In contrast, the majority of horseback riding injuries were to females (Figure 3). Data on the number of individuals who participate in these activities are not available so we cannot determine whether these sex differences are attributable to differences in choice of activity.

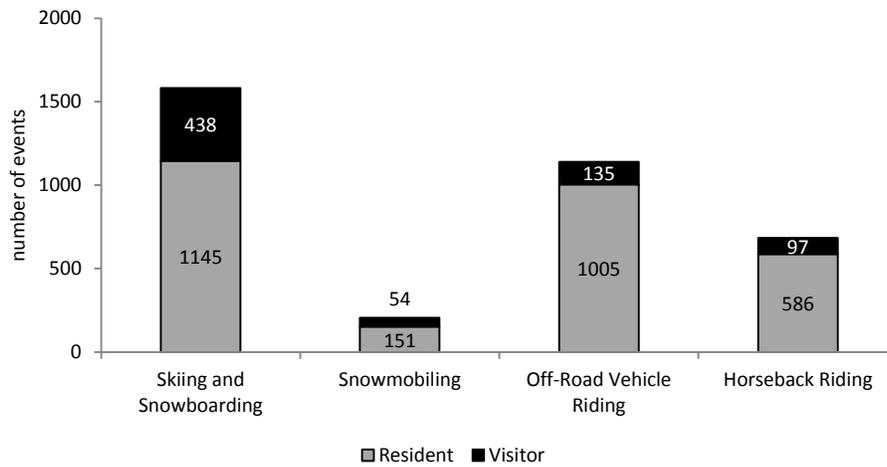
Figure 3. Sex Distribution of Recreational Injuries Treated in Montana Emergency Departments and Hospitals, 2011-2103



<sup>4</sup> <http://stateparks.mt.gov/recreation/snowmobileProgram.html>

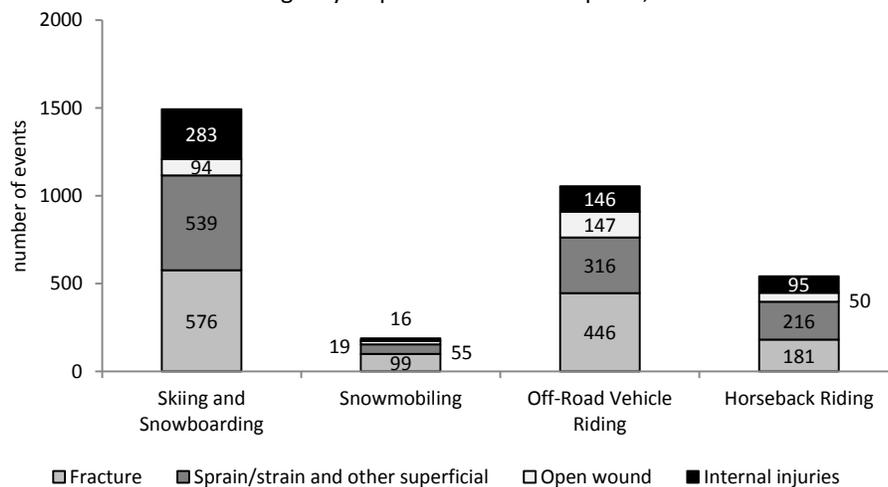
Most injuries for off-road vehicle riding and horseback riding were to Montana residents (88% and 86%, Figure 4). For the wintertime recreation activities, skiing and snowboarding and snowmobiling, lower proportions of injuries were to Montana residents (72% and 74%).

Figure 4. Residence of Individuals Treated for Recreational Injuries in Montana Emergency Departments and Hospitals, 2011-2103



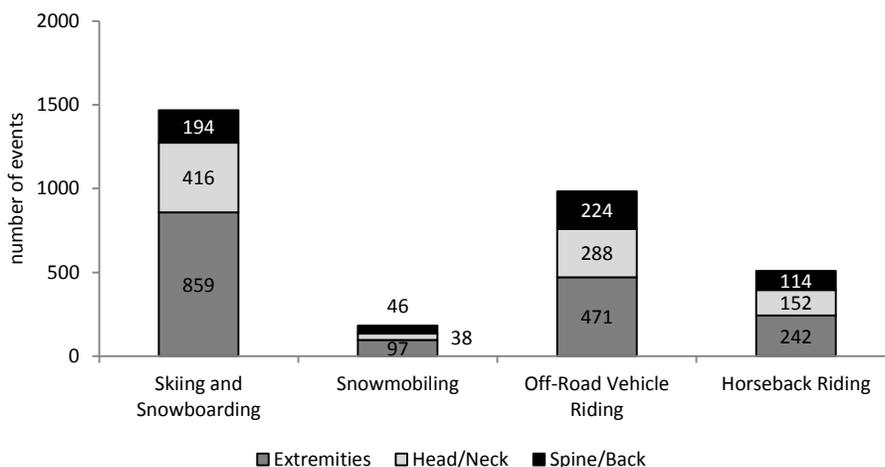
The most common injuries for skiers and snowboarders, snowmobilers, and off-road vehicle riders were fractures; for horseback riders, the most common injuries were sprains, strains, and other superficial injuries (Figure 5).

Figure 5. Types of Recreational Injuries Treated in Montana Emergency Departments and Hospitals, 2011-2013



The most common locations of injuries for all recreational activities were the extremities. For skiing and snowboarding, off-road vehicle riding, and horseback riding, the second most common locations were the head and neck (Figure 6). Approximately one quarter of injuries in snowmobiling, off-road vehicle riding, and horseback riding were to the spine and back.

Figure 6. Location of Recreational Injuries Treated in Montana Emergency Departments and Hospitals, 2011-2013



## Discussion and Conclusion

The behavior and skill level of individuals participating in recreational activities are the primary contributors to risk of injury. Protective equipment is helpful and highly recommended but not adequate in itself to prevent all injuries. According to the National Ski Areas Association (NSAA), 67% of skiers and snowboarders wore helmets in the 2011-2012 ski season, up from 10% in the 2000-2001 season.<sup>5</sup> Helmets reduce the incidence of minor head injuries although according to the NSAA they are less effective at preventing serious injuries. For snowmobile and off-road vehicle riders, helmets, eye protection, and appropriate gloves can protect against contusions and open wounds; such equipment is less effective for protection from fractures to the extremities and injuries to the spine and back. A Canadian study of hospital admissions in British Columbia found that no horseback rider who died of a head injury wore a helmet.<sup>6</sup> Another Canadian study found that the majority of horseback riders wore no protective chest or headwear.<sup>7</sup> The same study found that more experienced riders were actually more likely to be injured than inexperienced riders because more experienced riders engaged in more aggressive riding.

Individuals participating in recreational activities are personally responsible to realistically assess their own abilities and act accordingly. In Montana, skiers and snowboarders are legally required to ski in a safe manner.<sup>8</sup> Serious snowmobile and off-road vehicle injuries are caused by unsafe riding. Snowmobile drivers

<sup>5</sup> <https://www.nsa.org/media/68045/NSAA-Facts-About-Skiing-Snowboarding-Safety-10-1-12.pdf>

<sup>6</sup> Sorli J 2000. Equestrian Injuries: a five year review of hospital admissions in British Columbia, Canada. *Inj Prev* 6:59-61

<sup>7</sup> Ball CG, et al. 2007 Equestrian injuries: incidence, injury patterns, and risk factors for 10 years of major traumatic injuries. *Am J Surg* 193(5):636-40

<sup>8</sup> [Mont. Code Annotated §§ 23-2-736](#)

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must either possess a valid driver's license or complete an approved safety course before operating snowmobiles on Montana public lands.<sup>9</sup> Although anyone with a driver's license is legally allowed to operate a snowmobile in Montana, safety courses can and should be taken in person or online.<sup>10</sup> Montana State Parks recommends online training from Fresh Air Educators and the ATV Safety Institute's hands on safety course.<sup>11</sup> In Montana, children aged 11 through 15 years are required to complete a safety certificate course and be accompanied by a licensed driver to operate an off-road vehicle on public roads including unimproved roads on Forest Service land; private lands and lands managed by the Bureau of Land Management have no licensing requirements.<sup>12</sup> Other states are more restrictive: according to the Child Injury Prevention program of New York State, children aged 10 and under should never be on an all-terrain vehicles, either as drivers or passengers.<sup>13</sup>

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<sup>9</sup> <http://stateparks.mt.gov/recreation/snowmobileProgram.html>

<sup>10</sup> <http://fwp.mt.gov/education/outdoorRec/snowmobile.html>

<sup>11</sup> <http://www.atvcourse.com/usa/montana/>; <http://atvsafety.org/onlineEnroll.cfm>

<sup>12</sup> <http://www.atvcourse.com/usa/montana/atv-laws.aspx>; <http://stateparks.mt.gov/recreation/ohvProgram.html> ;  
[http://www.blm.gov/pgdata/etc/medialib/blm/mt/blm\\_programs/recreation.Par.11948.File.dat/OHVrules.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/mt/blm_programs/recreation.Par.11948.File.dat/OHVrules.pdf)

<sup>13</sup> [https://www.health.ny.gov/prevention/injury\\_prevention/children/fact\\_sheets/atv-19\\_years\\_and\\_younger.htm](https://www.health.ny.gov/prevention/injury_prevention/children/fact_sheets/atv-19_years_and_younger.htm)