

ORIGINAL RESEARCH

Epidemiology of Mountain Search and Rescue Operations in Banff, Yoho, and Kootenay National Parks, 2003–06

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Objective.—To describe the epidemiology of mountain incidents and mountain rescue operations occurring in Banff, Yoho, and Kootenay National Parks between 1 January 2003 and 31 December 2006.

Methods.—Retrospective review of Banff, Yoho, and Kootenay Public Safety Occurrence Reports detailing rescue operations within the study period. Demographics, activity, reason for rescue, mode of rescue, type of injury, and fatalities were analyzed.

Results.—A total of 317 emergency mountain rescue operations involving 406 persons was documented. The mean age of the rescued population was 35.2 years, and this population was predominantly male (63.1%). Hikers were involved in 43.5% of incidents, and ‘slips and falls’ were responsible for 50.2%. Helicopter was the mode of rescue in 64% of cases. Almost half (40.7%) of all rescues involved people with no injuries. The limbs were the most common body part affected (68% of traumatic injuries). Forty fatalities occurred—45% due to avalanches and 27.5% due to slips and falls.

Conclusions.—This study offers a synopsis of the rescue service provided by Parks Canada Rescue in the study area. Further work is needed to separate primary and contributory causes of mountain incidents, and this can be achieved by use of better data collection methods. Hospital follow-up is required to accurately assess the morbidity and mortality associated with mountain incidents. Data presented are expected to be of value to a variety of tourism, health, and safety organizations.

Key words: accident prevention, backcountry medicine, climbing injuries, orthopedic injuries, search and rescue, sports injuries, trauma

Introduction

Banff, Yoho, and Kootenay National Parks (Banff NPs) in the Canadian Rockies cover an area of over 9300 km² and receive in excess of 4 million visitors yearly.¹ Many people make use of the vast mountain ranges for outdoor activities. As in any such area, mountain incidents are inevitable as a result of the inherent risks of both the activities performed and the terrain.² In this area the Public Safety Program of Parks Canada has the responsibility for mountain search and rescue.

The vast size of the parks and their extremely rugged terrain render much of the region poorly accessible by road, and a helicopter is often used for search and rescue. A pilot is on call at all times and on a typical helicopter rescue will be accompanied by 2 to 3 wardens.

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No winching is done during rescues. Casualties are either placed directly within the helicopter or a fixed line of typically 100 feet in length can be attached to the base of the helicopter to allow “heli-sling” maneuvers with a suspended stretcher or harnessed casualty.³

The Public Safety Program is run by the Banff Field Unit (FU) and the Lake Louise, Yoho, and Kootenay FU. The 5 Public Safety Specialists are full-time wardens and qualified Mountain Guides (members of the Association of Canadian Mountain Guides, which is affiliated with the International Federation of Mountain Guides Associations). These wardens undergo continuing training as guides and receive Advanced Wilderness First-Aid training. Oxygen is used during rescue, but no controlled drugs are administered. General wardens sometimes become involved in nontechnical rescues, and Canadian Avalanche Rescue Dog Association volunteers assist with avalanche searches.

Rescue operations are funded by park fees and do-

nations, and rescue is free of charge. When casualties require further medical attention, they are flown to the hospital directly or rescuers rendezvous with ambulances. The main trauma hospital for Banff NPs is Banff Mineral Springs, which receives most of the casualties. No physicians are routinely involved in the search and rescue aspect of mountain rescue, although a paramedic will occasionally accompany the wardens for a nontechnical medical emergency or other such event.

The objective of this study was to analyze the epidemiology of mountain rescues involving Parks Canada Rescue (PCR) in Banff NPs over a 4-year period between January 1, 2003, and December 31, 2006. The study examined age, gender, and nationality before considering the activities being performed when incidents occurred, the reason for rescue, the mode of rescue, injuries sustained, and fatalities.

This is the first published study of mountain rescue data in the area described. The presented data describe the rescue service provided in Banff NPs. It is expected that this information will be useful to

- PCR and local health care agencies in service provision;
- Local tourism and media groups, who may wish to obtain objective data on the risks of mountain activities; and
- Those interested in improving safety and developing training schemes for mountain-based activities in the study area.

Methods

This retrospective review examined information from all documented rescue operations carried out by PCR during the study period. The Public Safety Occurrence Reports (original paper copies, filed after every incident involving a warden) of Banff FU and Lake Louise, Yoho, and Kootenay FU were examined and the relevant data extracted. Data entries into reports were occasionally partially complete or ambiguous, and all calculations were performed using the available information. This error is not thought to be significant. Usually details of final hospital outcome were not available in the reports, and hospital follow up was not performed.

A “rescue operation” was defined as any intervention by PCR in an incident involving injury or potential danger to persons while in the wilderness. The commercial ski areas within the study area have their own dedicated ski patrols and were excluded unless PCR became involved. Injury severity was assessed as Code Green (no injury or non-life-threatening), Yellow (potentially life-threatening), Red (serious and imminently life-threaten-

Table 1. Details of rescue operations undertaken by Parks Canada Rescue in Banff, Yoho, and Kootenay National Parks between January 1, 2003, and December 31, 2006

Details	Year				Total
	2003	2004	2005	2006	
Rescue operations	80	81	81	75	317
People recovered (alive or dead)	103	100	98	105	406
Survivors rescued	86	85	95	100	366
Survivors injured	56	55	55	51	217
Fatalities	17	15	3	5	40

ing), or Black (fatality) by the rescuers upon arrival at the scene.

“Hiking” is a broad term and was used to describe a spectrum of activities ranging from strolls around vehicle-accessible mountain lakes to multiday hikes through challenging and remote mountain terrain. The “own power assist” category includes persons who refused aid or those reported overdue or stranded who, after assessment or advice, did not require additional external help in evacuation.

Excluded from the study were all non-mountain rescue aspects of warden work. For example, attendance at traffic incidents and fire evacuation. Mountain rescue “false alarms”—for which no assistance was required—were excluded, as was any work involving missing or downed aircraft. Boat, canoe/kayak, and paraglider incidents were included when they took place in a mountain setting. Searches for missing persons that yielded no trace of a casualty were excluded. On occasion wardens assisted with rescue operations outside the Banff NPs area, and these rescues were included.

Results

Table 1 shows the details of rescue operations undertaken during the study period.

DEMOGRAPHICS

The population rescued had a mean age of 35.2 years (SD $\pm$ 17.0) and was 63.1% male. Figure 1 shows the age distribution and gender of rescued people. Three hundred of the 406 people recovered were Canadian (73.9%) and over half (208) were from Alberta. The United States accounted for 14.8% and Europe for 5.7% of people rescued. Figure 2 shows the monthly distribution of rescues.

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