INSIDE THE GAMES
Current Issues in Paralympic and Olympic Sports Medicine

PM&R Update
Park City, Utah
Wednesday, March 14th, 2012

Stuart Willick, MD
Medical Officer, International Paralympic Committee
Associate Professor
University of Utah
Division of Physical Medicine and Rehabilitation
DISCLOSURES

• The IPC covers travel and living expenses and provides a small daily stipend for meetings and event coverage.

• I get a lot of schwag.

• I have no other disclosures.
OUTLINE

• Paralympic and Olympic Experience
• Public Health/Epidemiology
• Anti-Doping
• Gender Determination Issues
• Olympic Legacies
• Paralympic Research
• Healthcare Delivery
• Paralympic Sports Highlights (home video)
• IOC MC formed in 1967 to address the increasing problem of doping in sports.

• Patrick Schamasch has been Director for 15 years.

• Since the creation of WADA in 2000, the IOC MC has given more attention to other medical issues and research.

• Full time director of researcher named in 2009.
The IOC Medical Commission has been strengthened since Jocques Rogge has been appointed IOC President.
TALE OF TWO MEDICAL COMMISSIONS

• The IPC was created in 1990.
• No permanent offices until 2000.
• IPC medical team has been inconsistent.
• IPC Medical and Scientific Department formed in 2007.
• Two paid employees.

Peter van de Vliet, ATC/PT/PhD
TALE OF TWO MEDICAL COMMISSIONS
SYDNEY 2000 SUMMER GAMES

- Observer Program
Olympic team needs 51 condoms per member
CONDOM CONTROVERSY

SLC 2002 Winter Games:
Where did the condoms go?
14,000 condoms show up 2 days late.
SALT LAKE 2002
OLYMPIC/PARALYMPIC VILLAGE POLYCLINIC

- Director, Musculoskeletal Services
- Polyclinic Deputy VMO, Olympics
- Polyclinic VMO, Paralympics
ELITE MEDICINE FOR ELITE ATHLETES

- Day 1: Received request for hyperbaric CO₂
- Day 3,4: Latvian and Slovenian physicians ordered CBCs on 8 healthy athletes.
- Day 5: Norwegian physician requests CBCs on 30 healthy athletes.
ELITE MEDICINE FOR ELITE ATHLETES

• Several requests for IV Fe++
• Czech physician requested IV supplies for Ca++ and vitamin injections and “auto-immunization”
2002 ABSTRACTS


2002 PUBLICATIONS


Sports injury surveillance has gained increasing attention over the past 10 years.

Injury Surveillance Systems are now in place for the NHL, NCAA and other major sports organizations.

The IOC has been pursuing an ISS since 2002, first under the direction of Per Renstrom.

The IPC successfully implemented an ISS for Winter Games in 2002.
Injuries among Disabled Athletes during the 2002 Winter Paralympic Games

NICK WEBBORN\textsuperscript{1,2}, STUART WILICK\textsuperscript{3}, and JONATHAN C. REESER\textsuperscript{4}

\textsuperscript{1}International Paralympic Committee, Bonn, GERMANY; \textsuperscript{2}University of Brighton, East Sussex, UNITED KINGDOM; \textsuperscript{3}University of Utah, Salt Lake City, UT; and \textsuperscript{4}Department of Physical Medicine and Rehabilitation, Marshfield Clinic, Marshfield, WI


- First comprehensive, prospective study of Paralympic injuries.
- Identified a high number of LE injuries in sledge hockey.
- Intervention planned …
INJURY SURVEILLANCE
INJURY SURVEILLANCE
Need a smart EMR
2004 ATHENS SUMMER GAMES

- Skipped it!
2006 TORINO WINTER GAMES

- Researcher on the ISS
2006 TORINO WINTER GAMES

- Researcher on the ISS
2006 TORINO WINTER GAMES

• Researcher on the ISS
2006 TORINO

- Researcher on the ISS
Comparison of Injuries from Two Paralympic Winter Games: Salt Lake 2002 & Torino 2006

Webborn, N¹,² Willick, S³

¹Sussex Centre for Sport & Exercise Medicine, University of Brighton, Eastbourne, United Kingdom; ² International Paralympic Committee, Sports Science Committee, Bonn, Germany; ³University of Utah Orthopaedic Center, Salt Lake City, Utah, USA

### Torino 2006 Paralympic Winter Games Research Projects

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Principle Investigator</th>
<th>Affiliation</th>
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<tr>
<td>1</td>
<td>Time Motion Analysis in Ice Sledge Hockey</td>
<td>Kudlacek, Martin</td>
<td>Faculty of Physical Culture, Palacky University of Olomouc, Czech Republic</td>
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<td>2</td>
<td>Physiological Characteristics of Disabled Nordic Sit-Skiers and Models of Performance</td>
<td>Bernardi, Marco</td>
<td>Comitato Italiano Paralimpico, Italy</td>
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<td>3</td>
<td>NPC Classification Questionnaire</td>
<td>Jensen, Trish</td>
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<td>Injury Surveillance of the TORINO 2006 Paralympic Games (incl. Minor Traumatic Brain Injury in Elite Sledge Hockey)</td>
<td>Webbborn, Nick / Crandell, David</td>
<td>IPC Sport Science Committee / Harvard Medical School, USA</td>
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</table>
BEIJING 2008 PARALYMPICS

- Largest Paralympic Games ever
- 4,000 athletes
- 148 delegations
- Media: 4,000
- Volunteers: 70,000 (originally planned to decrease from 80,000 to 30,000)
- Spectators: 1.8 million
- Appointed IPC CMO 6/08
BEIJING 2008 - BOOSTING
Ramadan coincided with the Beijing 2008 Paralympics.

Some endurance athletes were fasting and became dehydrated.

Requests for IV fluids were denied.

Concern for religious backlash.

Generated a series of articles in the sports medicine literature on the fasting athlete.

Ramadan coincides with London 2012
RAMADAN
Has health and performance implications for athletes; May have cultural and religious implications

Muslims’ anger as London Olympics clash with Ramadan
By Claudia Joseph
Last updated at 22:24 14 October 2006

The 2012 London Olympics have been plunged into controversy by the discovery that the Games will clash with Ramadan, the most holy month in the Islamic calendar.

The clash will put Muslim athletes at a disadvantage as they will be expected to fast from sunrise to sunset for the entire duration of the Games.

In 2012, Ramadan will take place from July 21 to August 20, while the Olympics run from July 27 to August 12.

An anticipated 3,000 Muslim competitors are expected to be affected.
Muslim athletes face Ramadan hurdles at London Olympics

By Claire Ferris-Lay  Wednesday, 11 January 2012 11:02 AM

The Olympics Games will run from 27 July to 12 August in London

Related:
Stories

- Want to visit the 2012 Olympics? That’ll be $3,400
- Qatar eyes Olympics win after World Cup success
- F1 teams urged to boycott Bahrain Grand Prix
- Qatar restaurants see trade slump after alcohol ban
- Maldives lifts luxury spa ban despite
BEIJING 2008 – SPORTS MEDICINE

- No specialty of sports medicine in China.
- No specialty of musculoskeletal radiology.
- Discussions were held about this between international sports medicine physicians and Chinese residents in the Polyclinic.
BEIJING 2008 - HIGHLIGHTS

- [http://www.youtube.com/watch?v=sVDKmEG3ga0&feature=related](http://www.youtube.com/watch?v=sVDKmEG3ga0&feature=related) (Beijing wheelchair crash)

- [Beijing Competition](http://www.youtube.com/watch?v=sVDKmEG3ga0&feature=related)
• Paralympic Injury Surveillance Project not approved by BOCOG.
Maximizing Physical Activity in Athletes With Amputations

Michelle Pepper¹ and Stuart Willick²

¹Sports Medicine Fellow, University of Utah Orthopaedic Center, Salt Lake City, UT; ²Associate Professor, Physical Medicine and Rehabilitation, Chief Medical Officer, International Paralympic Committee, University of Utah Orthopaedic Center, Salt Lake City, UT


VANCOUVER 2010 WINTER GAMES

- Spent one week in Vancouver in February during the Olympics working with the IOC Medical Commission and VANOC Medical Services.
- Spent three weeks in Whistler as IPC CMO.
WHISTLER WEATHER
WHISTLER WEATHER
WHISTLER WEATHER

Competition delayed
OLYMPIC FAMILY LOUNGE
Figure 2. Virus detections and proportion of respiratory specimens submitted to BC Children and Women’s Health Centre Laboratory diagnosed positive for a virus by epidemiological week. British Columbia, 2009/2010.
Figure 1. Number of individuals reporting gastrointestinal illness by symptom onset date. Olympic Workforce Temporary Housing Facility, Whistler, 2010 (n=72)
SPIKE IN ER VISITS PROMPTS CURBS ON ETOH SALES

Figure 2. Number of ER visits related to substance misuse* by resident location† and visit date. St. Paul's Hospital, 2010 compared to previous 3-day average and historical 3-day average‡.
Figure 1. Number of ER visits related to assaults* by resident location† and visit date. Vancouver Coastal Health Authority, 2010 compared to previous 3-day average‡

*Visits related to assaults are monitored through ICD-9 codes E960-E968.
VANCOUVER 2010 PARALYMPICS

4 research projects:

Kinematic analysis of the push gesture in elite Nordic sit skiers
PI: Dr. Laura GASTALDI  Politecnico di Torino, Italy

Match analysis of Paralympic ice sledge hockey / Field performance of elite ice sledge hockey athletes
PI: Mr. Mikko HAYRINEN, dr. Molik BARTOZS
The Jozef Pilsudski University of Physical Education, Warsaw, Poland

Autonomic Assessment as part of the wheelchair athlete’s classification  PI: Dr. Andrei KRASSIOUKOV
University of British Columbia

Injury surveillance of the Vancouver 2010 Paralympic Games PI: Dr. Nick Webborn, University of Brighton
RESEARCH TEAM
PREPARATION FOR COMPETITION

VIDEOS
LAUREN WOOLSTENCROFT

• 10 medals in three Winter Games, including a 2010 sweep in Vancouver with 5 Gold medals.
LAUREN WOOLSTENCROFT

• Skis with one pole, one upper limb prosthesis and two lower limb prostheses.
The Inuit Inukshuk
BLIND SKIING
THE FANS

Ralph Green
THE FANS
THE FANS
THE FANS
ANTI-DOPING

- WADA
- IOC
- IPC
- IFs
- Athletes
- Sponsors
- Fans
ANTI-DOPING STRATEGIES

• Improve laboratory technologies
• Extensive testing – Both the IOC and the IPC have doubled the number of tests per Games from 2000 to 2010. Over 5,500 tests in Beijing and over 2,100 in Vancouver
• Targeted testing
• OOC and “no advance-notice” testing
• Whereabouts program
• EDUCATION
ANTI-DOPING

- There are an estimated 200,000 doping control samples collected at national and international competitions each year.
- Estimated cost of one doping control: $300.
- Estimated cost of all direct tests: $60 million.
- Estimated cost of a (+) test: $10,000.
- Total yearly costs: $100 million.
- ~1.7% are positive.

Hanstad 2005
ANTI-DOPING SUCCESS

• Clean Vancouver Olympics.
• Nearly clean Vancouver Paralympics.
ANTI-DOPING VIOLATION

• One wheelchair curling athlete from Sweden tested positive for a beta blocker and a diuretic – no TUE on file.

• When he told his primary care physician that he was going to the Paralympics, his doc said “Good luck.”

• The IPC ADC concluded that there was negligence on the part of the athlete, his doctor, his federation, his NADO and his NPC; but that the athlete had no intent to improve his performance through the use of the prescribed medication.

• Sanctioned reduced from 2 years to 6 months.

• This case and others like it emphasize the importance of pre-games testing and education on the national level.
THE ATHLETE’s PASSPORT

INVITATION

4th OLYMPIC SYMPOSIUM ON SPORT MEDICINE AND SPORT PHYSIOTHERAPY

PREVENTION AND MANAGEMENT OF HEAD INJURIES IN SPORT
25th February 2010 – 10.00 to 13.00 hrs

ATHLETES’ PASSPORT SYMPOSIUM
15th February 2010 – 10.00 to 12.00 hrs
DIAGNOSIS AND TREATMENT OF NECK INJURIES IN SPORT SYMPOSIUM
26th February 2010 – 10.00 to 12.30 hrs

OLYMPIC WORKSHOP
ON SPORT MEDICINE AND SPORT PHYSIOTHERAPY

KINESIO TAPING AND MUSCLE PERFORMANCE
22nd February 2010 (Vancouver) – 09.00 to 11.00 hrs
23rd February 2010 (Whistler Mountain) – 16.30 to 18.30 hrs

Organised by the IOC Medical Commission
THE ATHLETE’S PASSPORT

• IOC 4th symposium on sports medicine
  Feb 15, 2010.
• Perspectives from:
  IOC Arne Ljungqvist, MD
  WADA Stuart Kemp, MD
  IBU Jim Carabre, MD
  ISU Jane Moran, MD
• Instituted for blood first
  and later urine.
THE ATHLETE’S PASSPORT

- Existing system, based on population norms, allows for false positives (e.g. athlete with exceptionally high Hg) and false negatives (e.g. athlete with normally low hemoglobin who blood dopes).
- Athlete’s Passport is based on each athlete’s norms.

![Graph showing Haemoglobin levels from 2000 to 2006](chart1.png)

![Graph showing T/E Values over 6 years](chart2.png)
ANTI-DOPING

- Special considerations for Paralympic Sport:
- Neuropathic pain medications (incl. cannabis)
- Anti-spasticity medications (baclofen, benzodiazepines, anti-Parkinsonian agents)
- Botulinum toxin injections: undetectable.
- Surgical procedures (dorsal rhizotomy, tendon lengthening procedures).
- Where is the line between improving function with ADLs and improving sports performance?
ANTI-DOPING

• Position Statements have been drafted on anti-spasticity agents: Botulinum toxin; Anti-Parkinson’s agents and

• Pain medications

• Testosterone use in SCI athletes – study planned

• Phosphodiesterase-5 inhibitors
Bogus Viagra nets B.C. Paralympian

The skip of Canada’s gold medal-winning Paralympic curling team has been arrested for allegedly trafficking thousands of counterfeit Viagra and Cialis pills.

Jim Armstrong was taken into custody April 15 in Blaine, Wash., after he picked up the bogus tablets from a U.S. postal outlet, according to a U.S. federal court complaint.

Customs officials in Los Angeles intercepted the package of allegedly counterfeit goods from China on April 7. They allowed the package to go through and police were waiting for Armstrong, 59, as he exited the post office, the complaint said.

The post office box was in the name of Armstrong’s late wife, Carleen Armstrong, who died of breast cancer in September 2009.

Armstrong, a retired dentist from Richmond, B.C., told the arresting officer his son had purchased the drugs so he could distribute them at Vancouver-area clubs, according to the complaint.

Armstrong was charged with trafficking in counterfeit drugs and was released from custody on a $20,000 bond. He is due back in U.S. District Court April 30.
SILDENAFIL STUDY

Protocol Summary
Version: January 28, 2010

Effect of sildenafil on athletic performance in athletes with spinal cord injury: a prospective, placebo controlled, blinded, crossover study

Principal Investigator
Stuart Willick, M.D., FACSM
University of Utah Orthopaedic Center

WADA Research Grant.
Reference number: 09E21SW
$100,000
CROSS-OVER ATHLETES

• When can athletes with disabilities compete with able-bodied athletes?
• Increased attention with case of Oscar Pistorius.
CROSS-OVER ATHLETE

South African open water swimmer Natalie Du Toit took 8th out of 24 swimmers in the Beijing Olympics, then won 5 Gold medals in the Beijing Paralympics.
CROSS-OVER ATHLETE

- Polish table tennis star Natalia Partyka competed in both Beijing Games. Has 2 Gold and 2 Silver medals from Greece and Beijing Paralympics.
• Brian McKeever qualified for the Canadian Olympic Nordic Team as an alternate. Has won 10 medals overall, including 3 Golds in Vancouver.
CROSS-OVER ATHLETES

• New Zealand paraplegic archer Neroli Fairfall competed in the 1980 Paralympics and 1984 Los Angeles Olympics.

• Italian archer with polio, Paola Fantato, competed in 5 Paralympics and the 1996 Atlanta Olympics.

• American VI runner Marla Runyan competed in 2 Paralympics and the 2000 Sydney and 2004 Athens Olympics.
CROSS-OVER ATHLETES

• There will be an increasing number of athletes with disabilities who wish to compete with their able-bodies counterparts at all levels of competition. The decision on whether any individual can or cannot compete will need to be made on a case by case basis. Safety and fairness are the key determinants. In some cases, the answer will clearly be yes. In others, such as the Oscar Pistorius case, a multi-disciplinary approach involving sports administrators, sports scientists, sports ethicists and, of course, lawyers will be needed.
GENDER DETERMINATION

• New attention prompted by South African sprinter Castor Semenya, who won the 800 m event at the 2009 World Championships.

• International, multi-disciplinary forum held in Miami, Florida in 2009.
GENDER DETERMINATION

Arne Ljungqvist:

1996 — the last time chromosome testing was done — 3,387 female athletes were tested and 8 were found to have gender disorders. Seven had Y chromosomes but did not respond to testosterone. One had two X chromosomes but an overactive adrenal gland. All were allowed to compete as women.
GENDER DETERMINATION

• From inspection to buccal swabs to ?
• Many challenges and ambiguities remain.
• Goals include: keeping a level playing field; and protecting the health and privacy of the athletes.
• All cases should be determined by a multi-disciplinary panel, including an endocrinologist, gynecologist, geneticist, radiologist, anti-doping specialist, legal counsel.
GENDER DETERMINATION

- First IPC case in 2011
- Visually impaired ex-marine track and field athlete applied for eligibility 3 months prior to the Para PanAmerican Games
- Married with children
- Had undergone sex reassignment surgery in Thailand 23 months prior
- Limited medical records available
The IPC was in the process of writing a gender determination position statement.

We declined eligibility until further medical records were available.

We provided the athlete and the NPC with our working guidelines.

Our highest priorities were confidentiality and sensitivity to the athlete’s privacy, as well as maintaining a level playing field.
The Great Elephant Ride [Kindle Edition]

Stephanie Timmer (Author)

Digital List Price: $9.95

Kindle Price: $9.95 includes free wireless delivery via Amazon Whispernet

- Text-to-Speech: Enabled
- Don't have a Kindle? Get your Kindle here.
OLYMPIC LEGACIES
OLYMPIC LEGACY

• Park City and Salt Lake City have become a Mecca for winter sports athletes since 2002.
• 51 Vancouver Olympians call Utah home.
• Westminster college boasts 22 Vancouver Olympic athletes among its student body.
THE HAZE
ENVIROMENTAL IMPACT

Chen Tiang Chief Engineer, Beijing Municipal Environmental Protection Bureau:

“The pollution in the Beijing Basin has been accumulating for over 1,500 years. It will take some time to clean it up.”

“The Games have served as a powerful catalyst to accelerate all of the environmental initiatives that China has been instituting over the past ten years.”
ENVIRONMENTAL IMPACT

• Solar panels on street lights in Village.
• Wind mills on buildings in Village.
• 90% of hot water in Village heated by solar energy.
• Part of heat for buildings from geothermal energy.
• Daily air quality reports available to IPC and the public.
ENVIRONMENTAL IMPACT

- 50% of cars removed from Beijing roads during the Games
- Discounts for public transportation provided for a two month period around the Games
- Billions of dollars spent on improvements in mass transit infrastructure
- Government promoted electric, hydrogen, hybrid and biofuel vehicles
- Lowest emission vehicle tax 1-2%
- Highest emission vehicle tax 40%
OLYMPIC LEGACIES
“Care for people with a disability is an important hallmark of a civilized and progressive society. There are 83 million people with a disability in China. We follow the principle of putting people first and advocate a humanitarian spirit. We stand for equality, oppose discrimination, care for the vulnerable and respect human rights.”
SOCIAL/POLITICAL IMPACT

• International attention from the Games accelerated the trend toward more open society in China with potential health benefits.

• Greater freedom of the press:
  Mining disaster made front page news;
  Melanine disaster made front page news.
PROSTHETICS LEGACY

- Otto Bock: 140 technicians from 20 countries, including 50 Chinese technicians
- They’ve been doing this for 20 years at the Paralympics, starting Seoul 1988
PROSTHETIC AND WHEELCHAIR REPAIR
PLAY LIKE A PARALYMPIAN
VANCOUVER 2010 LEGACIES

• New athletic facilities
• Sea to Sky Highway widened
• New CT scanner for the Whistler Clinic
• Over $1 million in medical supplies donated to clinics that provide care to the First Nations.
NUTRITIONAL LEGACY

• Big Mac w cheese: 28 g. of fat!
“During the march, there will be only one nation. What more could anybody want, if the whole world could be made as one.”

17 year-old Australian Jon Wing at the 1956 Melbourne Games
WHAT’S NEXT?
# LONDON: 28 COMPETITION VENUES

Service Name: Sports Medicine – Competition Venues

Where does this service description apply?

Identify at which competition venues this Service Description will apply or where there will be a change in how the service will be delivered. For each venue that is identified as being an exception, a service description will need to be developed for that venue(s) for v.2 of the Venue Operations Manual.

<table>
<thead>
<tr>
<th>Venue</th>
<th>If it does not apply, briefly explain the exception</th>
<th>Venue</th>
<th>If it does not apply, briefly explain the exception</th>
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## LONDON: 22 NON-COMPETITION VENUES

### 3. Services and Delivery Locations

Please find below list of services the Functional Area will provide by delivery location. A ticked box indicates the Functional Area will have developed equipment at these locations to deliver the service.

<table>
<thead>
<tr>
<th>No.</th>
<th>Service</th>
<th>Competition Venues</th>
<th>IOC Function Development Centre</th>
<th>Olympic Village</th>
<th>Rowing/Canoing Village</th>
<th>Sailing Village</th>
<th>Gymnastics accommodation</th>
<th>Training Venues</th>
<th>Airport International Rail Stations</th>
<th>Other Transport Venues</th>
<th>Hospital</th>
<th>Main Logistics Centre</th>
<th>Technology Venues</th>
<th>IOC/PC Hotel</th>
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<td>8</td>
<td>Podiatry</td>
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<tr>
<td>9</td>
<td>Optometry</td>
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<tr>
<td>10</td>
<td>Hydrotherapy</td>
<td>☑</td>
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</tbody>
</table>

### Additional Services

- Specialist services (Mental health, Dermatology, ENT etc.)
- Overnight Stay Facility
- Laboratory Services (not antidoping)
- Emergency care
- Ambulance Services
- First Aid Services
- Wheel Chair and Prosthetic Services
- Veterinary Services
Salt Lake City Creates Committee To Determine Whether To Bid On '22 Or '26 Olympic Games

Published February 9, 2012

Utah Gov. Gary Herbert and Salt Lake City Mayor Ralph Becker yesterday announced the "creation of an exploratory committee to see whether Utah should put together a formal bid" for the '22 or '26 Winter Olympic Games, according to Mike Gorrell of the SALT LAKE TRIBUNE. Herbert said, "We need to pursue this (exploration) to see if there is real opportunity there. This is just the first step of the process." But it's an exciting step that needs to be taken if we are going to take the journey." He then asked a 14-member committee to deliver a comprehensive report by May. While Becker emphasized "no predetermined recommendation" is expected from the committee, he "made it clear he believes Salt Lake City and Utah's other 2002 venue remains in place from '02 Winter Games in Salt Lake City."
THANK YOU
WORLD ANTI-DOPING AGENCY
play true
International Paralympic Committee
SECURITY

- $1,000,000,000
TRANSLATIONS

Wax Cabin
Cabine de fart
USA
FRIENDS
FRIENDS
FRIENDS
FRIENDS
Patrick Schmasch, M.D.  
(Director in Charge of the MC) 
Arne Ljundquist, M.D., Ph.D.  
(Chairman of the MC) 
Lars Engebretsen, MD, PhD  
(Head of Scientific Activities)
The Olympics are just a big test event for the Paralympics
OPENING CEREMONIES
OPENING CEREMONIES
WAX CABINS
33 Wax Cabin
Cabine de fart
USA
LAUREN WOOLSTENCROFT

- 10 medals in three Winter Games, including a 2010 sweep in Vancouver with 5 Gold medals.
WOMEN IN SPORTS

• In 1896 and 1900 women competed in tennis, golf and yachting only.

• In Sydney, 2000, women competed in 25 sports and 132 events, comprising 38% of all athletes and 44% of all events.

• Art exhibits and several symposia on women in sports.

• IOC has a legacy of promoting women in sports.*
CELEBRATING DIVERSITY

Vonetta Flowers, teaming with Jill Bakken, becomes the first African American to win a Winter Olympic Medal.
CELEBRATING DIVERSITY

Derek Parra – first Hispanic American to win a Winter Olympic Medal.
# EPIDEMIOLOGY

## Daily Water Quality Reports

Water Quality Daily Summary Report: February 17, 2010

<table>
<thead>
<tr>
<th></th>
<th>Chlorine</th>
<th>Turbidity</th>
<th>pH</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Levels</strong></td>
<td>&gt; 0.2mg/L</td>
<td>&lt;1.0 NTU</td>
<td>b/n 6.5-8.5</td>
<td></td>
</tr>
<tr>
<td><strong>Metro Vancouver</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source (Seymour- filtered water):</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td>Slightly lower Cl at one station.</td>
</tr>
<tr>
<td>Trunk Mains:</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>Distribution Mains:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>University of British Columbia</td>
<td>Not Tested</td>
<td>Not Tested</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>City of Richmond</td>
<td>Not Tested</td>
<td>Not Tested</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>City of North Vancouver</td>
<td>OK</td>
<td>OK</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>District of North Vancouver</td>
<td>Not Tested</td>
<td>Not Tested</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>District of West Vancouver</td>
<td>Not Tested</td>
<td>Not Tested</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Whistler</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution Mains:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Water System</td>
<td>OK</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Athlete's Village Water System</td>
<td>OK</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Olympic Park Water System</td>
<td>OK</td>
<td>OK</td>
<td>8.6</td>
<td>Slightly higher pH at end of system.</td>
</tr>
</tbody>
</table>
EPIDEMIOLOGY

- Received a daily “Weather Health Battleboard” that factored temperatures, wind, precipitation and visibility.
- IOC and IPC have long considered (but not regulated) weather standards for competition.

Weather Health Battleboard: Whistler Town valid at 0500 PST February 18, 2010

<table>
<thead>
<tr>
<th>Health Risk</th>
<th>Parameter</th>
<th>Rain (hypothermia, mobility)</th>
<th>Snow (mobility, medical evacuation)</th>
<th>Low Temperature (hypothermia, frostbite)</th>
<th>High Temperature (dehydration)</th>
<th>Wind Chill (hypothermia, frostbite)</th>
<th>Fog/Visibility (mobility, medical evacuation)</th>
<th>Freezing Precipitation (mobility, medical evacuation)</th>
<th>Wind (mobility, medical evacuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold</td>
<td></td>
<td>&gt;= 50mm/24 hours</td>
<td>&gt;= 5cm/event</td>
<td>&lt;= -15C</td>
<td>&gt;= 15C</td>
<td>&lt;= -25C</td>
<td>&lt;= 1km</td>
<td>&gt;= 0.2mm/24 hours</td>
<td>&gt;= 64km/h</td>
</tr>
<tr>
<td>18-Feb-10</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>-6.0</td>
<td>7.0</td>
<td>-6.0</td>
<td>10.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>19-Feb-10</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>-4.0</td>
<td>7.0</td>
<td>-4.0</td>
<td>10.0</td>
<td>0.0</td>
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<tr>
<td>20-Feb-10</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>-5.0</td>
<td>8.0</td>
<td>-5.0</td>
<td>10.0</td>
<td>0.0</td>
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<tr>
<td>21-Feb-10</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>-4.0</td>
<td>8.0</td>
<td>-4.0</td>
<td>10.0</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>22-Feb-10</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>-2.0</td>
<td>7.0</td>
<td>-2.0</td>
<td>10.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Source: Environment Canada.
OLYMPIC LEGACIES
OLYMPIC LEGACIES
ENVIROMENTAL IMPACT

VANOC tried to save fumes (and money) by trying a new ice machine. The bad press was a nasty twist of fate for Resurﬁce, an underdog that supplanted long-time Olympic supplier Zamboni as the ice-resurfacing equipment maker of choice for these Games. Zamboni - which claims to hold down about a 70-per-cent share of the global market for annual ice-resurfacer sales - had been the exclusive supplier of the equipment for the past four Winter Olympics, but lost out in the bidding this time around.