

## UIAA Mountain Medicine Centre Information Sheet 9

Intended Distribution: Mountaineers, Expedition Doctors  
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### DEATHS DURING MOUNTAINEERING AT EXTREME ALTITUDE

In 1986 a storm on K2 (8613m, 28,250ft), the world's second highest mountain led to events which claimed the lives of 13 climbers including two British mountaineers, Alan Rouse and Julie Tullis. Following the tragedy it was suggested that many such deaths might be avoided if supplementary oxygen were used. In an attempt to identify the factors involved in fatal accidents at extreme altitude (over 7000m, 22960ft) we studied fatalities on British expeditions to peaks above 7000m.

#### Methods and results

Reports relating to British expeditions to peaks over 7000m were collected from Mountain Magazine from 1968 until December 1987. We noted the details of fatal accidents and personnel. We admit that there were sometimes difficulties in compiling full records of expedition members and that not all the accidents occurred at extreme altitudes. Deaths of sherpas and porters are not included. We do however feel that ALL British expeditions to peaks over 7000m have been included here.

There were 83 such expeditions, comprising 535 mountaineers visiting the Greater Himalaya. 23 fatalities occurred on 10 of the 51 peaks visited. The overall mortality rate was thus 4.3% of mountaineers - or there was at least one fatality every fifth expedition.

The most frequented mountain was Everest, (8848m, 29,021ft); there were 121 individuals on 11 expeditions with 7 deaths (overall mortality rate 5.8%). On K2 (28 individuals on 5 expeditions) there were three deaths (overall mortality rate 10.7%).

We attempted to identify the principal cause of death in each case from the data available and from personal knowledge.

Cause of death	Number	Percent
Falls, rockfalls, avalanches	16	69.6
Cerebral / pulmonary oedema	4	17.4
Uncertain	3	13
Total	23	100

#### Comment

This study draws attention to the dangers involved in mountaineering at extreme altitude. We calculated that, by contrast, the average climber in England and Wales has only a two in a million chance of death on a particular day of activity, which puts climbing as the second (after air sports) most dangerous national leisure activity. Surprisingly, there is little hard data about horse riding, another high-risk sport.

The apparent contribution of altitude hypoxia to mortality here is low (17.4%), but its effect is significant in that in many fatalities apparently due to mountain accidents (e.g. avalanche) there are components of misjudgement, disorientation or exhaustion caused by severe hypoxia. It is likely that some of these deaths could have been prevented if early symptoms of cerebral or pulmonary oedema had been appreciated and treated by rapid descent and the use of oxygen/PAC chamber, nifedipine and dexamethasone. Supplementary oxygen would almost certainly have reduced these "medical deaths" but its use is limited for logistic reasons. It seems certain that the world's highest peaks will continue to be attempted without it.

The extreme altitude mountaineers of the 21st century should take heed of these figures when planning and undertaking expeditions if this high mortality is to be reduced. Since assembling

this data nearly 10 years ago there have been more deaths at high altitude, some clearly due to sudden high altitude cerebral and/or pulmonary oedema, in apparently acclimatised people. While the data could be updated, and brought into a more international arena, there is little suggestion that the essential facts have altered: high altitude climbing is high-risk activity, with an uncomfortably high fatality rate.

## References

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