Dr Rowena Christiansen - Personal Report regarding FIPS Congress held at Big White Ski Resort, Canada March-April 2014

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1. Introduction

I recently represented ASPA and Mt Baw Baw Alpine Resort at this congress.

I attended all scheduled presentation sessions as well as two meetings of the FIPS Medical Group (to decide the future direction of the Group and the medical theme for the next FIPS Congress in Italy in 2016) and a meeting of the FIPS Avalanche Group (to discuss the future direction of the Group and information sharing). This report is designed to highlight information from the congress which may be of interest to Australian ski patrollers.

Scheduled Congress activities took place from the evening of Saturday 29 March (dinner) to the morning of Saturday 5 April (breakfast). Scheduled presentation sessions were held on five of these days, and the Wednesday was a 'free day' for delegates.

A total of 22 major presentations were delivered. In addition, a number of country-based introductions and presentations were made at various times during scheduled sessions. On the final day reports were received from the three special interest groups – FIPS Medical, FIPS Avalanche and FIPS Technology. Three on-snow activities were held – a set of group-response first aid scenarios, an avalanche simulation and rescue training exercise and a team-based sled handling 'race'. After the avalanche training a panel discussion was held, and on the final day a panel discussion was held on 'Challenges in Ski Patrol' followed by a short feedback session for the Congress.

2. Special notes re 'Green Season' activities which have been developed in Canada and the USA

- Mountain biking;
- Running events;
- Music festivals;
- Car shows;
- Car races;
- Wave pools (heated);
- Water slides;
- Climbing walls;
- Zip lines;
- Elevated walkways;
- Tubing down a water course (similar to Movieworld on the Gold Coast with a circular route with ups and downs, corners, etc.);
- Sliding centre (luge etc.);
- Adventure parks/playgrounds;
- Special weekend adventure packages for families; and
- Ski swap events (with a fee on sales going to ski patrol).

3. Summary of presentations given at the Congress

Day 2 - Sunday 30 March

Presentation 1: David Lynn, President and CEO, Canada West Ski Areas Association
Key relevant points:

- 36% of Western Canadian ski resorts are not profitable;
- Lots of 'destination skiers' coming from overseas;
- Large capacity for growth and good infrastructure;
- Ski helmet use strongly supported but not mandatory;
- Strong use of signage (provided to members free of charge);
- Accident rate 2.3 per 1,000 skier visits (ranges from bruises to fractures);
- Statistics collected in CWSAA Accident Analyser Database;
- Statistically speaking skiing is safe;
- Law suits – strong reliance on 'waivers' which form part of conditions of lift tickets, etc. (but resorts will normally settle cases involving clear negligence on their part);
- Many accidents due to careless and risky behaviour;
- Majority of fatalities have been wearing helmets;
- Challenges include:
    - High Canadian $;
    - Air access costs and air travel taxation;
    - Operating costs – wages, etc.,
    - Restrictions on employment of foreign workers;
    - Trying to get children/young people/immigrants from warmer climes interested in skiing; and
    - Warming climate, etc …

Special notes:

- 'Respect' ski safety video;
- Web page: www.cwsaa.org;
- 'Job board' on web page; and
- 'LinkedIn' group.

Getting children/young people/immigrants interested in skiing:

- Letting children ski for low or no cost;
- Access to good-quality second-hand equipment;
- Appropriate level of risk management/judgment;
- Encouraging school ski programs and forming partnerships;
- Scotland – pilot program to provide all children with a free dry slope lesson and an on-slope lesson; and
- NZ – program to take old boots, poles and skis to schools so that children can get used to putting them on and walking around in them.

Presentation 2: Jean Louis Tuailion (France) – The Sochi Winter Olympics
Key relevant points:

- Previous winter collected snow storage of 500,000 cubic metres (30% lost over summer);
- Used lake/river for snow-making; and
- Snow guns every 50m.

Presentation 3: Duncan Isaksen-Loxton – Using smartphones in ski patrol
Key relevant points:

- Fall in coastal drownings from 2004 to 2011 - Surf Life Saving Australia introduced a smartphone app in 2009 for risk assessment and completing an incident form and a 2-minute educational video clip for inbound immigrants on Qantas;
- High penetration of smartphone ownership/usage globally;
- Needs to consider: resort, casualty and patroller;
- Some resorts have introduced apps which visitors can download and use during their visit;
- These can potentially be used to allow casualties to contact ski patrol, provide a GPS location and start an incident report;
- Harm minimisation and providing better care can potentially steer casualties and their families away from abandoning skiing as a leisure pursuit (loss of customers = loss of income and loss of potential for children of casualties to become 'lifetime skiers');
- Medic52 smartphone app - patrollers' own 'phones can be used for data processing and photos;
- Data collected and stored 'in the cloud' presents a resource for research, targeting of educational needs and areas for improving customer satisfaction;
- Challenges to industry growth:
    - How to get children interested in skiing and how to convert them to 'lifetime skiers';
    - Sensational media coverage of celebrity skiing accidents;
    - Resort management of accidents and 'saying sorry' in a way that does not admit liability;
- Smartphone cost and reliability issues e.g., weather, network coverage, data security; and
- Further growth to come in terms of small portable medical technology which can record and share data.

Special notes:

- Medic52 – www.medic52.com;
- Twitter #smartski patrol;
- Surf Life Saving Australia smartphone app;
- Mountain High/Jason Perlmutter – iPad app and accident investigation database;
- Steep Management and ISS 24/7 – risk management for events;
- SkiPCR – iOS version (2014);
- Copper Mountain visitor app; and
- Upcoming medical technology – Scanadu.

Some other challenges (as seen by RC):

- Not all patrollers have smartphones or access to smartphones;
- Silo effect (same goals but working in isolation):
    - ASPA (e.g., Mark Spilsbury, RC) has previously spent time looking at the issue of differing incident report forms around Australia and rectifying the lack of a national database for snowsports injuries. Academics and insiders alike have commented on the reticence of the resorts to release data lest the public see snowsports as dangerous, and the 2009 ASPA National Injury Survey went nowhere as a result. RC has an ongoing interest in this matter;
    - This coming season Mt Baw Baw is planning to use a customized iPad app for incident reports for instantaneous integration with the Resort database; and

    - A research group (Monash/Gold Coast) is working on a project for a standardised data set and data collection for guided activities in the outdoor sector (and is interested in collaboration re snowsports);
- In order for the data collected by smartphone to be useful for research it is first necessary to establish a standardised 'data set' for incident reporting and injuries which is consistent with international standards (research on snowports injuries being well established overseas);
- Resorts will continue to 'own' their own data (whether 'in the cloud' or elsewhere) and would have to agree to share it with anyone else and this remains a major barrier to establishing a national database;
- A truly national injury database would also somehow have to collect data from the on-mountain medical centres which receive 'walk-in' casualties and also have the opportunity to refine the working diagnosis recorded by ski patrol through the use of x-ray imaging, etc.; and
- There is a commercial aspect to usage of the Medic52 app which was not discussed at the Congress and this would be a potential barrier to adoption, particularly for patrols which are volunteer-based with limited funds.

Lunchtime country presentation – Canadian Ski Patrol (Colin Savaranamuttoo, CEO)
Key relevant points:

- 4,500 volunteers in around 230 ski areas in 10 provinces (over 1,000,000 volunteer hours per year);
- Average age 43;
- 75% male, 25% female;
- Four-season approach at many resorts with non-snow events in off-seasons;
- 21st century organisation – "Passionate, Professional and Proud" - business, client-focused, culture of openness and communication;
- Two-way partnership between resorts and industry;
- Issues re financial sustainability, recruitment and retention;
- Aim to try to capture teenagers who have decided to quit ski racing; and
- Planning to change from blue and gold to red and white colours.

(Also presentations (verbal only) from Rik Head, Australia and Fernando Herrera from Chile.)

Presentation 4: Flynn Seddon, Big White – Design and Safety of Terrain Parks
Key relevant points:

- Only paid patrollers used in terrain parks (longer training);
- Very focused on risk management;
- Slope choice important (best = wide, gentle, undulating);
- Standard classification of features into small, medium, large and extra-large;
- Classification aids risk management and the customer responsibly managing their own risk;
- Education – use social media e.g., FAQs on Facebook;
- Possible strategies for risk management:
- To access terrain parks: first attend information session (with parents if under 18) and watch an informative video 'SmartStyle';
- Have video playing in key locations e.g., rentals, ski school;
- 'Park Pass' program – become accredited at one resort and then gain park access at all affiliated resorts.

Presentation 5: Fred Haight, CSP – Alpine Racer Down Protocol
Key relevant points:

- FIS downhill races – have to think about safety of athlete, patrollers/workers and coaches;
- Need communication from top to bottom (race/patrol/medical);
- Need ability to stop race or flag athlete to stop part-way during race;
- Not clear to respond until know course is clear;
- Utilise help of bystanders with first aid training;
- Don't restart until all clear and everyone back in position; and
- Use helicopter rescue for quick and gentle evacuation.

Day 3 - Monday 31 March

Presentation 6: Doug McFarlane, General Manager, Whistler Blackcomb and Dave McPhee, Education Director, Whistler Blackcomb
Key relevant points:

- Most efficient patron carriage by lift anywhere in the world;
- Extensive snowmaking (unlimited water supply and own hydroelectricity project providing a self-sufficient electricity supply);
- 13-25,000 skiers per day (25-30 clinic transports per day);
- On-mountain clinic including CT scanner and part-time orthopaedic surgeons;
- May need to run lifts all night to avoid freezing/riming;
- Take down lift mazes and safety banners daily;
- Daily adjustment of all lift ramps;
- Start work at 0500 to open at 0800;
- Worksafe BC Campaign – Job Hazard Analysis (observe job duties and interview employee, identify hazards, note existing control measures and make recommendations);
- Tracking cycle for employees' recommended training, training documented and recorded and deficiency report (for further training);
- This approach allows a good understanding of what people's capabilities are for certain tasks;
- Patrol: 100 paid (95% return), 140 volunteers (85% return);
    - Additional resources which can be deployed include 72 doctors, 7 ALS paramedics, 80 Royal Canadian Mounted Police and 12 avalanche dogs;
    - Two mountains – separate patrol dispatch and resources for each mountain;
    - Morning meeting with everyone;
    - Paid patrol qualifications: 80 hour first aid course (OFAIII or OEC), CAA Level 1, outdoor leadership skills, advanced skiing ability and ideally volunteer SP experience (start on lower terrain and work way higher);
    - Five levels of patroller from first year to senior (12+ years);
    - Volunteers: same FA qualifications, advanced skiing ability and experience with rescue, back-country travel, first aid (commit 22 days per season);
    - Also minimum requirements and annual training for doctors and ALS paramedics (commit 12 days per season);
    - Extensive pre-season preparation and training (compulsory);
- First aid response protocols (respond to scene within 5 minutes, stay no more than 15 minutes) – good mobile coverage within resort and have an app for visitors as well;
- First aid rates: 2.15 to 2.2 per 1,000, with 43 helivacs in 2013-14;
- Patrol will usually start SAR until extra resources arrive (15 instances in 2011-12);
- Signage an important part of risk management;
- Avalanche awareness centre on mountain for public;
- Avalanche awareness training courses for employees and guests;

- Structured approach to accident investigation (gather witness statements, document scene and debrief team);
- Specialised training to deal with extreme weather conditions, including heavy snow, riming and avalanche control (paid patrollers only);
- Summer operations: around 500,000 visitors – biking, adventure park, glacier skiing, sliding centre and hiking (10 lifts running); and
- Also specialized training for summer operations.

Presentation 7: Colin Steward, CSP Silverstar – GPS Tracking
Key relevant points:
- On-mountain clinic runs over 100 hours per week;
- Dispatch in same building – list of skills set for every patroller on duty;
- GPS tracking app – can locate lost person and can send information to the person's 'phone;
- Can track daily movements (whilst managing privacy protocols) and ensure SAR effective in real time;
- Can deploy resources more efficiently based on proximity to incident;
- Protection for people working alone (safety provisions mandated by legislation);
- Trial from Christmas 2013 as partnership between Absolute Trac (Calgary), Blackberry and Telus (communications provider); and
- Happy to discuss with others.

Special notes:
- SafetyLink app (iTunes);
- WebTrac software (real-time tracking); and
- Brion Technologies in Melbourne is an associate.

(Country presentations: Korea, Switzerland.)

Presentation 8: Mark Zeigler – Swiss Patrol Education System
Key relevant points:
- Swiss Cable Association – same training for all patrollers, regardless of the size of the resort;
- The only thing that is more expensive than education is no education!;
- 2,620 ski patrollers in a 3-tier system (no volunteers);
- Entry requirements – advanced FA (CPR/AED), good skier in all conditions, can ski-tour one hour off-piste and complete a basic test with a sled;
- 17 day course – theory and practical (first aid, snow knowledge, etc.);
- Avalanche – 6 day course (theory and practical/exam);
- Avalanche explosives course – 6 day course (theory and practical) + one day exam;
- Federal Diploma in Specialist Ski Slope and Emergency Services (2 week course repeated every 3 years);
- Have started a certification for summer services;
- Extended medical services – Tramadol and Valaron for analgesia;
- Rega app – 24 hour rescue service (small annual membership fee);
- New technologies – cameras/helmet cam, GPS (but privacy issues);
- Have started a national accident database; and
- Organise children's camps on behalf of schools (very reasonable cost).

(Comment from Russia – non-medical workers are prohibited from using any drugs (including injections) when providing first aid.)

Afternoon – On-snow activity – first aid scenarios in mixed country teams.
(No report – unable to attend due to lack of transport to location.)

Trade Show – Three exhibitors.

Day 4 - Tuesday 1 April
(Country presentations – Italy, Sweden.)

Presentation 9 – Ken Lukawy, CSP Avalanche Director
Key relevant points:
- CSP is largely a volunteer organisation;
- Avalanche Safety and Rescue chapter in the CSP Patroller's Manual;
- Avalanche program objectives for SP with avalanche terrain:
    - Provide knowledge and skills;
    - Educate the public;
    - Support ski area avalanche programs; and
    - To be an effective member of the rescue team;
- Three levels of training and five components:
    - Introduction to avalanche safety (for all patrollers);
    - Avalanche Skills Training (Levels 1 and 2)*;
    - Companion Rescue Skills*; and
    - On-snow training.
    - (*Canadian Avalanche Centre programs.)

Note: Ken later mentioned that there is apparently a free online basic avalanche awareness course available through the Canadian Avalanche Centre.

Presentation 10 – Marie Nordgren, Sweden – Presentation from ISSW and IKAR 2013 on Swedish skiers' knowledge, skills and attitude towards off-piste skiing and avalanche.
Key relevant points:
- Increased number of Swedes being killed in avalanches (mostly abroad);
- April 2013 – web-based survey through www.freeride.se (largest Scandinavian ski site);
- 28 questions and 1,127 respondents – 93% engaged in lift-assisted off-piste touring;
- Good correlation between respondents and victims;
- Up to 87% use helmet, transceiver, shovel and probe and 62% train annually;
- About 75% had good avalanche awareness;
- 46% caught in an avalanche but still go back - 2% caught and buried in an avalanche, 34% caught and not buried;
- 83% ski outside resort areas;
- 73% prepared to take risks for good off-piste skiing; and
- Conclusion: people will continue to ski off-piste despite the risks.

Presentation 11 – Ed Gassman, USA – Legal Report
Key relevant points:
- Liability – negligence or product defect?;
- Negligence: collisions – people and moveable equipment;
- Product defect: chair lifts and rental equipment;
- Risk management:
- Reduce risk – signage, obstacle identification, proper maintenance of equipment, employee training;

- Eliminate risk – remove equipment, mark hazards (very difficult);
- Transfer risk – insurance, waivers;
- Statutes/laws: transfers risk to skiers – assumption of risk;
- Courts:
- Skier-skier accidents – same as car (civil/criminal);
- Lifts, rocks, trees, lift towers – man-made and natural hazards – assumed risk;
- Avalanches and natural hazards – did ski area have a duty to control?
- Miscellaneous:
- Was skier using the correct DIN setting for age/weight?;
- Snowboarding – single largest source of outdoor injuries; and
- Brain and spinal injuries increasing, especially with children and teenagers;
- Despite waivers casualties may still be able to sue a resort for gross negligence; and
- Most resorts now not padding towers as it is an inherent risk (lifts help you ski) and if there is padding present and someone hits this there may be issues around whether the padding was thick enough or high enough.

Note: This presentation reflects the legal position in North America and the situation may be different in Australia. Local advice should be sought rather than relying on the information given here.

Presentation 12: Kris Hawryluik, Patrol Operations Manager, Big White – Avalanche Safety Program

Key relevant points:

- A lot of rescue is done on foot or by snowmobiles – not much helicopter availability;
- Structured model of risk management for avalanche – problems and planning;
- Daily forecasting and field observations;
- Risk reduction methods (active/passive) depending on assessment of avalanche scale (1-5);
- Risk education (CAC AST program, SPs talking to people near resort boundaries, referral to CAC public bulletins, outreach weekend for snowmobilers);
- Afternoon review;
- Provide data to Canadian CAC/INFOEX system for public bulletins;
- Avalanche SAR – based around ICS approach;
- Level 1 ski patroller must have AST 1, 80 hour first aid course (run in evenings to suit volunteers) and winter travel skills;
- Avalanche dogs work independently – ignore them and avoid contaminating scene with clothing and secretions; and
- Balancing risk with commercial considerations – philosophy of 'get it open and keep it open'.

Presentation 13: Gilles Valade, Executive Director, Canadian Avalanche Centre (CAC)

Key relevant points:

- The CAC deals with public safety;
- The Canadian forecast area is huge;
- A lot of the land is 'Crown land' with varied usage – skiers, boarders, climbers, snowmobilers;
- Outside of the National Parks there is no organized SAR – basically volunteer-based;
- There is a lot of effort around prevention and education;
- 95% of the world's heli-skiing occurs in British Columbia;

- INFOEX created in 1991 – communal sourcing of information from 130 operations and over 24,000 daily observations in winter;
- Collaborations between universities and industry e.g., propagation saw test;
- After several avalanche tragedies the CAC was established in 2003 to focus on public avalanche forecasts and training whilst retaining close ties with the CAA (avalanche professionals);
- CAC offers AST (Avalanche Safety Training) Levels 1 and 2 and Companion Rescue Skills training;
- Time is of the essence so companion rescue important - at 10 minutes 20% survival and at 15 minutes down to zero %;
- Train lots of school children every year and separate course for snowmobilers;
- Avaluator – avalanche accident prevention card; and
- From AST 1 and 2 can then go on to professional avalanche training courses.

Presentation 14: Emily Grady, Industrial Training Director, Canadian Avalanche Association (CAA)

Key relevant points:

- Industry training program for those responsible for avalanche safety in the work setting to develop skills in safe and independent decision-making;
- Annually courses in three centres across the country and over 800 students from Canada and abroad;
- AST 1 and 2 are pre-requisites;
- Level 1, 2 and 3 courses – build sequentially and need a certain amount of experience at each level before progressing to the next;
- A number of other associated courses;
- All qualifications require regular review and updating; and
- Courses can be adapted to the international context and have been held overseas.

Presentation 15: Jim Christian and Sam Whittmore, Avatech USA

Key relevant points:

- Have developed a device called the Avatech Snow Profiler (similar to an avalanche probe with a small device on top) which performs a similar function to digging a snow pit but can carry out multiple measurements quickly;
- A 'snow penetrometer' (150cm long) which looks at the penetration force (and thus the hardness of the snow);
- Still in development but aiming for it also to measure temperature and density;
- Bluetooth connectivity – can GPS tag and 'crowd-source' information;
- Expected price (for initial sale just to experts) $2 - $3K.

***On-snow activity – simulated avalanche and rescue*.**

This was held up in a high snow bowl of the resort (in an area which is susceptible to avalanche). Participants first watched patrol experts commence search and rescue activities and then had the opportunity to participate in a line search using avalanche probes. An avalanche dog was then brought in and the dog found a live casualty and a couple of items of buried clothing. After travelling to a separate area near the weather station, a snow pit was dug in an undisturbed area (and the technicalities explained) and the Avatech device was tested compared to the snow pit (it correlated well). This was an excellent session (coordinated by Kris Hawryluik, Patrol Operations Manager, Big White).

Panel Discussion: Avalanche

- Education targets are not just back-country skiers and boarders but also snow-shoers;
- Protocols are useful as pre-determined decisions as people are not good at making decisions on the move due to sensory overload;
- Some resorts staff wear transceivers in-resort;
- Thermal imaging drone in development;
- Black Diamond probe with a mini-transceiver on the end;
- False sense of security from beacons and airbags;
- Essential equipment: transceiver, probe, shovel and brain (switched on);
- Deaths do occur from traumatic injuries;
- Transceivers can be damaged/broken;
- RECO system – stick-on locator chips (?free – only obligation = advertising);
- Only for organized rescue groups;
- Will search for both RECO and transceivers;
- Can get interference from mobile phones, radios, metal; and
- ISSW conferences are very worthwhile – presentations, research, case studies.

Note: Scotland has an information leaflet for walkers re avalanche awareness.

Day 5 - Wednesday 2 April: 'Free day'

Day 6 - Thursday 3 April

Presentation 16: Dr Michael Swangard and Tom Tull, CSP – Pain Management Research

Key relevant points:

- Pilot program since 2007 re 'extended protocols' for paid patrollers in British Columbia;
- Depending on location can take up to 1.25 hours to get to clinic for ambulance transfer;
- Decided to add extended skills onto existing high-level first aid training program (90 hour CSP FA course) in order to provide the best possible care to casualties;
- Researched and wrote a separate "Extended Protocols Manual";
- Pilot program launched at Silverstar in Fall 2008;
- Extended skills include:
    - Use of drug therapies: Entonox (pre-packaged 50/50 nitrogen/oxygen), oxygen, salbutamol, GTN, aspirin, epinephrine (adrenaline) and anti-histamines;
    - Use of Sager splint for femoral fractures;
    - Management of medical conditions: chest pain, angina and heart attack, shortness of breath, anaphylaxis and hypo/hyperglycaemia;
    - Special skills: chest auscultation, blood pressure measurement, pulse oximetry, glucometer, paediatric GCS and EP report form;
- Fall 2008 to Spring 2013 – 324 injured skiers of which 297 received Entonox for pain (only stopped in two cases);
- Entonox has been used both on-scene and in clinic (efficacy around 80%);
- Tanks stored in heated area, neoprene sleeve, canvas bag, hot pack used if external temperature colder than minus 10C;
- Not carried all the time – caches around the mountain;
- To avoid abuse every tank and levels logged;
- *Tip*: SaO2 will go down if don't give supplemental oxygen after stop using Entonox;
- Contraindications to consider: recent scuba-diving (may have excess N2 in system; inhalation injury (propensity for N2 to gather in small spaces); maxilo-facial injuries

(have to be able to put lips around regulator); have to be able to hold it/follow instructions; abdominal injuries; and pneumothorax;
- Epi-Pen not carried as falls under 'assist' protocol for prescribed medications but looking at whether feasible to carry a spare if a second dose required;
- Some CSP – if casualty requests Tylenol (paracetamol) can provide it if criteria met; and
- Issue re Sager splint – originally used in military context with boot on but manufacturer's instructions now say to remove the boot but there is a risk of hypothermia with this, so now moving towards use of the Kendrick traction splint instead.

General discussion notes:
- Question re use of Entonox at altitude – mentioned that although pre-packaged in Canada, doctors in Colorado, USA have in the past experimented with a higher percentage of oxygen in the mixture as people were getting off chair lifts with an SaO2 in the 80s (*Entonox is also pre-packaged in Australia as a 50/50 mixture*);
- It was claimed in discussion that paramedics in the USA and Canada can give their normal drugs whilst working in the ski patrol context (*this does not apply in Australia as dispensing rights are tied to employment by an ambulance service*);
- In the US doctors on scene will use lignocaine nerve blocks for shoulder reductions and boot-top fractures (*currently against FIPS and ASPA protocols to reduce shoulder dislocations without first obtaining an x-ray*);
- In Russia ski patrollers cannot give drugs (need licence) and bring the first aid team to the person (bring analgesic drugs and drugs to manage reactions/side-effects);
- USA, Italy, France, Japan, Korea and Sweden – ski patrollers can only give oxygen (no analgesic drugs) unless there is a doctor present; but
- In Switzerland strong analgesia can be provided by trained patrollers.

Presentation 17: Marie Nordgren, Sweden – Non-pharmacological Pain Management
Key relevant points:
- Research on the importance of non-pharmacological pain relief (linked in with IKAR and the Commission for Mountain Emergency Medicine);
- Pain in the pre-hospital setting is poorly managed for a number of reasons;
- Medications have side-effects (e.g., opiates, Entonox, Penthrane, IV administration, nasal injector e.g., Ketamine);
- Why is a non-pharmacological approach important?
    - Need an authority to use drugs;
    - Pain is complex, demanding a multi-model approach;
    - Acute pain alters physiological variables e.g., increased heart rate and blood pressure and oxygen usage;
    - There is a link between trauma and acute pain with psychological distress and the development of acute stress disorders and PTSD e.g., avalanche victims;
- Pain is many things – hurt, fear, lack of comfort/control, anxiety, unpleasant experience;
- Using a pain score is important (different scales available) – acknowledgement, mental effort is a distraction, sequential after splinting;
- Fracture treatment – alignment, traction, splinting;
- Active warming (two studies show that this helps) e.g., heat packs, blankets;
- Rescuer's attitude and knowledge;
- Application of oxygen (and consider sucrose tablets for children); and
- Distraction therapy (proxies – teddy bears, animals), focusing on breathing, doing small tasks to help.

Special notes:

- IKAR – avalanche management algorithm;
- *New England Journal of Medicine* – Brown et al "Accidental hypothermia" (algorithm);
- Also see CSP web page for links;
- IKAR – web page with medical recommendations; and
- Tenth World Congress on High Altitude Medicine and Physiology and Mountain Emergency Medicine on 25-31 May 2014 (EURAC/ISSM).

Presentation 18: Dr Rowena Christiansen – Australian Ski Patrol Models of Casualty Care, Medication Administration and our Medical Milieu

Key relevant points:

- Australian ski resort 'models of care' for casualties:
- Three large resorts in Victoria and two in New South Wales;
    - Larger resorts have dedicated medical/nursing/radiology and ambulance presence;
    - "Scoop and run" approach to deliver casualties to medical centre for definitive care;
- Blended model at Mt Baw Baw (Victoria) – small resort with paid/volunteer patrollers, some volunteer doctors on weekends and pilot program for weekend ambulance presence;
- Smaller resorts: four in Victoria, two in New South Wales and two in Tasmania;
    - No regular ambulance or medical presence, long waits for ambulance attendance and patrollers must care for casualties for extended periods (driver for extended medication skill set);
- Australian ski patrollers come from a variety of backgrounds, including health professionals;
    - When working as a ski patroller doctors can administer emergency drugs (if they need to step outside their normal role as a patroller) but nurses and paramedics do not have any special drug administration rights as this is normally tied to their professional employment in a health service;
- Ski patrol medication administration:
    - Ski patrollers are authorised to provide oxygen, methoxyflurane (Penthrane) and Entonox to casualties;
    - Oxygen and methoxyflurane are routinely taken 'on scene' but Entonox is generally used as a second-line agent 'in clinic';
    - Competence needs to be recertified annually;
    - Patrollers may assist a casualty with administration of asthma inhalers, adrenaline autoinjectors, glucose-containing substances and the casualty's own medications e.g., GTN;
    - With prior authorization, aspirin may be administered for a suspected heart attack;
    - 'Generic' salbutamol inhalers and Epi-Pens may be purchased and stocked in first aid kits;
    - Both methoxyflurane and Entonox are 'Schedule 4' drugs with restrictions on purchase, carriage, access and administration;
    - Specific legislation in each of the three States to authorize ski patrollers to possess and administer these substances;
- The ASPA Medical Advisory Committee:
    - Six volunteer doctors with oversight of first aid manual and curriculum, keeping practices current and addressing contentious issues;
    - Variety of backgrounds but common strong interest in pre-hospital and wilderness medicine;
    - Four active patrollers and five honorary medical officers for resorts/ski patrols;

- Links with the Australian Resuscitation Council:
    - The ARC Guidelines are the 'gold standard' for ASPA first aid practices, which are updated when changes are made;
    - Representation on the ARC Victorian Branch provides a liaison point and aids awareness of developments;
- Snowsports research in Australia:
    - Australia lags behind many other nations in terms of snowsports research;
    - No standardised data collection sheet, 'data set' or national database for snowsports injuries;
    - Anecdotal reluctance of resorts to release data to avoid public perception of being 'dangerous';
    - Difficulty obtaining funding – 'elitist' pursuit and emergency services 'minnow';
    - Some information is in the public domain e.g., Victorian Ski Resort Demographics;
    - Some resorts will provide data if asked by 'insiders';
    - Failed ASPA 'National Injury Survey' (2009);
    - Some snowsports research carried out by ANU (e.g., 2008 publication) and Monash (1987/91);
    - Limited conclusions can be drawn e.g., common types of snowsports injuries;
    - Various interested parties have been 'working in silos' with regard to data collection but this reveals great potential for future collaboration.

Presentation 19: Dr Mark Heard, CSP Medical Advisory Committee – Fracture Management

Key relevant points:

- Orthopaedic surgeon on the CSP MAC for the past 10 years and extensive in-resort clinic experience;
- Rationale for reduction of fractures and dislocations in the field: deformity and dislocation can potentially lead to:
    - Skin damage (tenting, stretching, ischaemia, breakdown);
    - Neurovascular bundle damage (prolonged traction, axonal death and nerve palsy (long recovery time));
    - Arterial and venous obstruction (swelling, ischaemia, muscle necrosis, compartment syndrome, acidosis …);
    - Soft-tissue envelope damage (necrosis – muscle, tendons, adipose tissue; lymph obstruction and swelling);
    - Bone – risk of avascular necrosis (hip and talus);
    - Joints – damage to articular cartilage from subluxation, dislocation and exposure;
    - Pain – poorly managed can lead to regional pain syndrome (chronic pain); and
    - Haemorrhage – shortening with facture leaves more volume to bleed into (realignment and traction will slow active haemorrhage);
- *Myths of reduction* – doing more harm, needing specialized training, risking legal action;
- *Truths of reduction* – unlikely to do more harm (most occurs at time of injury), reduces pain, legal action unlikely and in-line traction techniques straightforward;
- Management principles: assess fracture/dislocation, neurovascular and skin status and document; pre-and-post pain score; explain and get consent; encourage casualty to relax and pull with sufficient force to reduce deformity; reassess neurovascular and skin status and address open wounds;
- Not all fracture/dislocations will be reducible in the field – use common sense and if it doesn't look or feel right then don't do it;
- Open fracture – reduce under skin if possible;
- Splint to joints above and below;

- Slightly elevate for transport;
- Provide pain relief;
- Cover exposed areas to protect from ice and snow;
- Do not feed patient if short transit time to surgery expected; and
- Implementation will be subject to local protocols and legalities but in the ski patrol setting this could be undertaken in a staged manner (working together with paramedics and doctors) with the most common injuries first.

Note: It is currently against FIPS and ASPA protocols for patrollers to reduce dislocations, and specifically reduction of shoulder dislocations without first obtaining an x-ray. However, attempting (with pain relief) to restore fractured limbs to an approximation of normal anatomical alignment prior to splinting/traction is generally accepted practice.

Country Presentation: USA – John McMahon, CEO, National Ski Patrol
Key relevant points:
- Volunteers (3,500) and paid patrollers (25,000);
- Other categories: alumni (past patrollers) and associates (sponsors, etc.);
- Patroller profile is useful when going to suppliers for special deals on clothing and equipment as patrollers are consumers too and spend approximately $400 p.a. on skiing equipment and apparel;
- Profile: age/income/gender/degrees/other medical training (51%);
- "Brand character" needs to be attractive to sponsors;
- NSP has 30,000 members, a Board, Divisions/Directors, Committees (5 primary and 17 total), 13 office staff, by-laws, policies and procedures and a code of conduct;
- Primary committees = Education, Industrial Relations, Fundraising, Finance and Governance; and
- Budget of $2.9 million (revenue 42% membership, 18% sponsorship, catalogue sales to members (clothing and equipment), miscellaneous).

Practical session – Femoral fracture traction devices in use in Canada
Use of the Sager and Kendrick devices was demonstrated as well as an improvised method using triangular bandages.

Afternoon on-snow session – Team-based activity involving slow controlled descent using a toboggan device through slalom gates, followed by a visit to the Big White Patrol Hut (with guided tour).

(No report re sled 'race' – unable to attend due to lack of transport to location. The Patrol Hut is a very impressive facility, with a small clinic area downstairs in the front of the patrol base which can be used for acute management of casualties, ample space for lockers and gear storage, a training room and good accommodation, kitchen and recreation facilities.)

Day 7 - Friday 3 April

Presentation 20: Sandrine Gioani – French Ski Patrol
Key relevant points:
- A ski pass in France is the cheapest in the world;
- All ski patrollers are paid (and the same amount) – 2,500 alpine, 250 cross-country and 120 avalanche dog handlers;
- Education and training – three degrees (first, second and third) in ski patrol diploma;
- Courses offered: ski patrol, advanced first aid, first aid for the public; re-certifications;

- At present the first aid guidelines are the same for all the emergency services but a reform process is underway to allow the addition of special practices for specific environments and conditions;
- Will be subject to validation and people working across organisations will need to know all guidelines; and
- Project to develop open-distance learning and extend this to ski patrol courses.

- Telemedicine project: CARDIAN:
    - Evolution of using modern technology in ski patrol first aid – 'a breadcrumb trail for rescuers';
    - Some European countries (Sweden, Norway, Denmark, Romania, Germany and the UK have ambulance facilities to transmit data to hospitals;
    - This is underdeveloped in France as it doesn't have a paramedic system;
    - No European country consistently uses telemedicine in the EMS;
    - Three projects currently underway:
        - AmbuCom;
        - SAMU31+CCMM; and
        - ECG (CARDIAN) – Drs Paul Rubel and Lucien Cadoz – tested by Montgenevre SP and others;
    - Telemedicine has some negatives – cost, need for network coverage and need inter-agency cooperation to set it up;
    - There are also positives – links between rescuers and EMS dispatch provide information directly to the EMS, allowing doctors to make more efficient, relevant and targeted decisions re medical care and providing decision-making support for rescuers in complex situations;
    - The CARDIAN components consist of a small box/screen, a mobile telephone and four electrodes (both clavicles and hips);
    - This is simple to use for the rescuers; and
    - The ECG tracing is transmitted to the EMS if a network is available. If the tracing is OK there is no 'call back', but if there are problems they will contact the rescuers with instructions.

In her final segment Sandrine outlined the distribution of ski patrollers and injury rates in three areas – Le Brianconnais, Serre Chevalier Vallee and La Grave – La Meije.

Presentation 21: Dr Rowena Christiansen – Australian Ski Patrol Education and Training

Key relevant points:

- Australian Ski Patrol Association Education and Training:
    - ASPA is an umbrella body for Australian ski patrols;
    - It has an Education Committee and Medical Advisory Committee which collaborate to produce the Advanced Emergency Care Manual and training courses;
    - The ASPA AEC course contains units from the national Australian Health Training Package;
    - Courses are held annually in a variety of locations and two formats – four days for new candidates and two days for recertifying patrollers;
    - Patrollers must recertify every three years and complete certain core competencies annually;
    - The trainer/assessor pool is drawn from experienced patrollers;

    - From 2015 all trainer/assessors (by Government decree) must hold a 'Certificate IV in Training and Assessment' which is expensive and time-consuming to complete;
    - This represents a challenge for both ASPA and volunteer patrollers;
    - Instructors must also renew their competency annually, attending an update day and completing the same tasks as candidates;
    - Course content broadly covers the role of the responder, the approach to the casualty, basic life support, anatomy, physiology and first aid with a body systems-based approach, management of a variety of other first aid presentations, management of fractures and application of slings, splints and other equipment;
    - The course has online and face-to-face components and utilises multiple choice and practical assessments;
    - Successful completion of the course is a pre-requisite for working as a patroller;
- In-resort training and assessment: Mt Baw Baw Alpine Resort:
    - Some resorts conduct their own additional 'in-house' training and assessment;
    - Mt Baw Baw ran a three-year pilot program including an annual training weekend, additional practical competencies and resort-specific scenario-based assessments;
    - Constructive feedback was given and areas for improvement identified;
- Training opportunities in Polar Medicine:
    - Commercial courses are offered annually in Australia (GPTT), New Zealand and Norway (Expedition Medicine Ltd);
    - Five-day course in high arctic Norway included lectures, practical sessions and outdoor activities, including a short expedition up into the mountains and sleeping overnight in a snow cave.

(Russia – brief verbal country presentation (with translator).)

Presentation 22: Dr Duke Whan Chung, Korea – Hand Injury in Winter Sports (Fingers, Thumb, Palms)

Key relevant points:

- *Skier's Thumb* (acute injury) accounts for under 10% of skiing injuries – ulnar collateral ligament of MCP joint (simple 64.4%, fracture/dislocation 12%);
- *Gamekeeper's Thumb* is the chronic version of the same injury (frequency 7 to 9.5%);
- Can be diagnosed clinically via stress test and on MRI;
- May have associated avulsion factures;
- Management is either conservative or operative (surgical reattachment for complete rupture and chronic cases);

- *Frostbite* – current treatment of choice is rapid rewarming;
- Principles of treatment of localized frostbite include activation of capillary supply to the damaged area (hyperbaric oxygen can be useful);
- Evaluation of localised frostbite is exceptionally difficult, particularly in the early stages;
- Best to wait 3-6 months before deciding on amputation but consider earlier if there is sepsis or deeper frostbite;
- Retain small blisters intact but may need to puncture larger ones;
- Order of damage in frostbite: erythema, oedema … necrosis of soft tissue and bone necrosis;
- Case studies of reconstructive surgery after partial amputation for frostbite – fashioning of new fingers using flaps and retention of finger bones as far as feasible (gives a better more functional result than conventional amputation level at MCP joints;

Research on skier injuries 2008-13:

- Ski resort near metropolitan area (1 hour's drive) – 484,743 skiers;
- Overall snowsports injury rate 0.98%;
- Type of injuries have changed from pre-1980 to post 1980: Falls 32.5%, collisions 65.3%, aged 21-30 years 47.4% and under 1 year of skiing 45.9%;
- Fracture locations: wrist 45%, tibia 20% and clavicle 25%;

Case studies – series of x-rays:

- Surgical repair allows people to return to work and sports more quickly; and
- Over 80% of young people choose surgery over conservative management.

Country Presentation: British Ski Patrol

Key relevant points:

- SP training takes place in Scotland just before Christmas;
- 5 day course includes indoor and outdoor elements:
    - Use of toboggan and sled;
    - Use of a dry mat for training (can still be used when snow falls on top);
    - Use of axes, crampons, ropes and belay devices;
    - Chair evacuations;
    - Night exercise – being able to operate in the dark;
    - Avalanche – transceiver, shovel and probe; and
    - Resort safety management – signage, nets , etc.

Short individual presentations were then given on the three major ski areas – Glencoe, Nevis Range and Glenshee. Over the past season all had experienced heavy snow falls resulting in a lot of work digging out tows etc. and had to deal with avalanche risk management.

Country Presentation: Italy

Key relevant points:

Goals for the next two years:

- Involve more regions;
- Obtain recognition from the national government;
- Obtain recognition from local NHS as medical CEFRA (training provider); and
- Host the next FIPS Congress in 2016.

<u>Special Interest Group Reports</u>

1. FIPS Medical Group (Dr John Holmes, BASP/Scotland)

Topics for 2016:

1. Transport of the neurologically compromised casualty (head-injured, spinal injuries, unconscious):
    a. Start with theory and expert views;
    b. Use of equipment (first indoors/demonstration then outdoors in scenarios) followed by a debrief indoors;
2. Critical incident stress management – what do resorts have in place?
3. (During FIPS Medical Group discussions, RC suggested that this also cover human factors in the EMS e.g., during incident issues (as researched and widely utilised in the aviation industry).);
4. Combined avalanche/medical session e.g., hypothermia; and
5. Research which is being done "on the hill".

2. FIPS Avalanche Group (Ed Carlson, USA)

- Primary objective: to facilitate information sharing;
- Current Objectives:
    - Develop a reliable communication system for all members, including access to a database of useful resources;
    - Develop a questionnaire to identify specific concerns;
- Future Objectives:
    - Continue to identify specific concerns;
    - Address all concerns in a timely manner;
    - Develop recommendations as to 'best practice';
    - Actively recruit new members;
    - Keep the group actively engaged; and
    - Develop relationships with the greater avalanche community.

3. FIPS Technology Group (Luca Sardelli, Italy)

www.fips-skipatrol.org
luca.sardelli@gmail.com (contact to get user account as website is WordPress-based).
FIPS2014Social – closed Facebook group
(Can send photos to Luca for the web page.)

FIPS digital strategy – starting the next phase:

- *Goals*: public internet presence, keeping members informed about other countries, providing SIGs with a communications platform which is accessible and secure;
- Now – have a website, Yahoo groups, personal email addresses and a Facebook page;
- *Problems* – lack of translation, lack of content, technical issues and sourcing, translation and organisation of content;
- *Next* – building scope of requirements, discussion and design, approval by the Executive, and implementation (estimated timeline about six months).

Panel Discussion: Challenges in Ski Patrol (Rik Head (ASPA/FIPS), John McMahon (CEO, NSP) and Colin Savaranamuttoo (CEO, CSP))

Key relevant points:

- Identify what needs to be fixed then form a hypothesis and do your research, based on both history and current knowledge;
- Three target audiences: membership, stakeholders (e.g., resorts – do they see ski patrol as a necessity or a necessary evil?) and consumers;
- Branding is important – modern, professional and relevant (ski area, partners, public, members);
- Image 'on the hill' is important and is reflected in how people have confidence in us;
- Leveraging the 'cool' factor in SP – T-shirts, etc.;
- Concept of 'having your house in order':
    - Is the organisation working at its personal best?;
    - Concepts of trust, openness and transparency;
    - Documentation – goals, action plans, timelines;
- Nurturing the next generation to take over:
    - Organisational life cycle – many SPs have average age of 40-45 years;
    - Need young people to step up and make the organisation theirs (don't celebrate history at the cost of progress);
- Volunteerism – discretionary time is becoming shorter and shorter but 'skilled volunteerism' is on the rise: 'making a difference' and obtaining a transferable skill set;
- Paid and volunteer patrollers need to work together and organizational goals etc. need to be relevant to paid patrollers as well;

- Important to look after patrollers – having accommodation available, etc.;
- Competition for customers between resorts and 'green season' competitiveness;
- Technology – efficient communication systems; apps for resorts – skier safety and contacting the patrol if needed;
- Financial sustainability:
    - Revenue from membership (limited);
    - Other revenue streams: fund-raising, donations/estates, like-minded companies e.g., Patagonia, Vockl skis but have to be able to deliver sales of product e.g., direct sales to patrollers;
- Need actionable objectives and have a plan for achieving this;
- Have to take advantage of the window of opportunity before the ski industry disappears;
- Organisational change – have to get people to understand why change is necessary and why they have to 'up their game' – have to understand what the threat is; and
- Many (but not all) ski areas: paid = volunteer patrollers (all are 'professional' patrollers).

Final Feedback Session re FIPS Congress

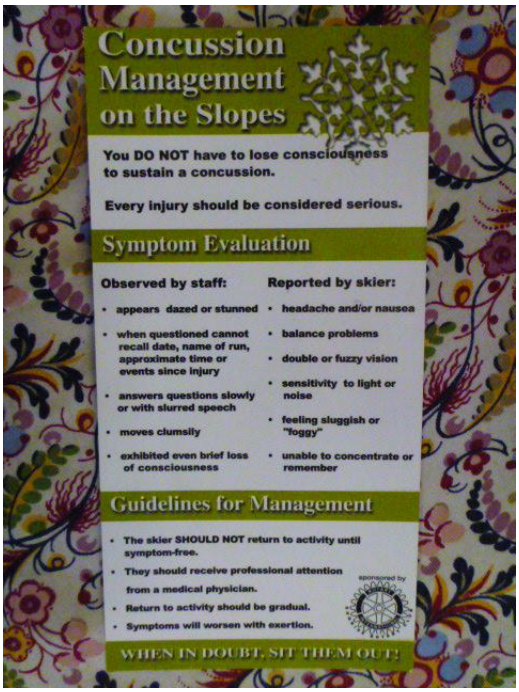
Much of the discussion concerned how best to attract 'young patrollers' to the next FIPS Congress. Suggestions included greater publicity, having a slot for young patrollers to present at the next Congress, forming a young patrollers' FIPS special interest group, and other countries following the lead of Canadian Ski Patrol, which plans to hold a 'Young patrollers forum' and sending a report/young patroller to the next FIPS Congress. It was acknowledged that young patrollers may not come without sponsorship.

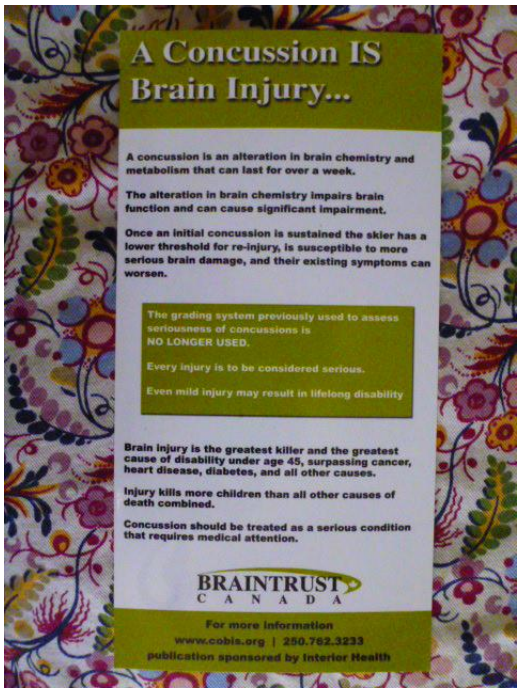
Other suggestions included:

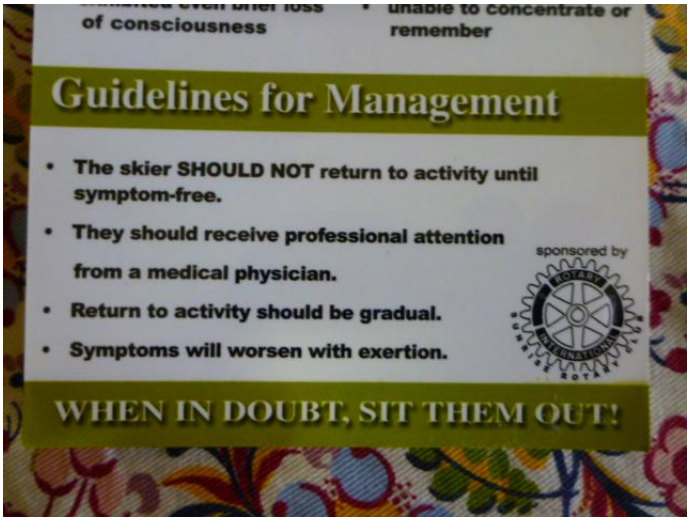
- Holding one or two 'certification' programs at the next FIPS e.g., avalanche and risk management;
- Raising awareness of the 'brand' by putting the FIPS logo on ski patrol jackets;
- Including a segment on training and education at the next FIPS (RC suggestion);
- Including some material on teaching first aid for people with disabilities (CSP VP Education suggestion put forward by RC on CSP's behalf); and
- Providing translators (for at least some of the sessions) due to the high number of delegates coming from a non-English speaking background to enable better dialogue and exchange of ideas (RC suggestion).

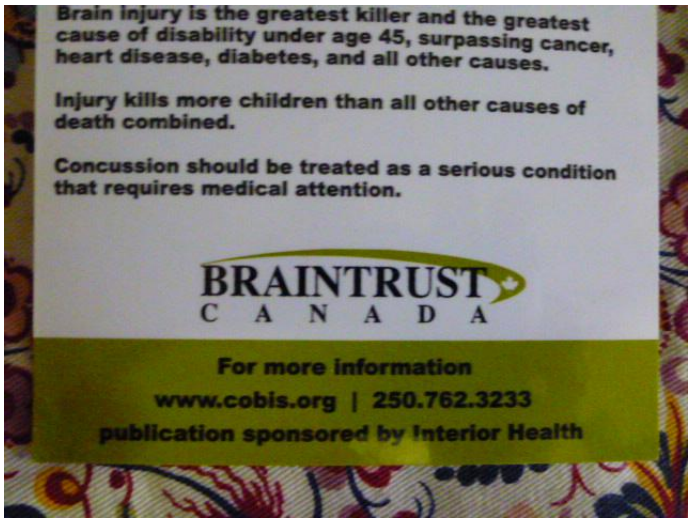
6. Pictures and commentary re promotional materials distributed at the Congress.

6(a) Safety Promotion



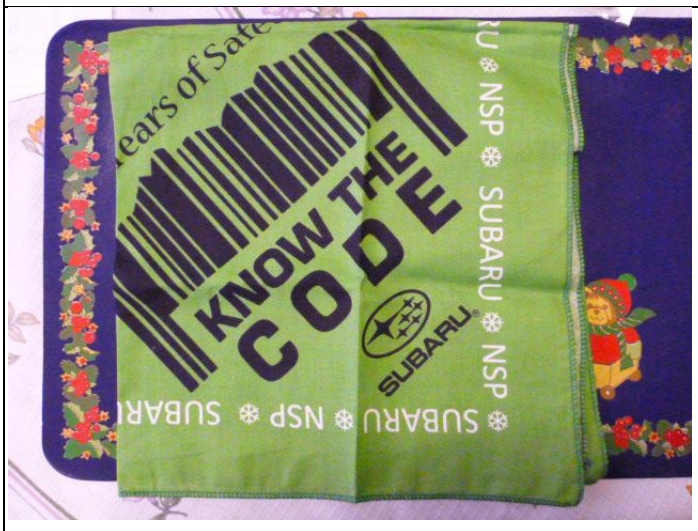




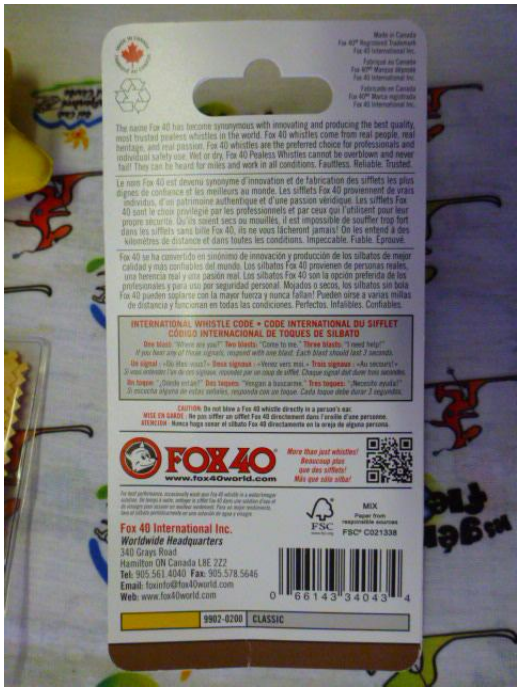


Concussion safety plasticised card from Canadian Ski Patrol. Publication sponsored by Rotary, Braintrust Canada and Interior Health.

Safety sticker for young people from National Ski Patrol, USA. Co-sponsor: Smith Optics.



Scarf with snow safety messages from National Ski Patrol, USA. Co-sponsor: Subaru.

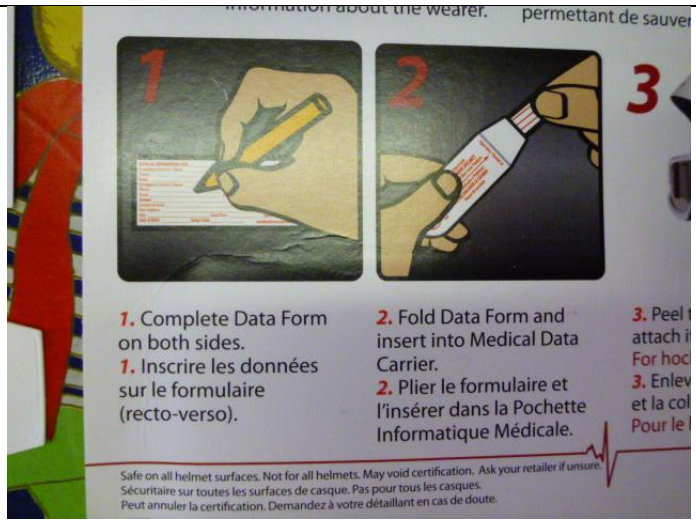


'Safety Star' squeezible and safety whistle from Canadian Ski Patrol.

Mini-torch and safety-conscious polar bear with helmet (zipper pull) from Canadian Ski Patrol.

6(b) Safety Promotion and Fundraising

'Easy access' bandaids – packet of three (pull on the top and the bottom edge comes out ready to apply to the skin). National Ski Patrol, USA. Fundraising margin goes to NSP.



Commercial product – plastic pocket with small medical data sheet inside. Designed to be stuck onto helmets for easy identification and retrieval of medical information for a casualty. Also provides peace of mind to parents who are not skiing with their children as it is an independent and reliable source of information. The 'loose' version in the bottom right-hand photograph above is also available without the helmet-specific packaging. There is a generous fundraising margin available to patrols who decide to promote this product, and with sufficient numbers the packaging can be customized, as it has been for Canadian Ski Patrol in this instance. An English-only version would be available (this one is bilingual due to Canadian requirements).

6(c) Marketing and Patrol Promotion

British Association of Ski Patrols – promotional sticker re first aid and courses offered.

Selection of stickers, cloth badges and pin-on badges from Britain, Canada, France, Korea and Sweden.

Cap and neck warmer from France.

Neck warmer and scarf from Italy.

Pen from New Zealand.

Lanyards from Italy and Canada.

Headband from Sweden and polar fleece hat from Scotland.

A variety of promotional items from Canadian Ski Patrol.

	*Canadian Ski Patrol Manual on CD*

(*Note*: In reciprocation, a selection of conference attendees was given a variety of small souvenirs kindly provided by Mt Baw Baw Alpine Resort and some ASPA kangaroo pins.)

6(d) General Merchandising

	
	*A couple of useful items on offer from Action Rescue Gear.*