

International
Paralympic Committee



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Committee

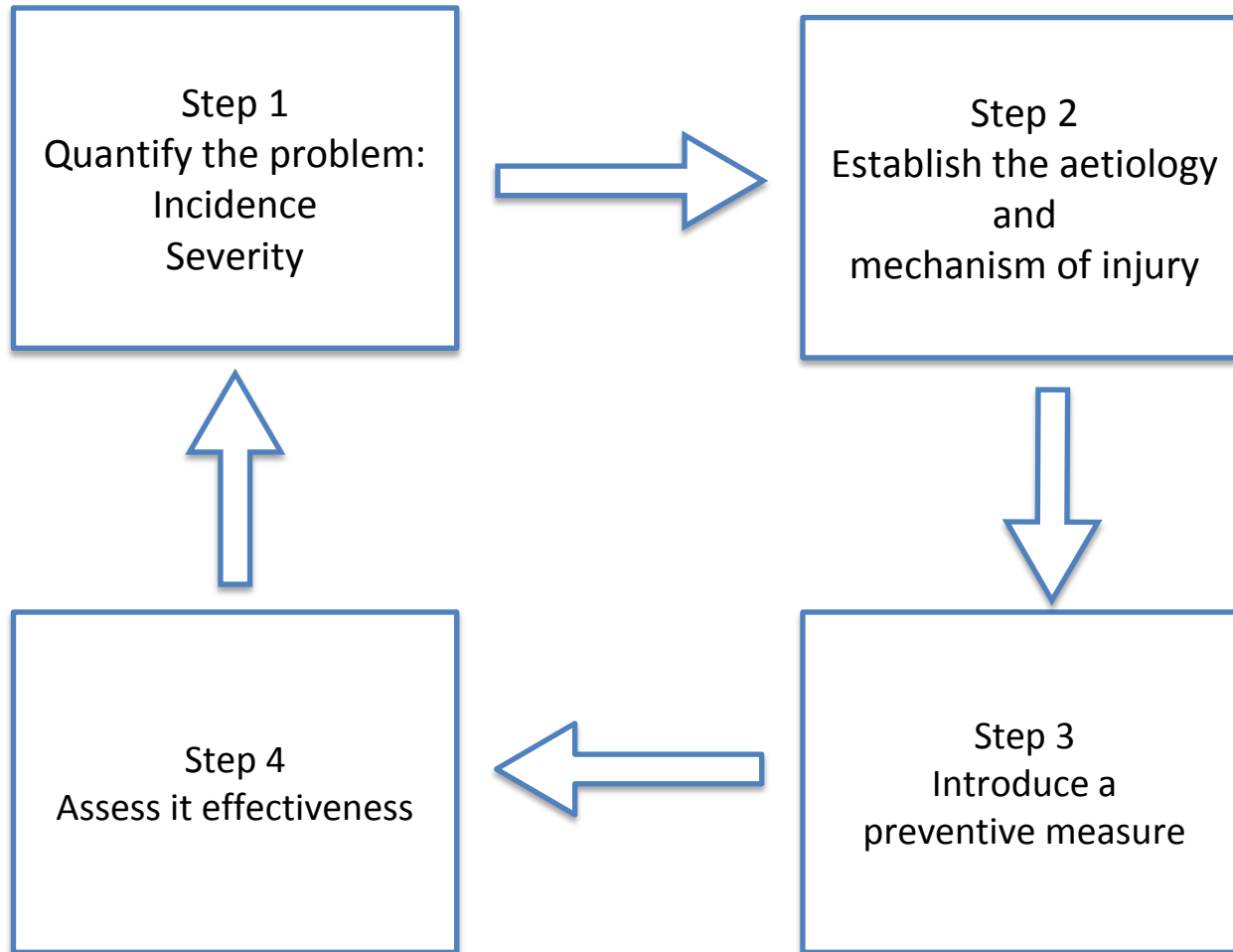
How can injury surveillance inform advances in sport safety: The case of Alpine skiing

Professor Wayne Derman MBChB, PhD, FFIMS
Stellenbosch University



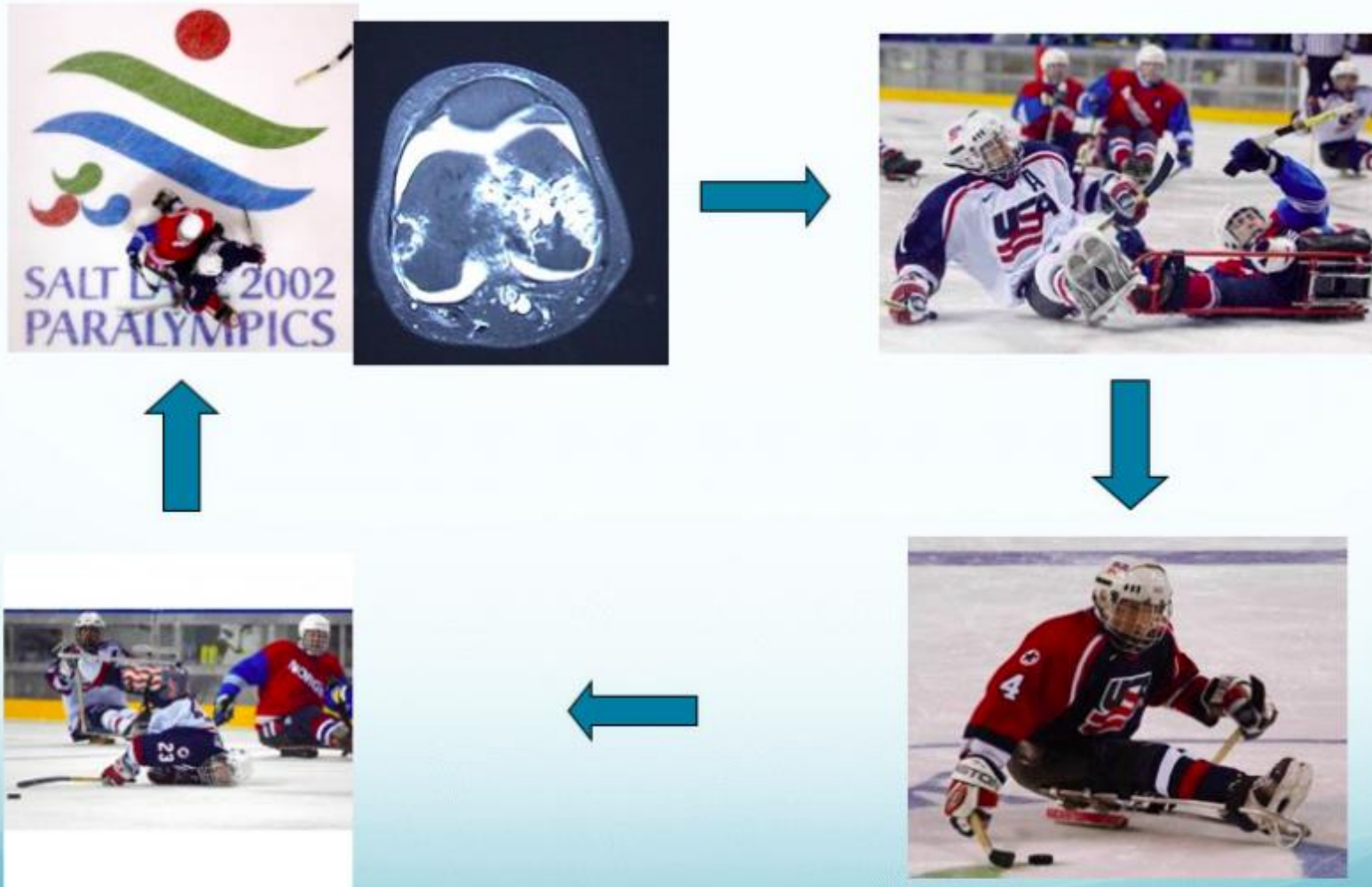


Developing injury prevention programs?



van Mechelen W, Hlobil H, Kemper HC. Incidence, severity, etiology and prevention of sports injuries. A review of concepts. Sports Med 1992;14(2):82-99

Sports Injury Prevention Example





IPC INJURY AND ILLNESS PREVENTION STUDY

International Paralympic Committee
Version 1.2.006

LONDON 2012 PARALYMPIC GAMES

USER : Team Doctor (AFG)
TEAM : Afghanistan Paralympic Committee

Injury/Illness Calendar : AFG [Home](#) [Contact Us](#) [About](#) [Session](#) [Log off](#)

Welcome back!
Thank you for your ongoing commitment to this project. If you experience any problems with data entry please [contact us](#).

Step 1 : Select one of the three options below.

- Record an **INJURY** for the team today (or on the date selected below)
- Record an **ILLNESS** for the team today (or on the date selected below)
- No Injuries or Illnesses are recorded for the team today (or on the date selected below)

Step 2 : Click on the date in the calendar below on which you wish to report an injury or illness.

Month/Year	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
August 2012	20	21	22	23	24	25	26
	27	28	29	30	31		
September 2012						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23

Key	
Red	Data INCOMPLETE (past days)
Yellow	Data INCOMPLETE (today)
Green	Data COMPLETE
Grey	Future days



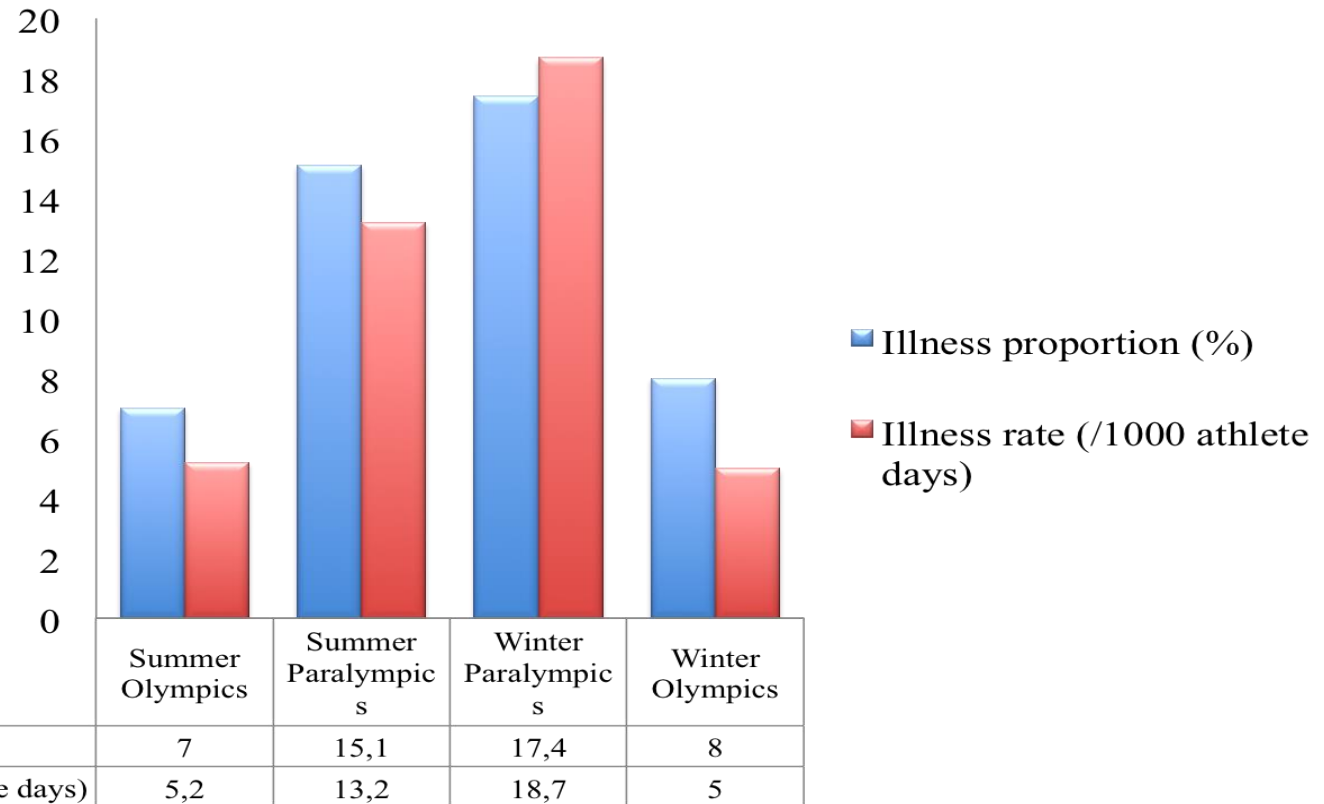
Illness and injury in athletes during the competition period at the London 2012 Paralympic Games: development and implementation of a web-based surveillance system (WEB-ISS) for team medical staff

Wayne Derman,^{1,2} Martin Schwelnus,^{1,2} Esme Jordaan,³ Cheri A Blauwet,^{4,5} Carolyn Emery,^{6,7} Pia Pit-Grosheide,⁵ Norma-Angelica Patino Marques,^{5,8} Oriol Martinez-Ferrer,^{5,9} Jaap Stompforst,^{5,10} Peter Van de Vliet,^{5,11} Nick Webborn,¹² Stuart E Willick^{5,13}



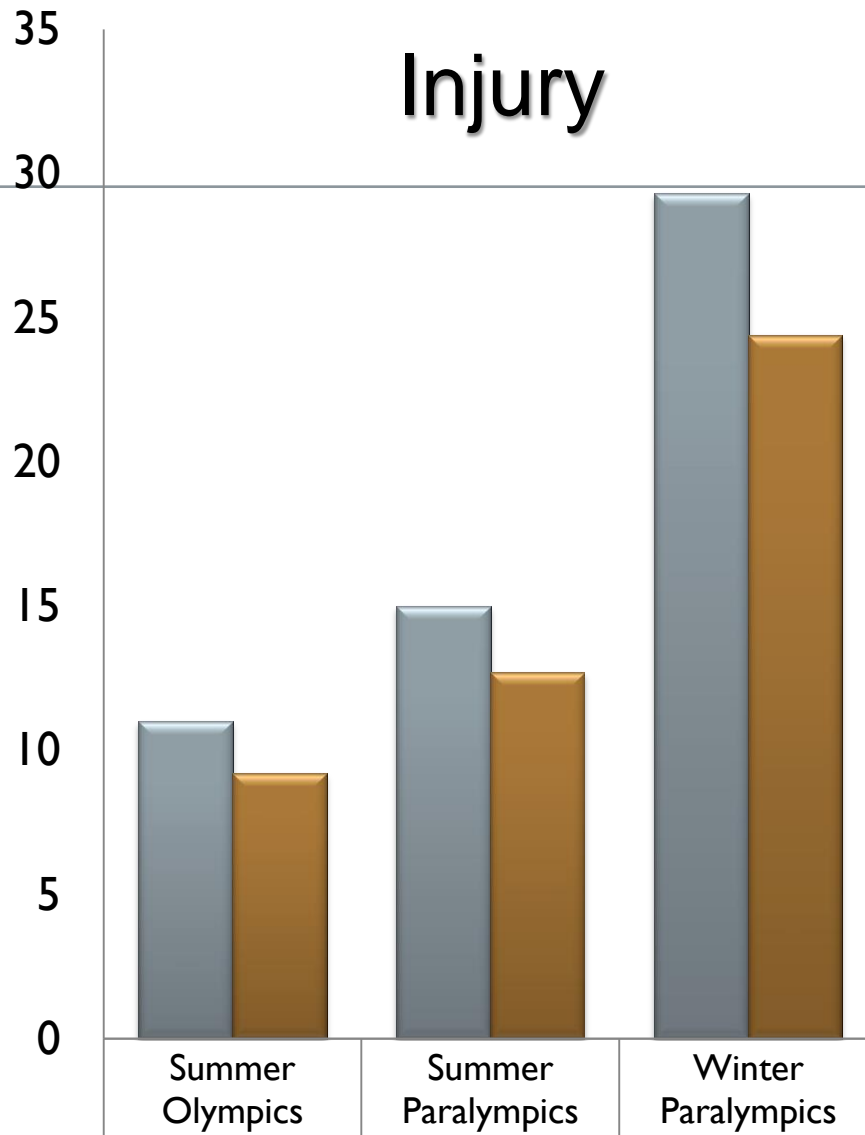
The incidence and patterns of illness at the Sochi 2014 Winter Paralympic Games: a prospective cohort study of 6564 athlete days

W Derman,^{1,2,3} M P Schwelnus,^{2,3,4} E Jordaan,⁵ P Runciman,¹ P Van de Vliet,⁶ C Blauwet,⁷ N Webborn,⁸ S Willick,⁹ J Stompforst¹⁰





Injury



■ Injury proportion (%)
■ Injury rate (/1000 athlete days)

Injury proportion (%)	11	15	29.3
Injury rate (/1000 athlete days)	9.2	12.7	24.4



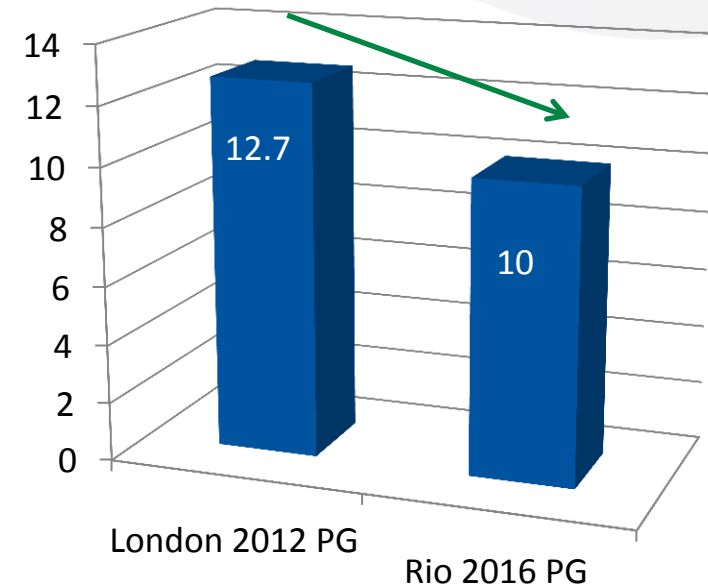
High precompetition injury rate dominates the injury profile at the Rio 2016 Summer Paralympic Games: a prospective cohort study of 51 198 athlete days

Wayne Derman,^{1,2} Phoebe Runciman,^{1,2} Martin Schwellnus,^{2,3} Esme Jordaan,⁴ Cheri Blauwet,⁵ Nick Webborn,⁶ Jan Lexell,^{7,8,9} Peter van de Vliet,¹⁰ Yetsa Tuakli-Wosornu,¹¹ James Kissick,¹² Jaap Stomphorst¹³



- A total of **510** injuries recorded
- Incidence rate: **10.0/1000 athlete-days**
 - Team physician with delegation of 100 athletes can expect to see 10 injuries over 10 days
- **12.1%** of all athletes at the Games encountered an injury

Injury Incidence Rate



(Willick et al, BJSM 2013)



Results



- Countries: 45 (**34/45 = 71,2%**)
- Participating athletes: 547 (516 on WEB-IISS) of the athletes (**94.3% of athletes**)
- Compliance: **100%** participating countries

	Number of athletes	Athlete days
All athletes	547	6564
Alpine / snowboard	219	2628
Cross country/bi-athlon	149	1788
Ice sledge hockey	129	1548
Curling	50	600



High incidence of injury at the SOCHI 2014 Winter Paralympic Games: a prospective cohort study of 6564 athlete days



- **174 injuries**
- **134 athletes injured**
- **24,5% of athletes sustained an injury**

	Number	IP (% athletes)	IR (per 1000 athlete days)
All injuries	174	24,5%	26,5
Alpine / Snowboard	108	37,0%	41,1
Ice sledge hockey	41	24,0%	26,5
Wheelchair curling	10	14,0%	16,7
Bi-athlon / Cross country	15	10,1%	8,4



Mitigating risk of injury in alpine skiing in the Pyeongchang 2018 Paralympic Winter Games: the time is now!

Wayne Derman,^{1,2} Cheri Blauwet,³ Nick Webborn,⁴
Martin Schweltnus,^{2,5} Peter Van de Vliet,⁶ Dimitrije Lazarovski⁶

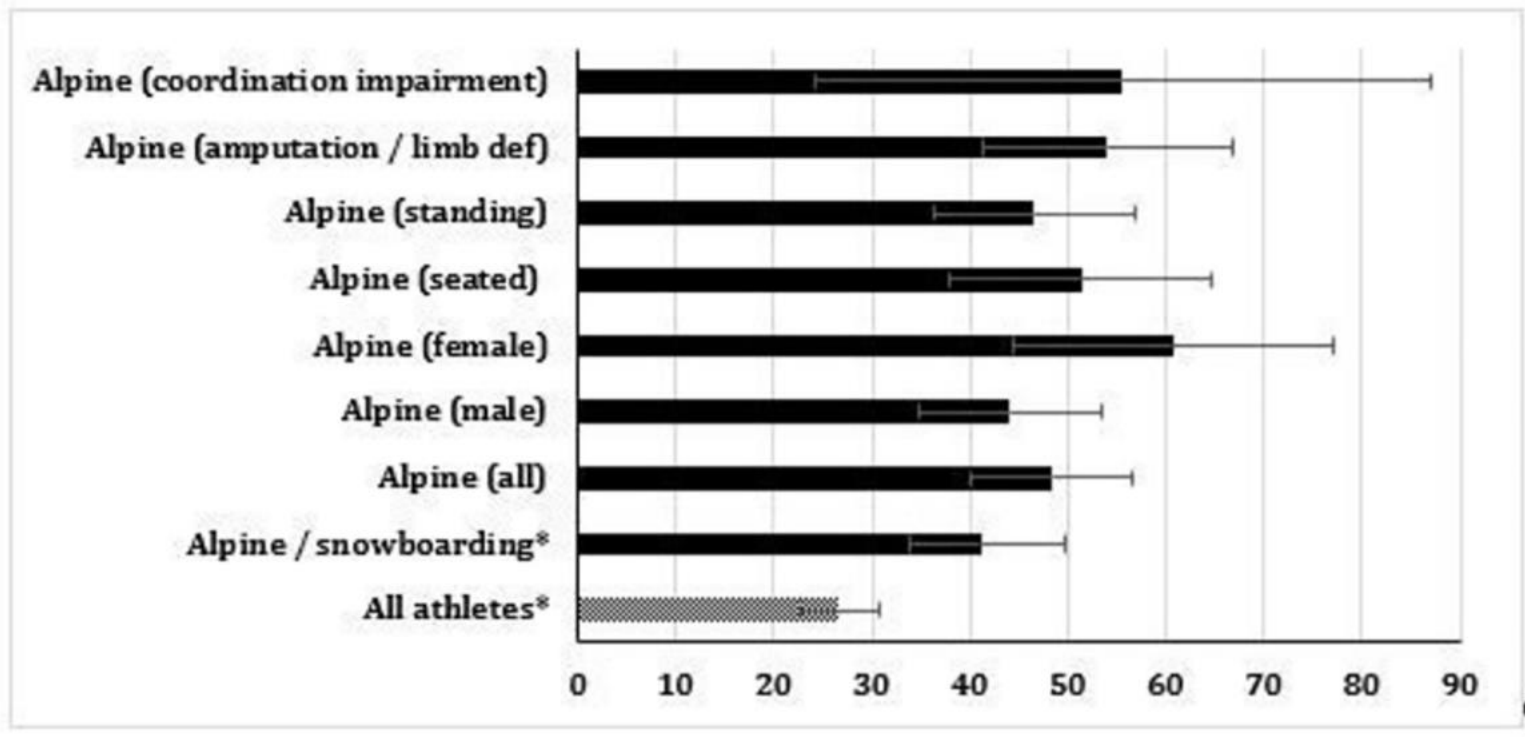


Figure 1 Injury incidence rate (IR) in Para alpine skiing at the Sochi 2014 Paralympic Winter Games.

Mitigating risk of injury in alpine skiing in the Pyeongchang 2018 Paralympic Winter Games: the time is now!

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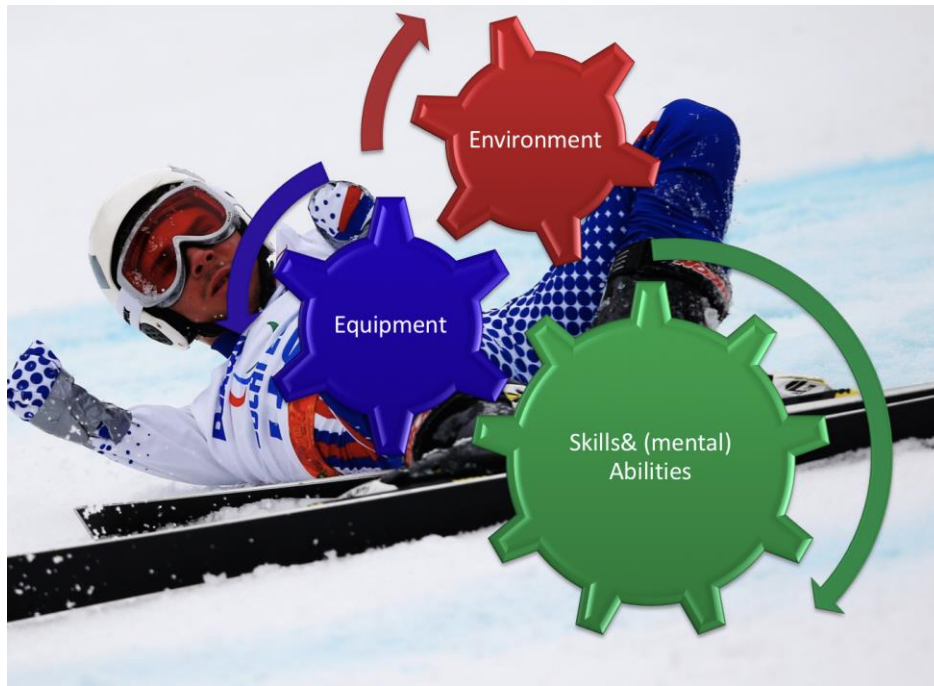
Table 1 Total injuries and injury IR by event, and course segment during the Para alpine skiing events of the Sochi 2014 Paralympic Winter Games

Event	Course segment		
	Upper part of course (IR 15.9)	Lower part of course (IR 10.2)	Finish area (IR 4.4)
Downhill (21 injuries, IR 39.7)	13/8 DNF	5/3 DNF	3/1 DNF
Super G (7 injuries, IR 7.3)	3/2 DNF	2/2 DNF	2/2 DNF
Combined (6 injuries, IR 7.4)	3/1 DNF	2	1
Giant slalom (4 injuries, IR 2.9)	2/1 DNF	2/1 DNF	
Slalom (8 injuries, IR 6.0)	4/2 DNF	4/1 DNF	

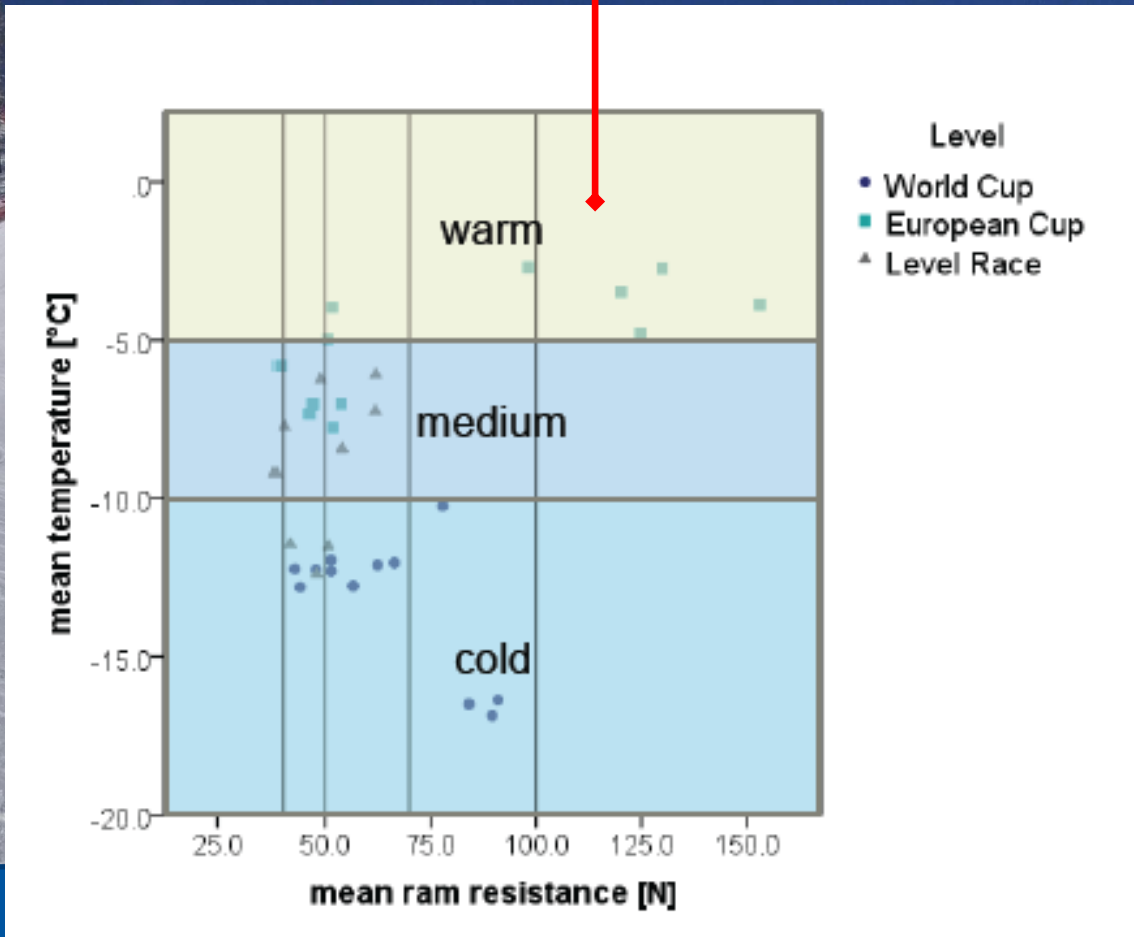
DNF, did not finish; IR, injury rate (injuries/1000 athlete-days).

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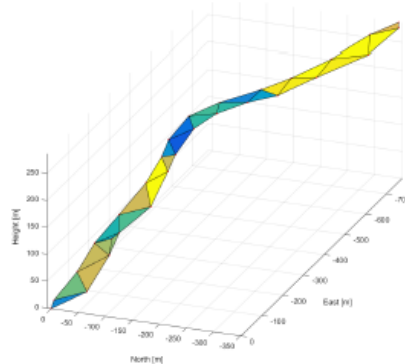
- Amputation/limb deficiency:
no info - snow conditions – loss of control
- Spinal Cord Injury
Loss of control – snow conditions
- Visual Impairment
collided with safety nets – snow conditions



Environment



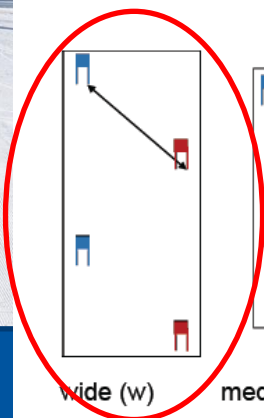
Steepness



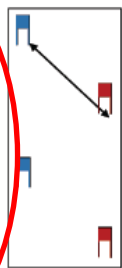
Terrain Model – St. Moritz- Salastrains



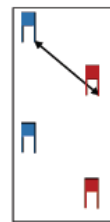
Course setting



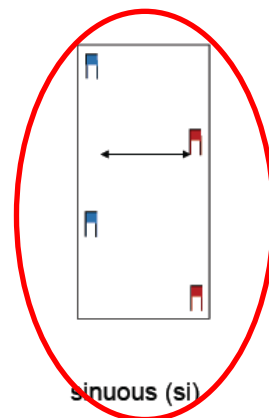
wide (w)
> 28 m



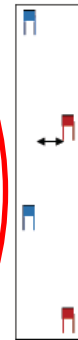
medium (m)
26-28 m



narrow (n)
≤ 26 m



sinuous (si)
> 6.3 m



straight (st)
≤ 6.3 m

Course Setting



Athlete



Coaching

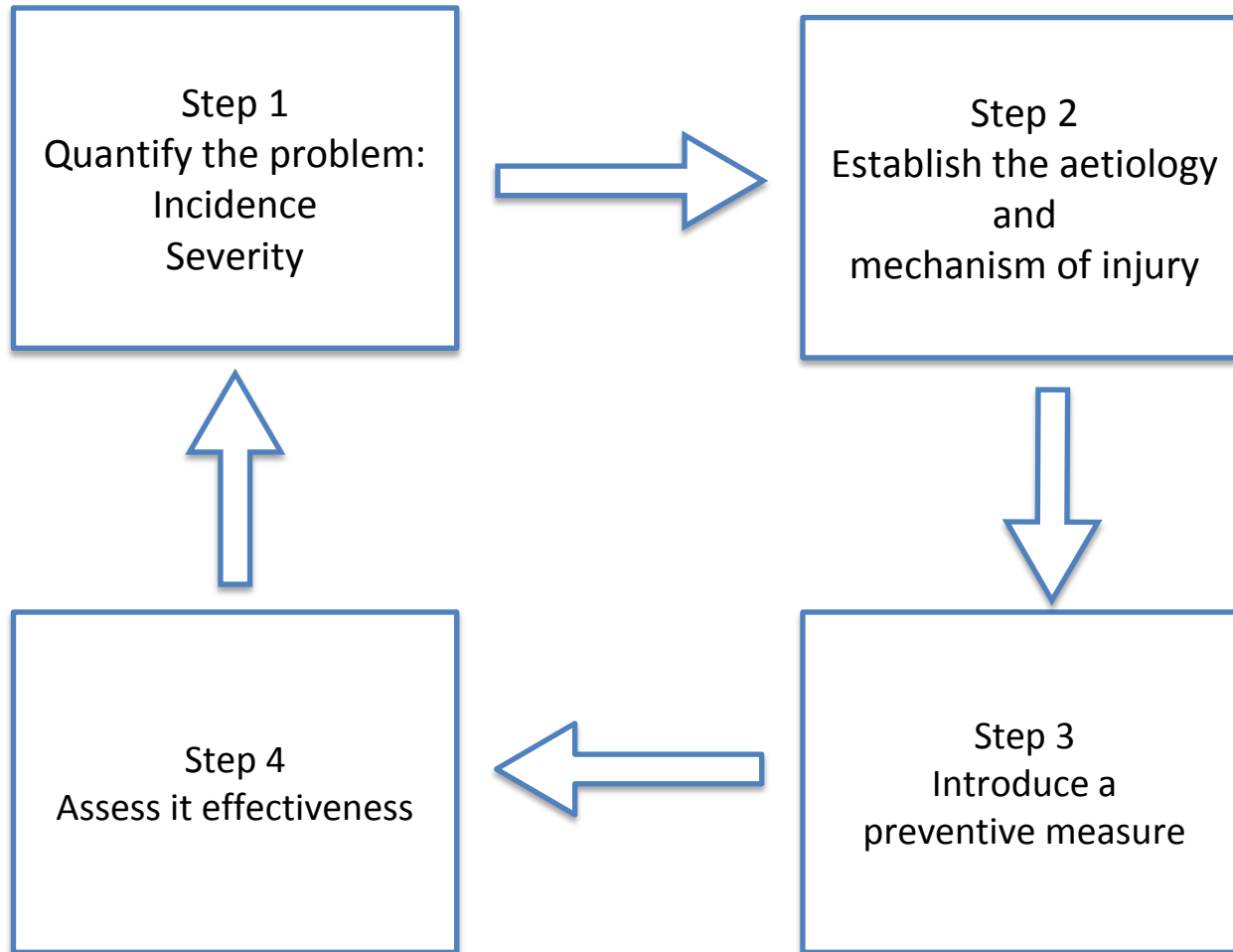
So what about Pyeongchang?: Steps Taken



- Increase in number of training runs esp downhill. Earlier start times in the day to take advantage of more optimal snow conditions.
- The Alpine venue allows for a more optimal start location on the course avoiding steep grades in response to previously reported high injury risks on steep sections in Sochi.
- Based on experiences during the 2017 test event, the course design will be widened, given that narrow courses are associated with tighter turns and by inference higher incidence of injury. This 2017 course setting has been accurately replicated through GPS methodology.
- The course design and preparation includes ‘waves’ as opposed to jumps—a particularly high-risk manoeuvre for Paralympic monoskiers.
- Members of the IPC Medical Committee will be in constant radio communication with the race officials to understand race conditions and race facts in real time.
- Official pre-Games technical and medical briefings will include an education programme for team medical and coaching staff.
- Appointment of an independent race director, who will facilitate an independent view regarding safety issues and will have the final call to amend start times, postpone or cancel an event if the conditions are deemed too hazardous.



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THANK YOU FOR YOUR ATTENTION

