

ADVENTURE PROGRAM RISK MANAGEMENT REPORT INCIDENT DATA FROM 1998 – 2007

BY

DREW LEMON, NOLS DIRECTOR OF RISK MANAGEMENT

PROJECT SPONSORED BY

NOLS, WILDERNESS RISK MANAGERS COMMITTEE AND ASSOCIATION FOR EXPERIENTIAL EDUCATION.



This analysis of incident data that was submitted to the Adventure Program Incident Data Reporting Project was compiled for the Wilderness Risk Management Conference held in Jackson Hole, Wyoming in October 2008. This is not a comprehensive research paper, but is simply a way to display the incident data that was voluntarily submitted by interested parties. The data are presented in tables and charts with only brief narrative discussion; the tables and charts should speak for themselves. Information on the WRMC/AEE Incident Data Reporting Project can be found at <www.aee.org/accreditation/wildernessCommittee>

METHODOLOGY

1. Adventure programs voluntarily submit incident data to the WRMC/AEE Incident Data Reporting Project.
2. Incidents are reported using a standardized form, though organizations can modify the form with approval.
3. Specific criteria have been defined to determine what is a reportable incident. Simple cuts and scrapes or aches and pains are not included in the data. The reportable incident criteria are as follows.
 - Requires more than simple first aid
 - Requires follow-up care by staff in the field
 - Requires follow-up care by a medical professional
 - Requires follow-up care by a therapist, psychologist or social worker
 - Requires use of prescription medications
 - Requires evacuation from the field
 - Results in the loss of a day or more of participation in the program
 - Results in a near miss (close call)
4. Each incident report is reviewed and measured against these criteria. Any report deemed by the author as not meeting the criteria is not included in the database. Illegible reports are not included.
5. Program days are also submitted. Program days include participants and staff. A program day is 1 person on the program for one day (e.g.: eight participants and two staff on a five-day trip equals 50 program days; $8+2 \times 5=50$).
6. Program days are reported by the predominant activity of the day: e.g. backpacking. Program days should be submitted even if no incidents occurred.
7. Program days are used to calculate incident rates. Only those incidents with corresponding program days were used in the following tables and graphs. If an organization submitted incident reports for a particular year, but did not submit program days for the same year their incidents were not counted in these data. There were 100 incidents excluded due to this inadequate reporting.

8. Forty-three organizations submitted data from 1998 – 2007. Thirty-two were AEE accredited organizations.
9. Incident and program day reports are sent to the AEE office and then forwarded to NOLS where the information is entered into databases managed by the author. Filemaker Pro software is used for incident records and Excel software is used for program days and calculations.
10. Confidentiality is held in the highest regard. The name of the organization is necessary for organizing the data, but is not divulged to anyone. The patient's name is not necessary and where it has been reported it is not divulged.
11. The WRMC is primarily interested in collecting incident data on wilderness or backcountry activities or trips. Some activities such as rock climbing and river kayaking occur in front country settings, but because these are also backcountry activities the author included them in the backcountry only data. Many organizations also conduct facility-based activities such as climbing walls and challenge courses. These data are presented separately from backcountry data.

RESULTS

BACKCOUNTRY AND FACILITY/FROTCOUNTRY DATA COMBINED

INJURY PROFILE – ALL INJURIES

This table displays all injuries for both backcountry and facility/frontcountry activities combined and is sorted by the number of injuries. Athletic sprain or strain injuries are the most common and primarily involved knees, ankles and the lower back. There is also a category of Athletic: tendonitis injury of which there five incidents. All athletic injuries combined total 238 incidents. Soft tissue injuries are divided into wounds/infections, bruise/contusion, burns, bite/stings and blisters. All soft tissue injuries combined also total 238. These two categories combined account for 70% of all reported injuries.

TABLE 1

WRMC INJURY PROFILE - ALL INJURIES (Sorted by # of injury) 1998-2007 Backcountry and Facility Injuries Participants and Staff		
Type of Injury	# inj.	%
Athletic: sprain/strain/tendinitis	238	34.8%
Soft tissue: wound or wound infection	112	16.4%
Soft tissue: bruise/contusion	98	14.3%
Fracture	73	10.7%
Dislocation	32	4.7%
Head w/no loss of consciousness	27	3.9%
Frostbite	23	3.4%
Soft tissue: burn	20	2.9%
Other	12	1.8%
Head w/loss of consciousness	12	1.8%
Eye injury	10	1.5%
Dental	9	1.3%
Athletic: tendinitis	5	0.7%
Soft tissue: bite/sting	5	0.7%
Immersion foot	4	0.6%
Soft tissue: blister	3	0.4%
Snowblindness	1	0.1%
Total all Injury	684	100%

BACKCOUNTRY DATA

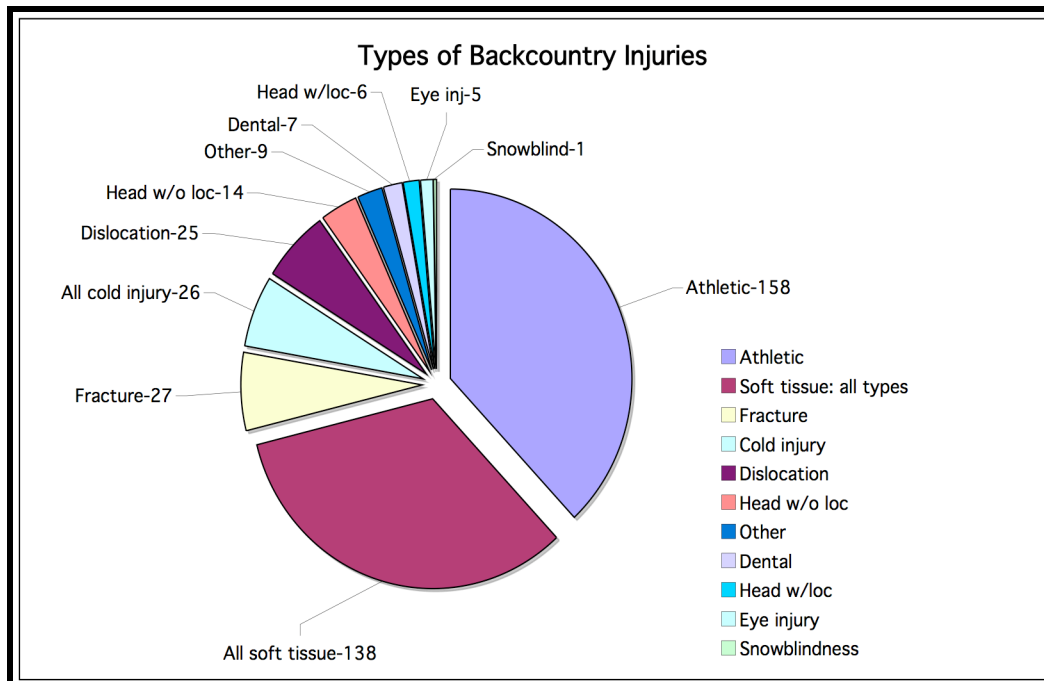
INJURY PROFILE – BACKCOUNTRY ONLY

The data in table two is injuries by type listing the number of injuries, the injury rate per type, the number of evacuations and the evacuation rate per injury type. The leading type of injury is athletic with 158 injuries, which also has the highest evacuation rate. Soft tissue wounds is the second leading type of injury with 138 injuries. Combined these two categories account for 71% of backcountry injuries. Over half (57%) of injury incidents are evacuated from the field. Chart one represents injury types graphically.

Table 2

INJURY RATE per 1000 program days - BACKCOUNTRY ONLY				
1998-2007				
(Sorted by # of injury)				
Participants and Staff				
Backcountry Program days = 801,569				
Type of Injury	# inj.	Injury rate	Evac	Evac rate
Athletic:sprain/strain/tendinitis	158	0.20	103	0.13
Soft tissue: all types	138	0.17	63	0.08
Fracture	27	0.03	21	0.03
Cold injury (frostbite/immersion foot)	26	0.03	16	0.02
Dislocation	25	0.03	13	0.02
Head w/no loss of consciousness	14	0.02	4	0.00
Other	9	0.01	8	0.01
Dental	7	0.01	4	0.00
Head w/loss of consciousness	6	0.01	4	0.00
Eye injury	5	0.01	3	0.00
Snowblindness	1	0.00	0	0.00
Total Backcountry Injury	416	0.52	239	0.30

CHART 1



INJURY RATE BY ACTIVITY PROFILE— BACKCOUNTRY ONLY

Table three presents injuries by activity and the injury rate per 1000 program days. These data show the relationship between the number of injuries and the number of program days. Backpacking had the most injuries of any activity type, but winter camping had the highest injury rate, however, it would not be fair to say that winter camping is more dangerous than backpacking based solely on these data; the sample size for winter camping is simply too small to make such a comparison. The total injury rate of 0.52 injuries per 1000 program days is the more important result of these data. Based on these data one could expect one backcountry injury for about every 2000 program days. Two thousand program days is equivalent to a group of ten people in the backcountry for 200 days.

TABLE 3:

PROFILE OF INJURIES BY ACTIVITY WITH INJURY RATES - BACKCOUNTRY ONLY			
with injuries and injury rates per 1000 program days.			
1998 - 2007 (Sorted by # of injuries)			
Participants and Staff	<i>Injury rates calculated by activity specific exposure (program days)</i>		
Activity	# of Injuries	Program days	Injury rate
Backpacking	145	188,970	0.77
Camping (includes cooking)	42	196,270	0.21
Cycling mtn	39	13,349	2.92
Canoe (flatwater & portage)	36	21,436	1.68
Day hiking & orienteering	32	38,273	0.84
Ski touring	23	21,254	1.08
Climbing (rock/rappelling)	20	40,862	0.49
River kayak	19	20,581	0.92
Other activities	10	5,055	1.98
Service projects	7	28,285	0.25
Solo	6	49,453	0.12
Mountaineering rock/alpine	6	17,195	0.35
Winter camping	5	1,289	3.88
River rafting	5	8,723	0.57
Swim/dip	4	2,671	1.50
Snowshoeing	4	4,691	0.85
Cave	3	1,858	1.61
Sea/touring kayak	3	9,232	0.32
Non-activity	2	11,121	0.18
Canoeing (whitewater)	2	9,961	0.20
Climbing (snow/ice)	2	687	2.91
Skiing - telemark (backcountry)	1	0	0.00
Canyoneering	0	39	0.00
Climbing (tree)	0	856	0.00
General participation	0	105,703	0.00
Independent travel	0	636	0.00
Sailing	0	3,119	0.00
Snowboarding (backcountry)	0	0	0.00
Total Backcountry	416	801,569	0.52

CONTRIBUTING FACTOR OF INJURY – BACKCOUNTRY ONLY

The contributing factor profile lists the predominant factor that led to the injury (though there are often secondary tertiary factors also). Contributing factors in this study can be an act such as falls/slips, a human factor such as carelessness or previous history of a medical condition or an environmental factor such as weather or animal encounter. The fact that Falls/slips are the leading factor correlates to the high incidence of athletic and soft tissue injuries.

TABLE 4

PRIMARY CONTRIBUTING FACTOR OF BACKCOUNTRY INJURY 1998 - 2007 (Sorted by factor)		
Contributing Factor	# of incidents	%
Fall/slip	98	24%
Previous history	37	9%
Carelessness	35	8%
Fall on rock (not climbing)	26	6%
Overuse	25	6%
Unknown	24	6%
Technique	22	5%
Exceeded ability	21	5%
Other	17	4%
Cold exposure	15	4%
Fall on snow	15	4%
Inattention	13	3%
Equipment	12	3%
Animal/insect	10	2%
Not following instructions	9	2%
Loose rock (not rockfall)	6	1%
Immersion/submersion	5	1%
Rockfall	5	1%
Falling object not rockfall	4	1%
Misbehavior	4	1%
Visibility	3	1%
Weather	3	1%
Exhaustion	2	0%
Plant (poison/toxicity)	2	0%
Hygiene	1	0%
Psychological	1	0%
Supervision	1	0%
Total	416	100%

ILLNESS PROFILE – BACKCOUNTRY ONLY

Nausea and vomiting illness was the leading type of illness. Nausea and vomiting and abdominal pain are closely related, but I chose the category that was indicated on the report and/or the symptom that most predominant. The category “Other” is comprised of single incidents of illness symptoms not attributable to any of the listed categories. It is notable that there were no incidents of anaphylaxis reported. I chose to only present the illness profile for backcountry activities since illnesses in facility settings are relatively easy to respond to. It is worth noting that 78% of illness incidents are evacuated while 45% of injuries are evacuated. This may speak to the relatively minor nature of the injuries reported and perhaps either an uncertainty in the ability of leaders in handling illness symptoms in the backcountry or patient’s lack of desire to remain in the field with an illness. In contrast incident data (unpublished) kept by the author for the National Outdoor Leadership School show that 57% of injuries and 40% of illnesses are evacuated.

TABLE 5

ILLNESS PROFILE - BACKCOUNTRY ILLNESS 1998 - 2007 Participants and Staff (Sorted by illness) Total program days = 801,569						
Illness Type	# ill.	%	Illness Rate	Evac	% Evac	Evac Rate
Nausea/vomiting	41	18%	0.05	31	14%	0.04
Allergy	31	14%	0.04	17	8%	0.02
Flu symptoms	23	10%	0.03	15	7%	0.02
Infection	16	7%	0.02	11	5%	0.01
Abdominal pain	14	6%	0.02	12	5%	0.01
Other	14	6%	0.02	11	5%	0.01
Asthma	14	6%	0.02	7	3%	0.01
AMS	13	6%	0.02	9	4%	0.01
Diarhea	11	5%	0.01	10	4%	0.01
Genitourinary	11	5%	0.01	9	4%	0.01
Dehydration	11	5%	0.01	5	2%	0.01
Respiratory/not flu	10	4%	0.01	8	4%	0.01
Hypothermia	7	3%	0.01	2	1%	0.00
Cardiac/chest pain	4	2%	0.00	4	2%	0.00
Heat illness	2	1%	0.00	1	0%	0.00
Fever (non specific)	2	1%	0.00	2	1%	0.00
Anaphylaxis	0	0%	0.00	0	0%	0.00
TOTAL ILLNESS	224	100%	0.28	154	69%	0.19

NEAR MISS INCIDENTS – BACKCOUNTRY ONLY

Near misses are close calls that did not result in an injury. Near misses can be unusual, fascinating or scary. Near miss incidents are worth studying, as they may be predictors of injuries. Near miss incidents can be due to environmental factors such as weather or rockfall or involve human factors such as failure to use a belay system correctly.

TABLE 6

NEAR MISS INCIDENTS - BACKCOUNTRY ONLY 1998 - 2007 Participants and staff (Sorted by # of incidents)		
Activity	# of incidents	%
Backpacking	30	17.3%
Climbing (rock/rappelling)	26	15.0%
Camping	19	11.0%
Canoeing (flatwater& portage)	18	10.4%
Canoeing (whitewater)	17	9.8%
Cooking	14	8.1%
Mountaineering	9	5.2%
River kayaking	9	5.2%
Solo	5	2.9%
River crossing	5	2.9%
Hiking (day/orienteering)	4	2.3%
River rafting	4	2.3%
Cycling (mountain)	4	2.3%
Swim/dip	2	1.2%
Sea kayaking	2	1.2%
Climbing (ice/snow)	1	0.6%
Other	1	0.6%
Snowshoeing	1	0.6%
Sailing	1	0.6%
Service project	1	0.6%
Total Backcountry	173	100.0%

FACILITY/FROTCOUNTRY DATA

INJURY RATE BY ACTIVITY PROFILE– FACILITY/FROTCOUNTRY ONLY

Facility/Frontcountry specific injuries are non-backcountry injuries, most of which occur at facilities, e.g. summer camps, base camps, campuses, or winter resorts, but they also include roadheads and transportation incidents. These data are presented as rates per 1000 program days and sorted by the number of injuries per activity. The rates are calculated using the program days for the specific activity. Program day data did not consistently conform with the facility related activities and so there are injuries reported without corresponding program days. The injuries are listed here so the activities in which the injuries occurred can be seen.

Horseback riding had the most reported injuries, while snowboarding at winter resorts had the highest injury rate. Ropes courses had a low injury rate and artificial climbing walls had the lowest injury rate.

TABLE 7

PROFILE OF INJURIES BY ACTIVITY WITH INJURY RATES - FACILITY ONLY			
Injury rates states as injuries/1000 program days.			
1998 - 2007		(Sorted by # of injuries)	
Participants and Staff	<i>Injury rates calculated by activity specific exposure (program day's)</i>		
Activity	# of Injuries	Program days	Injury rate
Horseback riding	89	102,803	0.87
Sports and recreational games	33	26,042	1.27
Snowboarding - ski area	30	1,789	16.77
Camp; base or facility	21	0	0.00
Initiatives team challenges	18	199,091	0.09
Ropes course (high & low element)	16	145,036	0.11
Other	8	95,002	0.08
Ski downhill - ski area	8	1,553	5.15
Transportation (to activity)	8	67,223	0.12
Climbing (manufactured walls)	7	163,354	0.04
Day hiking (facility)/orienteering	6	0	0.00
Swimming-lake front or pool	4	0	0.00
Cooking-facility or on the road	3	0	0.00
Canoeing-facility	2	0	0.00
Service project	2	0	0.00
Skiing telemark - ski area	2	2,369	0.84
Unknown	2	0	0.00
Cycling mountain-facility	1	0	0.00
Cycling road	1	845	1.18
River kayak-pool session	1	0	0.00
Running	1	17,675	0.06
Surfing	0	50	0.00
Travel / study	0	16,796	0.00
Total Facility	263	839,628	0.31

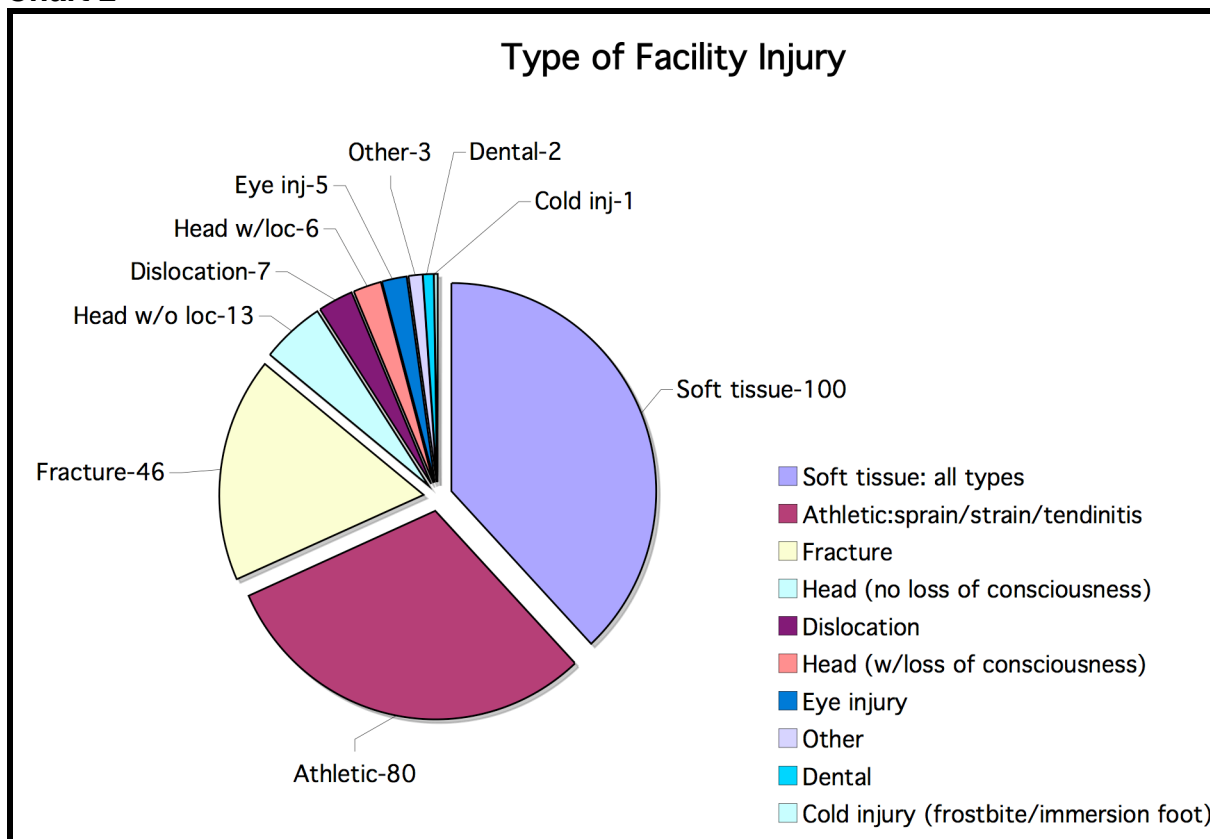
INJURY RATE BY INJURY TYPE PROFILE – FACILITY ONLY

Table eight presents injury rates per 1000 program days and is sorted by the type of injury. Soft tissue injuries are the leading type followed by athletic. Facility incidents are not evacuated, but the patient may be brought to a medical care facility or be seen by a health care professional. Chart two displays injury type graphically

TABLE 8

INJURY PROFILE - FACILITY/FROTCOUNTRY ONLY 1998-2007 Participants and Staff (Sorted by # of injury)					
Type of Injury	# inj.	%	Injury rate	Medical Care	% Medical Care
Soft tissue: all types	100	38%	0.12	88	33%
Athletic:sprain/strain/tendinitis	80	30%	0.10	59	22%
Fracture	46	17%	0.05	45	17%
Head (no loss of consciousness)	13	5%	0.02	11	4%
Dislocation	7	3%	0.01	6	2%
Head (w/loss of consciousness)	6	2%	0.01	5	2%
Eye injury	5	2%	0.01	4	2%
Other	3	1%	0.00	3	1%
Dental	2	1%	0.00	2	1%
Cold injury (frostbite/immersion foot)	1	0%	0.00	0	0%
Total Facility/Frontcountry Injury	263	100%	0.31	223	85%

Chart 2



NEAR MISS INCIDENTS – FACILITY ONLY

The facility near misses with ropes courses and climbing walls primarily had to do with participants unclipping cables on ropes courses (49 incidents) or improper belays at climbing walls (12 incidents). Transportation incidents included six incidents of trailers becoming unhitched from the tow vehicle while traveling down the road. Horseback incidents were primarily riders falling off, being bucked off or having to perform an emergency dismount from the horse (12 incidents).

TABLE 9

NEAR MISS INCIDENTS - FACILITY ONLY 1998 - 2007 Participants and staff (Sorted by # of incidents)		
Activity	# of incidents	%
Ropes course (high)	84	55.3%
Climbing Wall	19	12.5%
Transportation	15	9.9%
Horseback riding	15	9.9%
Other	6	3.9%
Camp (base or facility)	4	2.6%
Initiative	3	2.0%
Cooking	2	1.3%
Ropes course (low)	2	1.3%
Service project	1	0.7%
Swim/dip	1	0.7%
Total Facility	152	100.0%