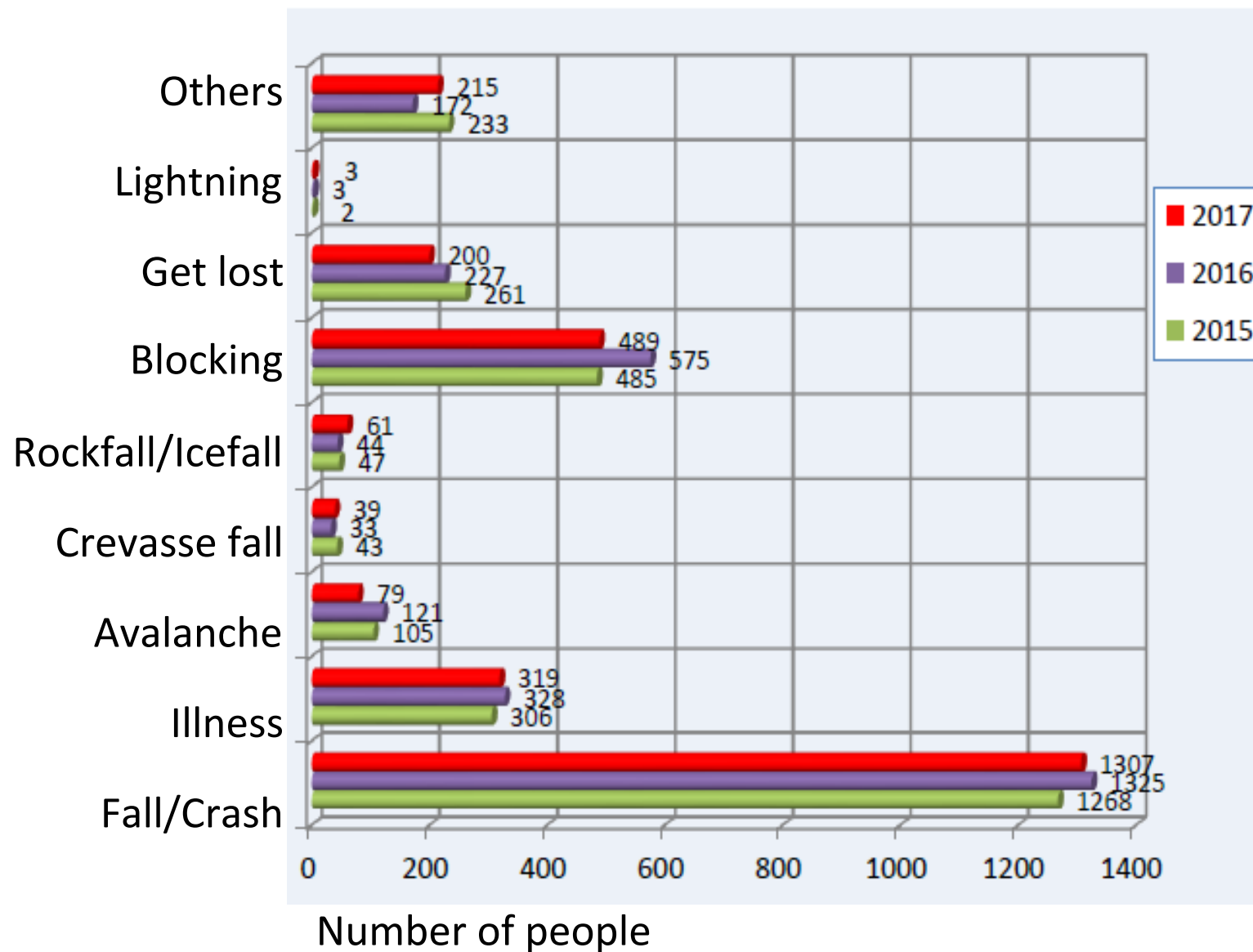


Inhalational Analgesia: Its role in Mountain Rescue ?

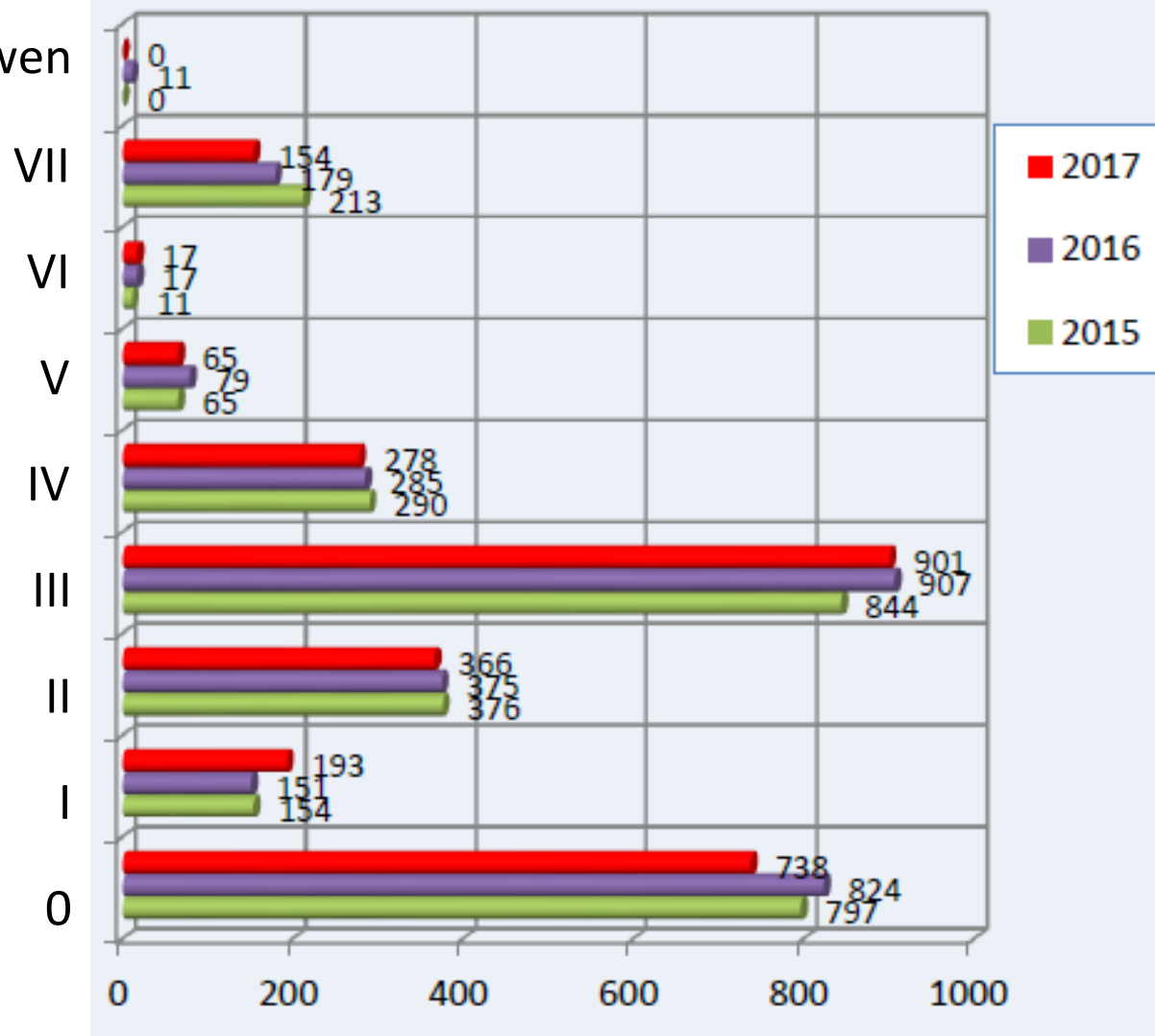
Prof. Dr. V. Lischke
Bergwacht im Deutschen Roten
Kreuz

Emergency causes



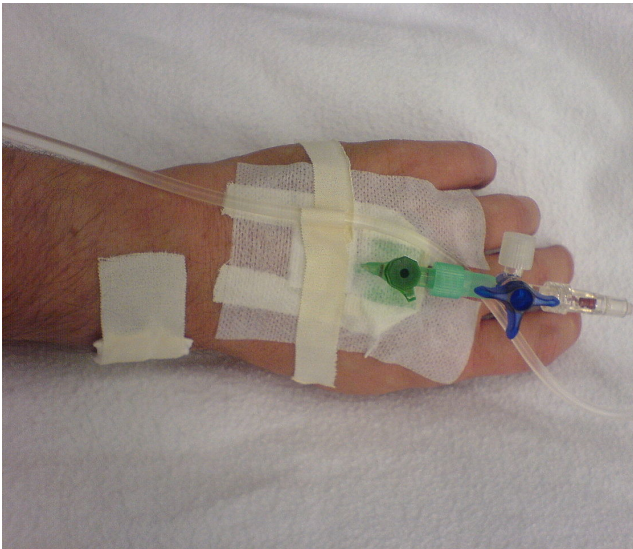
NACA Index

Unknowen

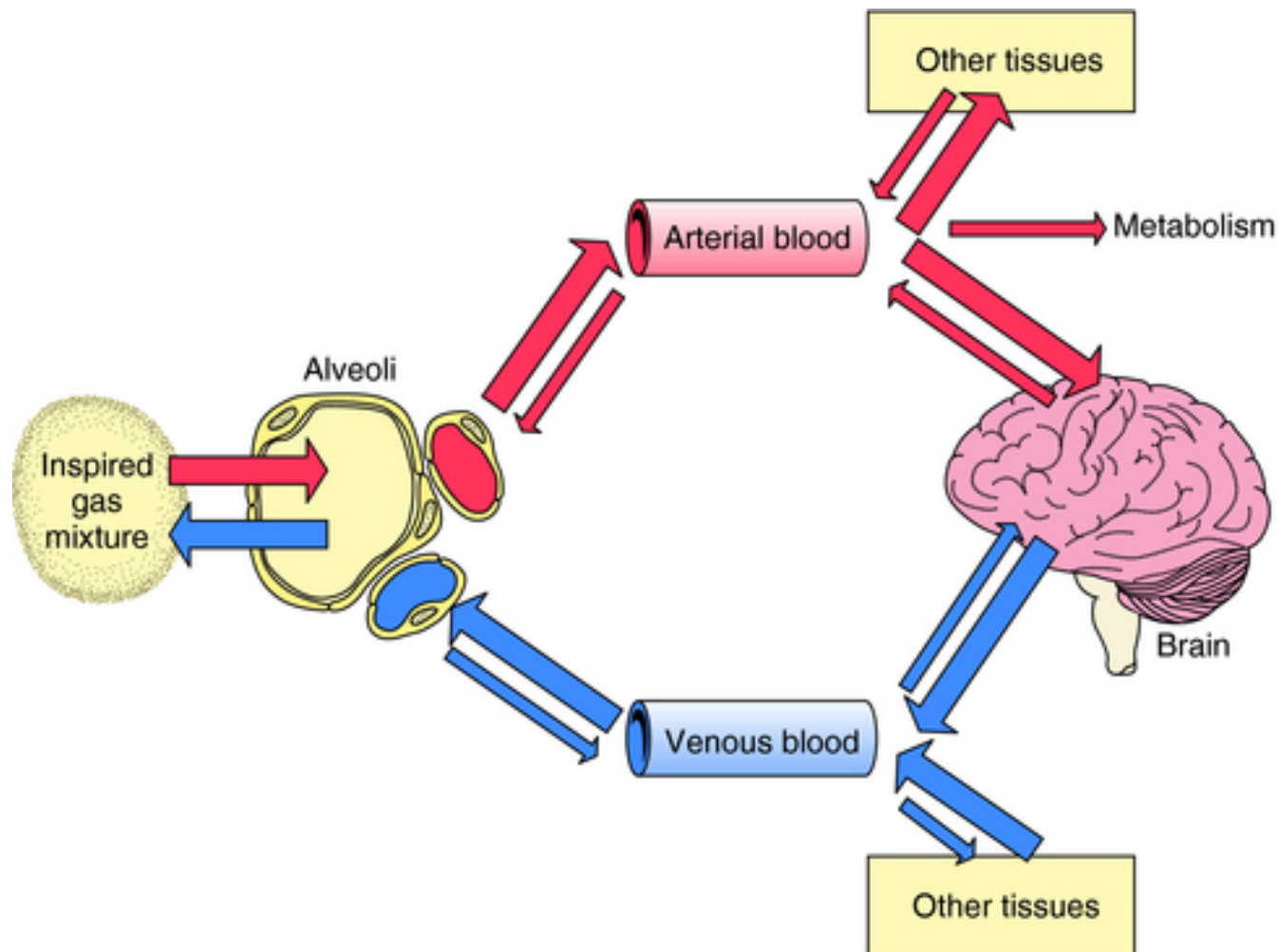


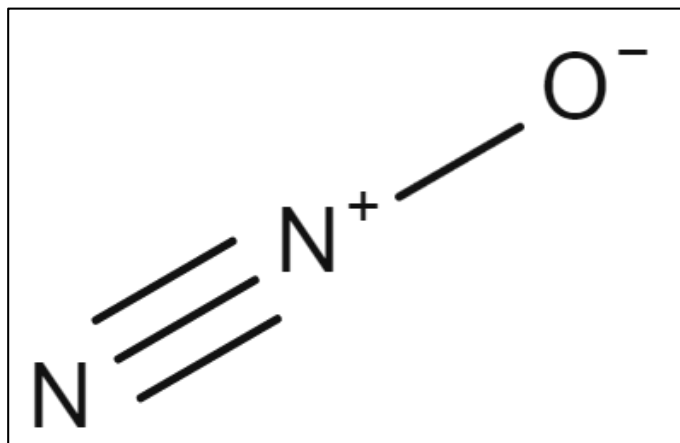
Number of people



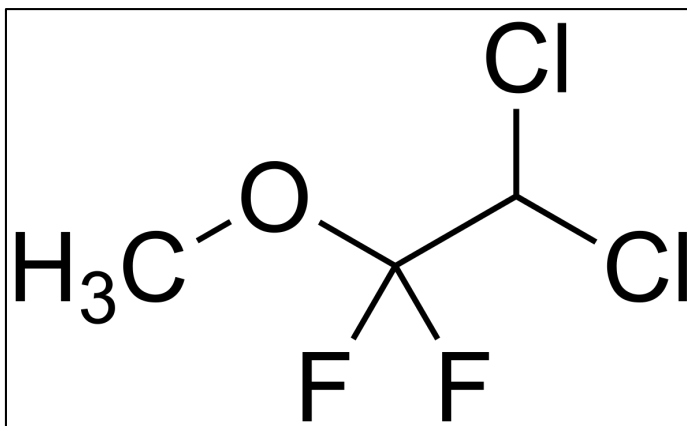


Pathway of an inhalational analgesic agent during absorption (red arrows) and emission from (blue arrows) the body .
The large arrows indicate the direction of net movement.





- ENTONOX 50:50 mixture nitrous oxide / oxygen.
- Contraindication: Condition where gas is entrapped within a body and where its expansion might be dangerous.
- For immediate use, ENTONOX cylinders should be maintained above 10°C (50°F) for at least 24 hours before use.
- Cylinder 700 l, approx. 4 kg; 350 l, approx. 2.4 kg



- 1960 Methoxyflurane introduced => inhalation anaesthetic for human.
- Dose-related renal tubular damage were reported.
- The US-FDA withdrawn Methoxyflurane in 2005.
- Australia/New Zealand => Methoxyflurane has never been withdrawn.



1968



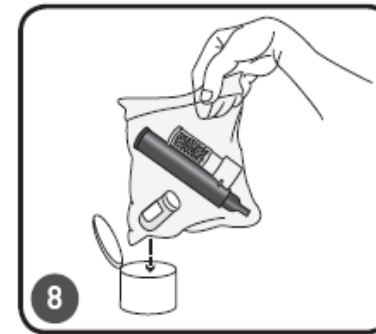
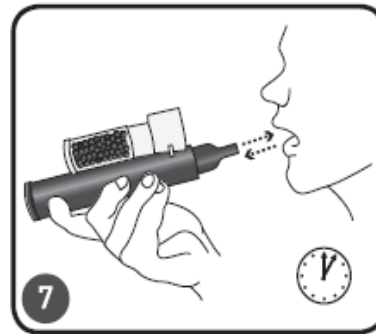
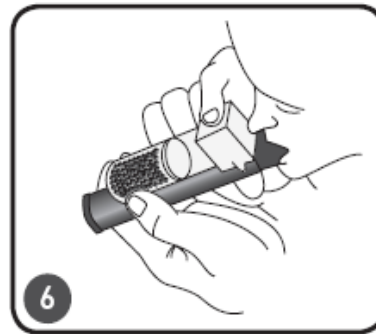
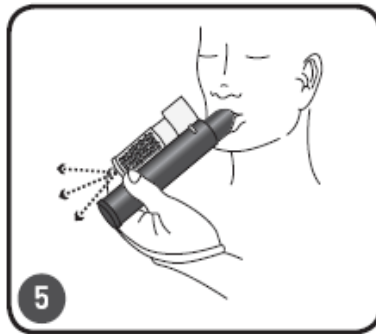
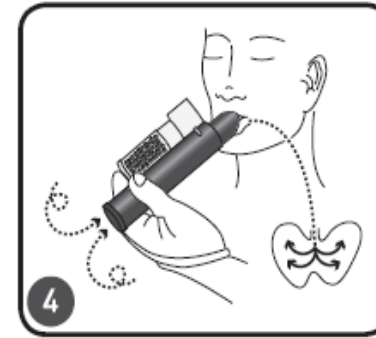
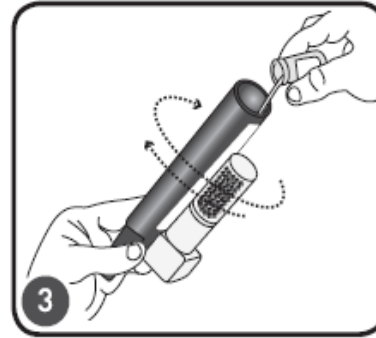
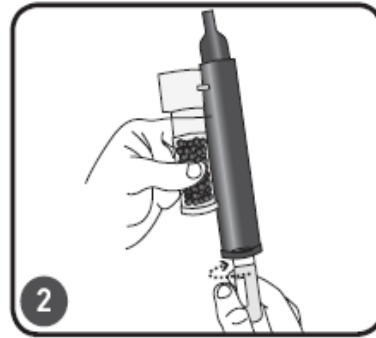
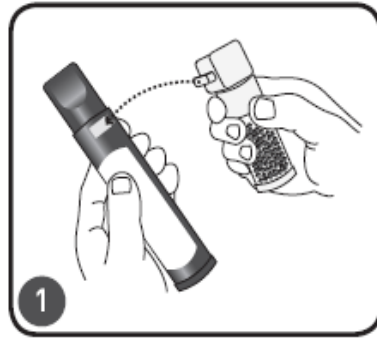
2015

- Analgesic doses => blood concentration 0.6-2.6 mg/100 ml methoxyflurane
- Anaesthetic doses => blood concentration 6-13 mg/100ml methoxyflurane

Anaesthetic	MAC-hours	Serum fluoride level ($\mu\text{mol/L}$)	Blood methoxyflurane level (mg/mL)
Calculated average	1.0	20	10–13
Safe upper limit	2.0	40	20–26
Subclinical toxicity	2.5–3.0	>50	25–33
Clinical toxicity	>5.0	>90	>45
Analgesic	0.3	< 10	0.6-2.6







- Methoxyflurane is contraindicated in renal impairment, patients under 18 years.
- It should not be used in patients with liver damage secondary to anaesthesia, hypersensitivity to fluorinated anaesthetics, malignant hyperthermia, diabetes, crush injury, ventilatory depression, reduced awareness, hypovolemic shock.



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FALLS CREEK SKI PATROL PENTHRANE ADMINISTRATION REPORT

INTRODUCTION

The data in this report relates to Penthrane administration by the Falls Creek Ski Patrol from 2006 to 2010 and 2013 to 2017, the data from 2011 and 2012 has been omitted due to some invalid data.

Over the ten seasons covered by the data the Ski Patrol attended 12799 call outs transporting 6337 patients to the Falls Creek Medical Centre and administering Penthrane on 1006 occasions. The patrol on average transport 50% of their total call outs to the Medical centre. Penthrane was administered to 16% of patients transported to the Falls Creek Medical Centre.

Year	2006	2007	2008	2009	2010	2013	2014	2015	2016	2017	Total
Total Call Outs	1053	1260	1135	1320	1385	1081	1345	1353	1290	1577	12799
Transport to Medical Centre	612	690	599	616	711	462	630	649	632	736	6337
Transport to Medical Centre %	58%	55%	53%	47%	51%	43%	47%	48%	49%	47%	50%
Penthrane Used	78	104	97	101	97	83	87	96	124	139	1006
Penthrane / Medical Centre%	13%	15%	16%	16%	14%	18%	14%	15%	20%	19%	16%
Penthrane / Total Call Out %	7%	8%	9%	8%	7%	8%	6%	7%	10%	9%	8%



Mark Zagorski

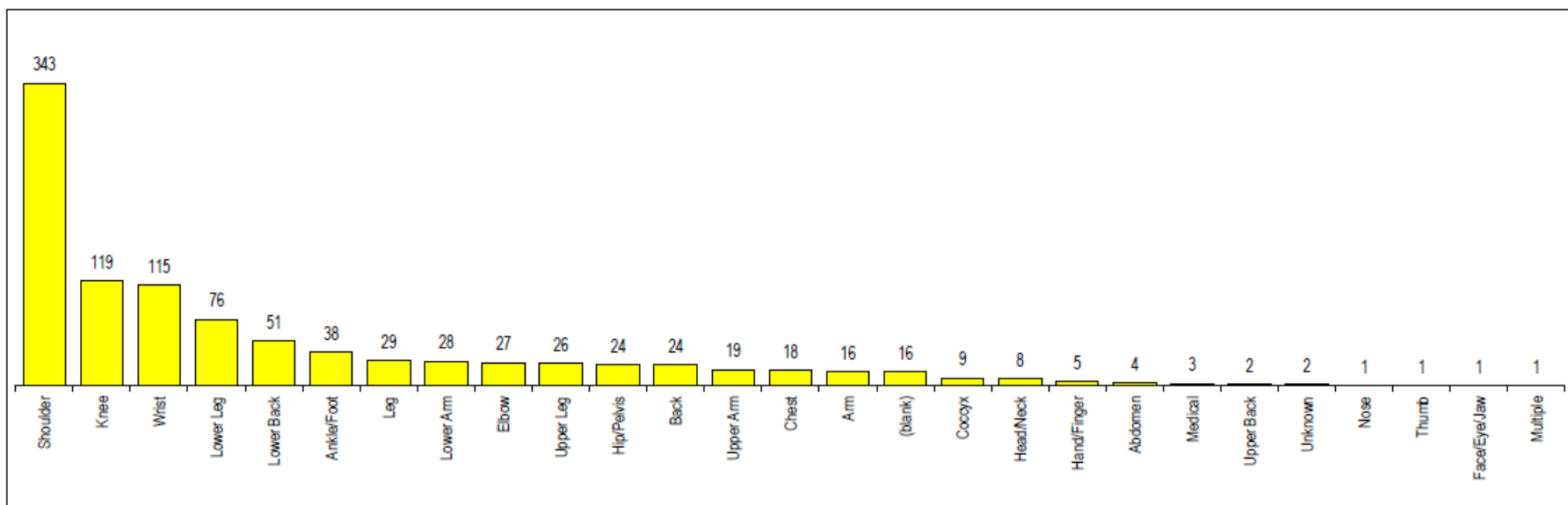
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INJURY TYPE



Injury Type	Shoulder	Knee	Wrist	Lower Leg	Lower Back	Ankle/Foot	Leg	Lower Arm	Elbow	Upper Leg	Hip/Pelvis	Back	Upper Arm	Chest	Arm	(blank)	Coccyx	Head/Neck	Hand/Finger	Abdomen	Medical	Upper Back	Unknown	Nose	Thumb	Face/Eye/Jaw	Multiple	Total
Penthrane Administration	343	119	115	76	51	38	29	28	27	26	24	24	19	18	16	16	9	8	5	4	3	2	2	1	1	1	1	1006



Summery

The inhalative administration of analgetics shows clear advantages over intravenous analgesia with regard to invasiveness and practicability in particular for less experienced providers.

Logistical considerations such as size and weight of the application systems must be taken into special consideration in mountain rescue.

Country-specific legal features must also be taken into account during the analgesic application.

