Alpine Sports

How to care for kids that ski and snowboard (Yes, in the Midwest)

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Disclosures

- No relevant financial disclosures

Objectives

- Learn the background of skiing and snowboarding competitions to better communicate with patients
- Understand injury patterns associated with these activities
- Understand red flags for emergent treatment

History

- Modern skiing dates to 1850s
  - Dates to prehistoric times (Ski fragments in Russia carbon-dated to 8000-7000 BC)
  - Olympic debut 1936
- Snowboard dates back to 1960s
  - 1970s – 1990s: slow allowance of snowboarders to “ski” resorts
  - Olympic debut 1998

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M & W Olympic Skiing

1. Alpine Skiing
    1. Downhill
    2. Slalom
    3. Super G
    4. Giant slalom
    5. Combined (1 D, 2 S)
2. Ski Jump
3. Nordic (cross-country) skiing
    1. Biathlon – Nordic skiing & shooting
    2. Combined – Nordic skiing & ski jump

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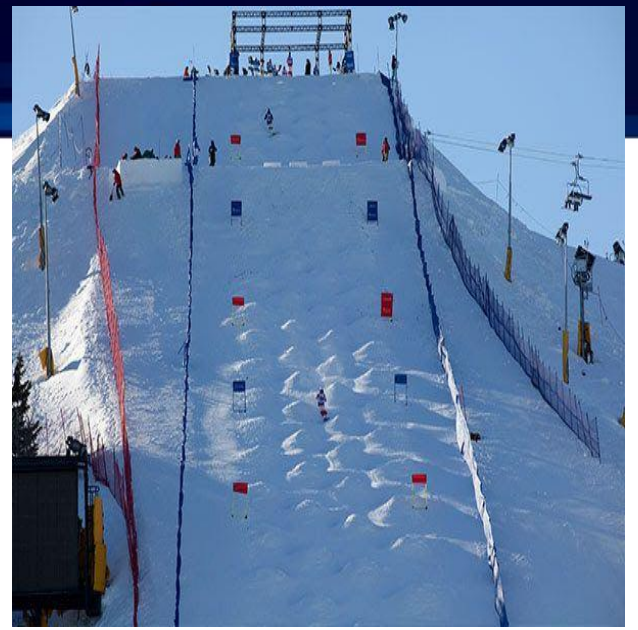
M & W Olympic Freestyle Skiing



Freestyle Skiing

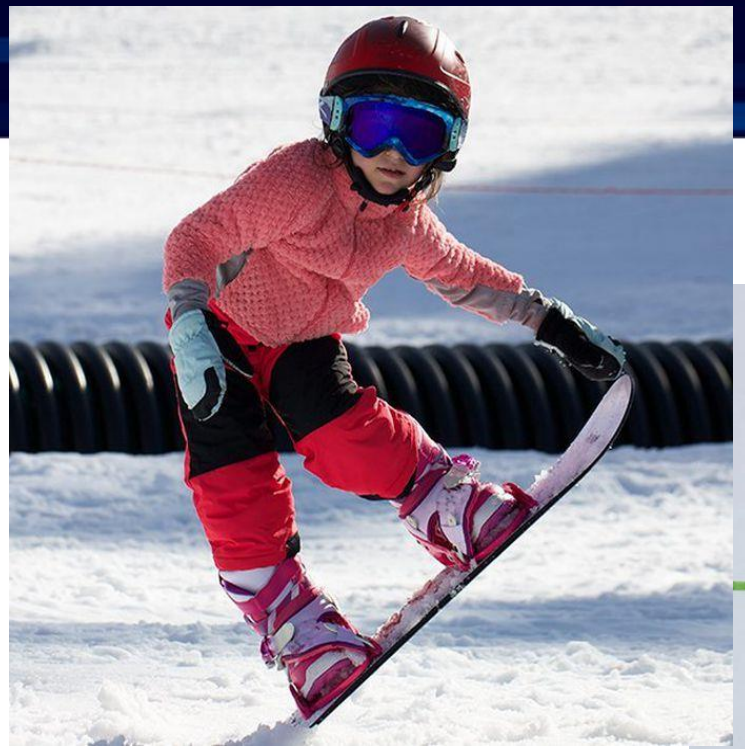
- Aerials
- Moguls
- Ski Cross
- Halfpipe
- Slopestyle
- Big Air (new for 22)

M & W Olympic Snowboarding

- Giant slalom
- Half-pipe
- Cross
- Slopestyle
- Big Air

Equipment

- **Skis / Board & boots**
- **Helmet**
  - Race helmet covers ears
  - Chin bar?
- **Poles**
  - Pole hand guards
- **Goggles**
- **Race suit**
  - Padding
  - Mouthguards
  - Wrist guards (snowboard)



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Injury Prevention

- Lessons / Education
  - Rules of mountain
  - Proper equipment
  - Lift use
- Helmet use
  - Decrease head injury without increased neck
- Neuromuscular training & conditioning

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Future

- **Qualifying for 13-15y international races not predictive**
  - 25% earned spot on USST
  - 35% no longer elite level within 4y
  - Remainder competed at regional / collegiate
- **College**
  - NCAA D1 10 (21 overall)
  - USCSA 175 schools (mostly club)
- **Lifelong sport**

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High School

- Season early Jan to mid Feb
- WIARA
  - Points per team place
  - State event in mid-Feb
- Primarily ski teams
  - Slalom, giant slalom
  - Some Super G
  - Some snowboard

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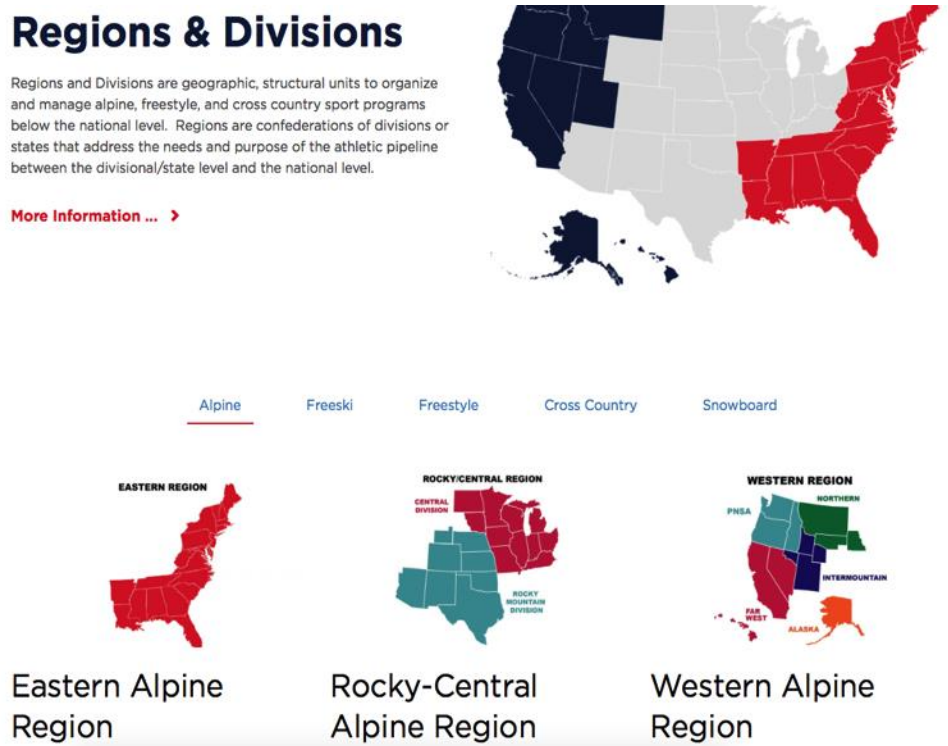
Club & Competitions

- Ski clubs
  - Public & Private Hills
  - Race schedule early Jan to late Feb
  - MWAR (Midwest Alpine Racing)
  - WIJARA (WI, IL, IA Jr. Alpine)
  - USSA events
  - FIS event

- U8, U10, U12, U14, U16, U19, U21, Senior



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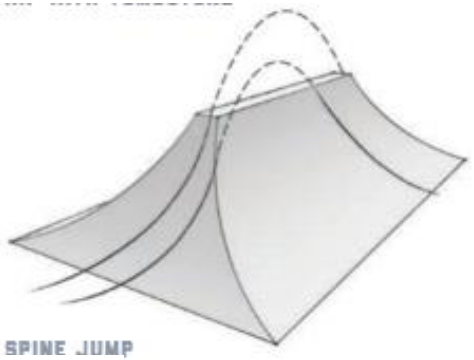
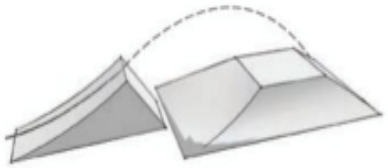
Terrain Park – Jibs, Jumps, & Pipes

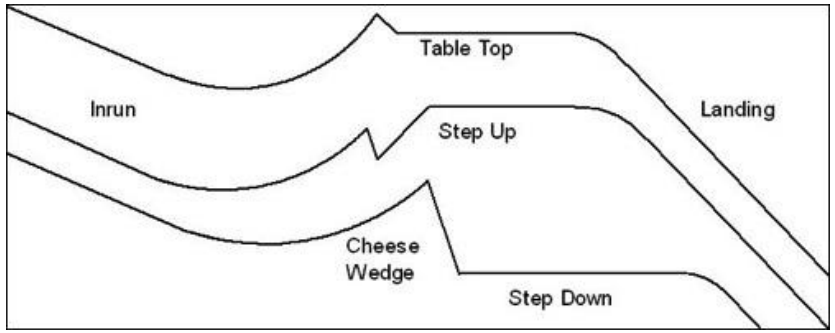
HIP JUMP



SPINE JUMP



GAP JUMP



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Epidemiology

- >9 million participants per year (all ages)
- Injuries: 1-5/1,000 athlete days
  - Snowboard rates increasing over last decade
  - Ski rates stable
  - Average age higher for ski than board
- Snowboarders sustain more head, neck, upper body and abdominal injuries
- Skiers sustain more lower body injuries
- Most injuries are non-emergent

	Most common injuries	
Age/competition category	Snowboarding	Skiing
Pediatrics	1. Upper extremity Wrist (radius fracture) Shoulder (glenohumeral dislocation, clavicle fracture, AC joint injury) 2. Head/neck/face Concussion 3. Lower extremity Ankle Knee (MCL sprain)	1. Lower extremity Knee (contusion, sprain) 2. Upper extremity Hand (fractures, sprain) Wrist (radius fracture) 3. Head Concussion
Recreational	1. Upper extremity Wrist (radius fracture) Shoulder (glenohumeral dislocation, clavicle fracture, AC joint injury) 2. Head/neck/face 3. Lower extremity Ankle (sprain and fracture)	1. Lower extremity Knee (ACL injury) 2. Upper extremity Shoulder (glenohumeral dislocation, clavicle fracture, AC joint injury) Hand (first MCP UCL sprain) 3. Head/neck/face Concussion

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Ski Patrol & Mountain Clinics

- **Ski patrol**
  - Maintain & promote safety
  - First-aid on hill
  - Transport injured skiers
- **Training**
  - Outdoor Emergency Care course
    - EMT, RN, Physicians may take ‘bridging course’
  - CPR
  - Skills

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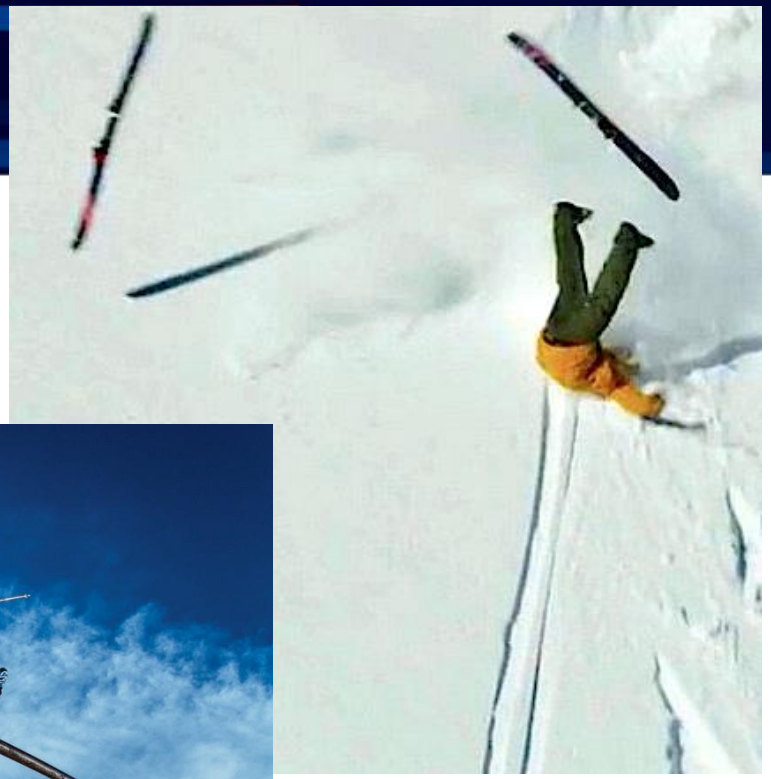
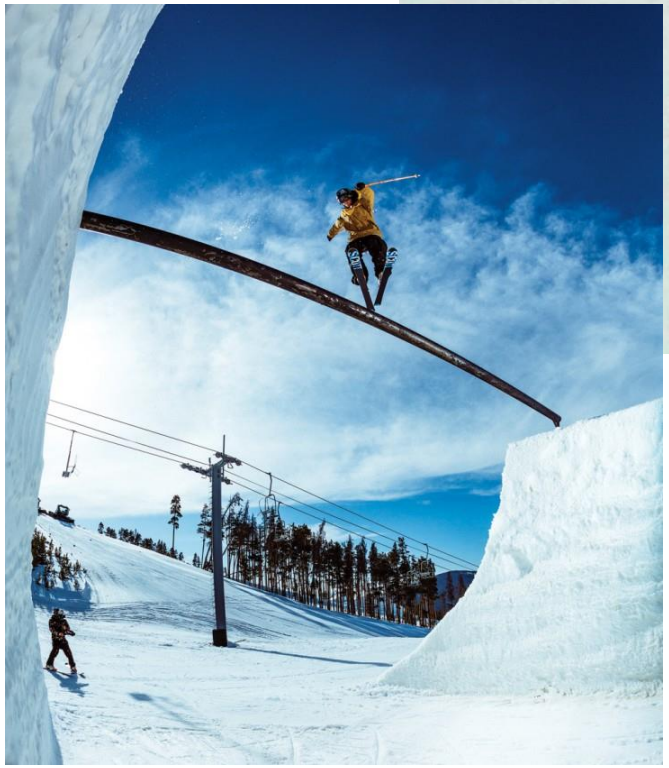
Upper Extremity Injuries

- **Fractures**
  - Snowboarders
    - Distal radius > clavicle > proximal humerus
  - Skiers
    - Lower risk: clavicle > distal radius > prox humerus
  - Clavicle fx can take 10-12 weeks to return
- **Dislocations**
  - Glenohumeral > AC > elbow
    - Snowboard >> ski





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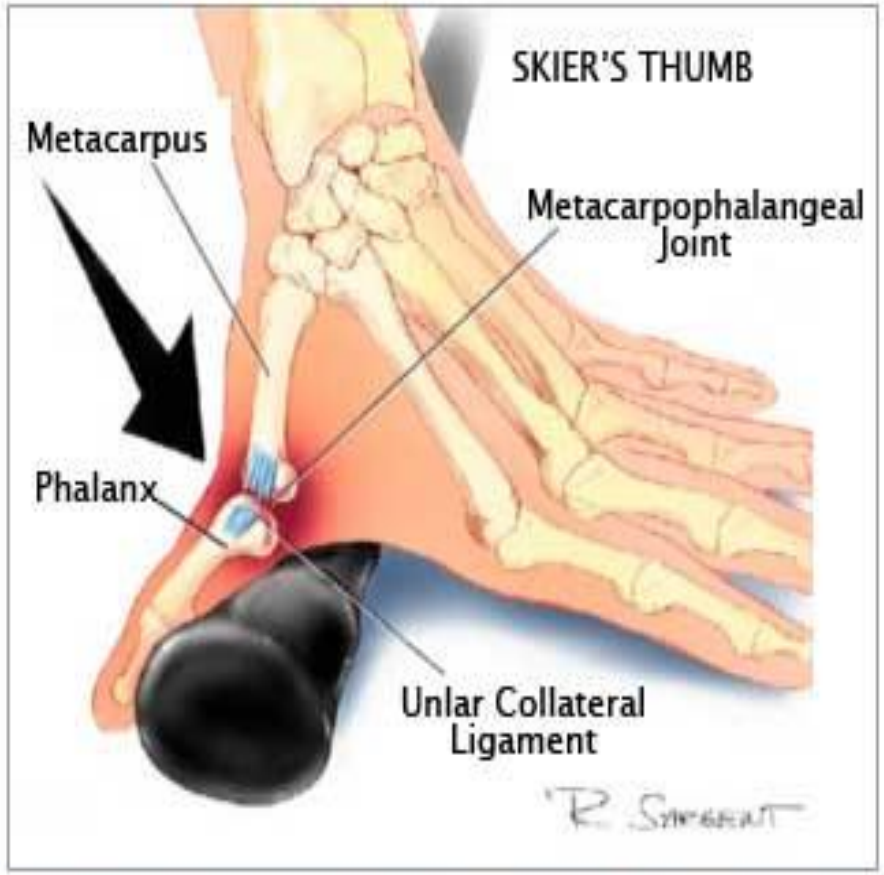
Skier's Thumb

- Thumb ulnar collateral ligament sprain
  - Chronic = gamekeeper's thumb
  - Sudden valgus force to thumb (pole in hand during fall)
  - Pain & laxity at MCP joint
  - Radiographs
    - Fracture
    - Stener lesion = surgical
  - Grade 1-2: non-op with brace and rehab (5-6 week injury)
  - Grade 3 = surgical



MECHANISM OF INJURY RESULTING IN A SKIER'S THUMB

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Lower Extremity Injuries

- Fractures
  - More common in boarders
  - “Boot top” tibia and or fibula shaft
  - Metatarsal (snowboard)
  - “Snowboarder’s fracture” (15x than gen pop)
    - Mistaken for ankle sprain
    - Foot axial loaded while dorsiflexed causing eversion > inversion
    - If non-op (NWB x 4w), immob x 6w
    - Any displacement is surgical

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ACL Tears

- 8.5 per 100 skier-sessions
  - F > M
  - Compare to girls soccer 12.2 per 100,000 AEs
- Skiers & terrain park boarders
  - Forward twist
  - Boot-induced
  - Don’t forget MCL, meniscus
- Imaging, rest, pre-hab, surgery, rehab
- Injury prevention
  - Lessons, avoiding fatigue, dry land train/conditioning

Head Injuries

- **Facial fractures**
  - Snowboard > ski
  - Collision or fall
- **Skull fracture and intracranial hemorrhage**
  - High index of suspicion for transport
    - Collision with obstacle
    - Terrain park falls
  - Altered mental status, worsening symptoms, possible c-spine injury
- **Evaluate**
  - Thorough neuro exam w/ GCS
  - SCAT5?
- **Concussion**
  - *Treat*: relative rest, school adjustments
    - Gradual RTP once fully recovered
  - *Refer*:
    - Not improving within 10-14 days
    - Multiple concussions
    - Intense families
    - Neurobehavioral or learning disorder history
  - Never allow to return that day
  - Never allow to return w/ symptoms
  - Young athletes need written medical clearance

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Other Injuries

- **Spine injuries**
  - Lumbar more common
  - Skiers increased severity
  - Transverse process fx & compression fx
  - C-spine injury
- **Chest wall (ski > board)**
  - Rib fractures
  - Underlying pulmonary injury
- **Abd/Pelvis (board>ski)**
  - Abd organ laceration/contusion
  - Pelvic fracture

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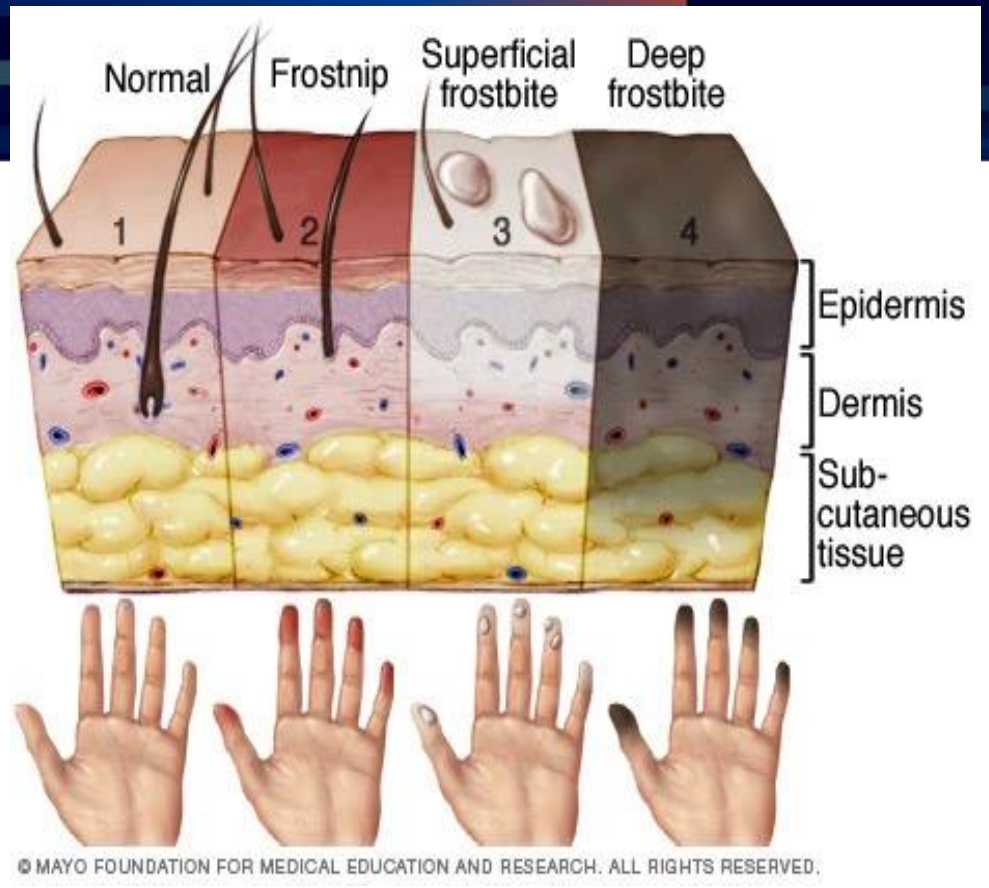
Frostnip & Frostbite

- Exposed skin to cold, windy weather
- **Frostnip** – very superficial
  - Rewarm and first aid
- **Frostbite**
  - Protect area & remove wet clothing
  - Gentle handling without rubbing/massage
  - Rewarm (often best in medical setting)
- **Chillblains / Pernio**
  - Inflammatory skin condition caused by cold exposure
  - Burning, itching, swollen
  - Treat: Avoid cold exposure, tight clothing, NSAIDs
    - Can take up to 3 weeks



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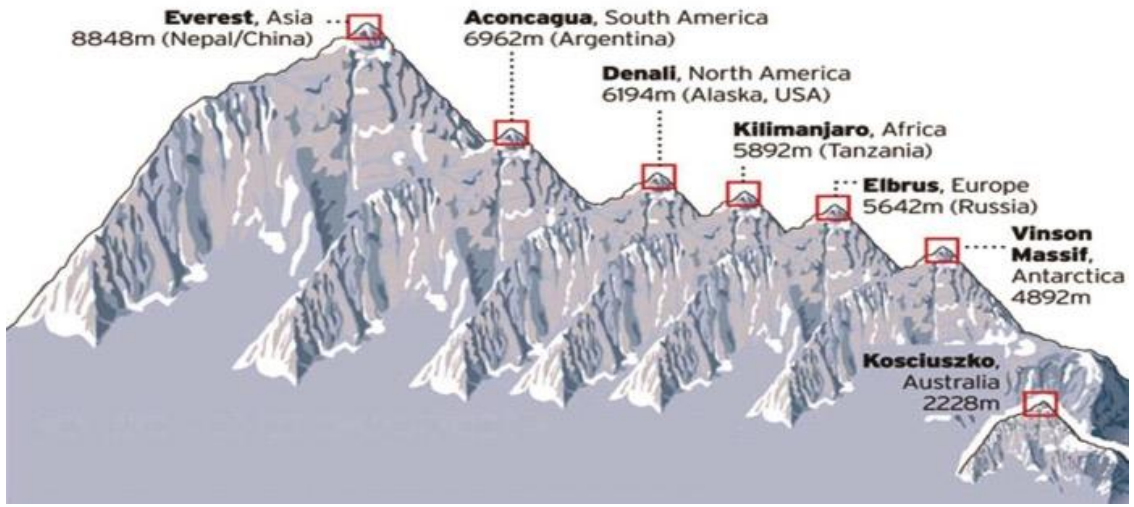
Altitude Illness

- **Acute Mountain Sickness (AMS)**
  - HA + dizzy, GI, fatigue, difficulty sleeping
  - Change in activity b/c sx's
  - 50-85% travelers >4000 m
  - Prevent: gradual ascent
    - >3000m ascend only 500-1K m/day
  - Treat: Descent
  - Acetazolamide or Dexamethasone



- **High Altitude Pulmonary Edema (HAPE)**
  - Dyspnea at rest, cough, weakness, chest tightness
- **High Altitude Cerebral Edema (HACE)**
  - "end stage" AMS ataxia/mental status change

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Thank You! | Questions?

- **Resources**
  - Olympic.org
  - Weinstein S, et al. Common Skiing and Snowboarding Injuries. Curr Sports Med Rep 2019.
  - Bartsch P, Swenson ER. Acute High-Altitude Illnesses. NEJM 2013.
  - Cappaert TA, et al. NATA Position Statement: Environmental Cold Injuries. J Athl Train 2008.

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