

ORIGINAL RESEARCH

New Zealand Land Search and Rescue Operations: An Analysis of Medical and Traumatic Conditions

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Objective.—The aim of this study was to describe the range and types of medical and traumatic conditions encountered in land search and rescue operations in New Zealand.

Methods.—Twenty months (May 2010 to December 2011) of land search and rescue operations were analyzed. Data on medical and traumatic conditions were extracted from the New Zealand Police search and rescue database.

Results.—During the period audited, New Zealand Police coordinated 1490 land-based search and rescue operations, from which 611 persons fulfilled the study inclusion criteria. Males accounted for 60.5% of the subjects, and a trauma-related injury was the most commonly encountered condition (37.3% of all). The lower limb was the most commonly injured body site, and most injuries occurred as the result of a slip or fall. Medical conditions were recorded in 11.6% of operations and included a wide spread of conditions, with cardiovascular events being seen most frequently. Hypothermia was diagnosed in 9.3% of all operations, and fatalities made up 5.6% of the sample. Thirty percent of all operations were for persons with cognitive impairment who had wandered away from their usual place of residence. These were almost entirely urban searches and concentrated in districts with large populations.

Conclusions.—Search and rescue personnel are exposed to a broad range of medical and traumatic conditions. In New Zealand, they include preexisting cognitive impairment that results in persons lost in urban environments. Notwithstanding this, many subjects will also need to be managed in remote, resource-limited environments for extended periods. First aid training and field equipment should reflect these demands.

Key words: search, rescue, injury, illness, New Zealand

Introduction

Significant numbers of people venture into New Zealand's wilderness areas to participate in recreational activities each year. When compared to residents of other countries, New Zealand residents score highly in overall levels of physical activity.¹ Many sporting and recreational activities are undertaken in outdoor and wilderness areas.² The dramatic increase in absolute numbers of New Zealand residents participating in outdoor and wilderness activities seen in the 1970s and 1980s³ may now be stabilizing.⁴ Still, in 2009, many New Zealanders reported participation in a range of outdoor activities, including walking, 64%; hiking,

9.4%; mountain biking, 6%, and mountaineering, 1.1%.² New Zealand is also a destination for outdoor recreational activities for many international visitors. Some outdoor enthusiasts will become lost, ill, or injured and may require the services of search and rescue (SAR) organizations.

In New Zealand, SAR operations are divided into category 1 operations (land, inland waterway, subterranean, and marine close to shore) and category 2 operations (aircraft, marine offshore, and activated emergency locator beacons). Category 1 operations are coordinated by New Zealand Police (NZ Police), and category 2 operations, by the NZ Rescue Coordination Center.⁵ Category 1 operations can occur in wilderness and suburban/urban locations. Suburban/urban operations are largely searches for missing persons. That differs from the responsibilities of the NZ urban SAR

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(USAR), who, under the umbrella of the NZ Fire Service, are responsible for the rescue and extraction of persons trapped in collapsed structures.⁶ The SAR responsibilities within NZ Police are devolved to police districts where police are assisted by New Zealand land search and rescue (LandSAR) volunteers.

In the year from 2011 to 2012, NZ Police coordinated 1675 category 1 SAR operations, of which 920 were land based.⁵ New Zealand LandSAR volunteers were involved in 421 of these operations, contributing almost 30,000 volunteer operation hours.⁷ One of the roles of SAR personnel (both NZ Police and NZ LandSAR volunteers) is to provide first aid to the victim. Although statistics are gathered on SAR operation logistics, there has been no formal audit of the types of medical and traumatic conditions encountered by SAR personnel in New Zealand. The cost of training and equipping of SAR personnel is borne by NZ LandSAR, NZ Police, and by the volunteers themselves. Information on medical and traumatic conditions that personnel are likely to encounter will help rationalize both training and field equipment (including contents of medical kits). That should maximize the use of limited funds and ensure best victim care.

Studies of medical and traumatic conditions encountered in search and rescue operations in a number of countries have been published.^{8–21} Only one, a review of mountaineering fatalities, has been found for New Zealand.²² Although both the outdoor environment of New Zealand and the activities undertaken in the outdoors have a number of similarities to those of Europe and North America, differences, including its noncontinental (and therefore less predictable) climate and variable terrain found over relatively short geographical distances, may result in a different mix of medical and traumatic conditions, requiring verification by NZ-specific data.

The objective of this audit was to describe the range and types of medical and traumatic conditions encountered in land search and rescue operations in New Zealand.

Methods

Twenty months (May 2010 to December 2011) of category 1 land SAR operations were analyzed. Data on medical and traumatic conditions were extracted from the NZ Police SAR database. Conditions were grouped into 6 broad categories: traumatic injuries; cognitive impairment (dementia, autism, and intellectual disability); medical conditions (exhaustion, dehydration, and all acute illness—either de novo or due to a preexisting medical condition); hypothermia; and “despondent”

(suicidal or other acute psychiatric condition). Use of alcohol and drugs was also noted. All fatalities were recorded. Operations that were purely retrievals of well persons were excluded from the analysis.

Ethics approval was provided by the University of Otago and by the NZ Police Research and Evaluation Steering Committee.

Results

During the period audited, NZ Police coordinated 1490 category 1 land SAR operations.^{5,23} Of these, at least 1 medical or traumatic condition was recorded in 611 (41%), fulfilling the audit inclusion criteria. The operations audited were spread across urban/suburban and wilderness locations throughout all NZ Police districts. Wilderness locations accounted for 60.5% of operations. Bay of Plenty, Southern, and Canterbury police districts together accounted for approximately half the operations. There was an almost even split in operations occurring in the North Island and the South Island (Table 1).

Ages of the SAR subjects had a wide range, from 3 to 94 years, with a mean age of 47.9 years. The mean age dropped to 40.1 years when operations for persons with cognitive impairment were excluded (Table 2). Male subjects accounted for 60.5% of the sample (Table 2).

For the 611 subjects, 657 medical and traumatic conditions were recorded (Table 2). Trauma accounted for 37.3%, cognitive impairment for 27.9%, and nontraumatic medical conditions for 11.6%. Hypothermia was recorded in 9.3% of cases. The 76 medical conditions (Table 3) were led by cardiovascular and nonspecific “collapse” (some of which may have been precipitated by cardiovascular events). Some were known preexisting conditions that did not necessarily contribute to the need for the SAR operation; they were noted coincidentally (Table 3). For example, a history of asthma was noted in 4 persons; however, for all 4, it had not contributed to the need for the SAR operation. In contrast, all cases of a cardiovascular event did contribute to the need for the subsequent SAR operation.

In the analysis it became apparent that there was a clear split between 2 types of operations, those for a group subsequently labeled “wanderers” and a second group labeled “nonwanderers” (Table 2). Wanderers were defined as persons with preexisting cognitive impairment who had gone missing from their home or residential care. These searches were largely in urban/suburban areas and were concentrated in the more populous North Island; they accounted for 30% of the sample. The proportion that such operations contributed to the overall workload in any given district varied greatly. In the Auckland City District, for example,

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