

# PLAYER WELFARE UPDATE

Player Welfare Symposium  
Heat & Air Quality Guidelines 2024





# HEAT GUIDELINES UPDATE

# ACSM Expert Consensus Statement on Exertional Heat Illness: Recognition, Management, and Return to Activity

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## Abstract

Exertional heat stroke (EHS) is a true medical emergency with potential for organ injury and death. This consensus statement emphasizes that optimal exertional heat illness management is promoted by a synchronized chain of survival that promotes rapid recognition and management, as well as communication between care teams. Health care providers should be confident in the definitions, etiologies, and nuances of exertional heat exhaustion, exertional heat injury, and EHS. Identifying the athlete with suspected EHS early in the course, stopping activity (body heat generation), and providing rapid total body cooling are essential for survival, and like any critical life-threatening situation (cardiac arrest, brain stroke, sepsis), time is tissue. Recovery from EHS is variable, and outcomes are likely related to the duration of severe hyperthermia. Most exertional heat illnesses can be prevented with the recognition and modification of well-described risk factors ideally addressed through leadership, policy, and on-site health care.

as low as 15°C (1). Based on data from the National Center for Catastrophic Sport Injury Research at the University of North Carolina at Chapel Hill, deaths in athletes from exertional heat stroke (EHS) have averaged three per year since 1995, mainly in high school football players (2). Despite educational and preventive efforts to lessen EHS morbidity and mortality, recent literature reveals little to no change in the annual number of EHS deaths among athletes (3). The prevalence of exertional heat illness across all sports is not known (4). The difficulty assessing the data and trends surrounding the epidemiology of exertional heat illness is greatly complicated

Consensus statement

IOC consensus statement on recommendations and regulations for sport events in the heat 

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PDF



PDF +  
Supplementary  
Material



**Extreme  
Heat Policy**

*Issued by Sports Medicine Australia  
V1.0 February 2021*

# IDENTIFY THE RISK

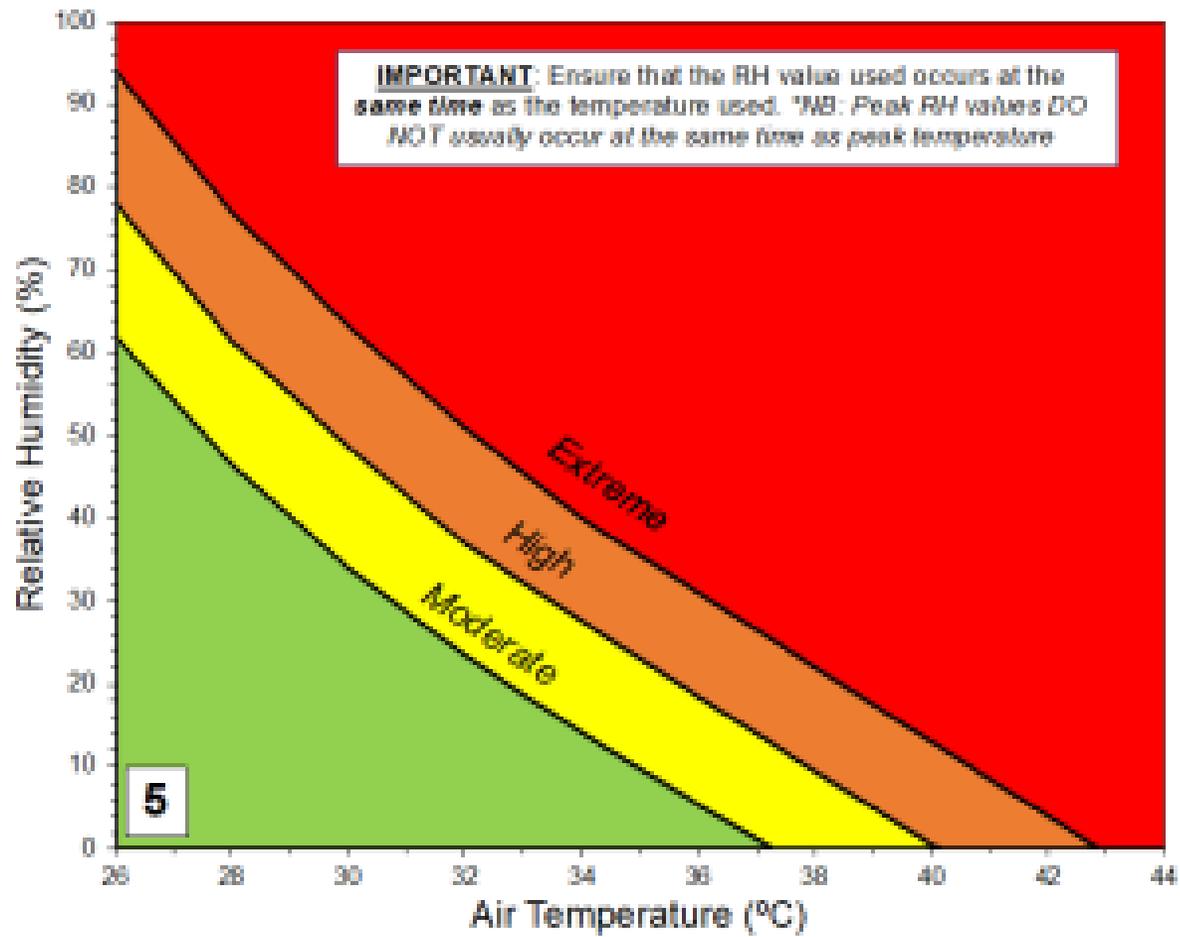
## **Does your region/competition need to have a plan in place?**

- Examine the entire competition period – including the preseason
- Has your competition period changed?
- Has your region changed?

## **Identify peak air temperature and relative humidity levels for match and training regions**

- Meteorological services, historical data
- Relative humidity at peak temperature
- Minimum 5-year period
- Identify Risk above 'Moderate' on SMA Sport Risk Classification

# Sport Risk Classification 5



# PLAN

## Education:

- Team medical, coaching and conditioning staff
  - Identify at risk players
  - Pre-season risk – fitness levels
  - Training location – including indoors
  - Respiratory illness
- Players – educate on signs and symptoms
  - Preparation – alcohol, caffeine
  - Pre-hydration
  - Clothing

# PLAN

- **Plan to measure risk**
  - Measure where teams will train and play
  - Fluctuating conditions
  - Ensure you can assess Heat Stress Index – HIS
    - Air Temperature
    - Relative Humidity
    - Wet Bulb Globe Temperature (WBGT)
    - Air speed



Alert Level	WBGT by Region (°F)			Event Conditions	Recommended Actions & Breaks
	Cat 1	Cat 2	Cat 3		
Black	>86.2°	>89.8°	>92.0°	Extreme Conditions	<ul style="list-style-type: none"> <li>No Outdoor Training, delay training until cooler, or Cancel Training</li> </ul>

# GUIDANCE FOR ATHLETIC TRAINERS

Red	84.2-86.1°	87
Orange	81.1-84.1°	84
Yellow	76.3-81.0°	79
Green	<76.1°	

WBGT	Temp	Humidity	Warning in NOAA Heat Index chart	Warning in OSHA Heat Safety Tool	Preventative Measures	COOL-SPACE® Effectiveness
<18°C (<65°F)	86°F 30°C	40%	CAUTION	LOW RISK	Take caution and basic preventative measures	Reduce temperature by up to 13°
18-23°C (65-73°F)	86°F 30°C	90%	DANGER	HIGH RISK	Take extra care and caution as well as more preventative measures	Reduce temperature by up to 2°
23-28°C (73-82°F)	90°F 32°C	40%	EXTREME CAUTION	LOW RISK	Take extreme caution	Reduce temperature by up to 14°
>28°C (82°F)	90°F 32°C	95%	EXTREME DANGER	EXTREME RISK	Take very extreme caution and elaborate preventative measures.	Not Effective

## Heat Stress index – Traffic Light System



HIS <150  
No cooling measures  
required



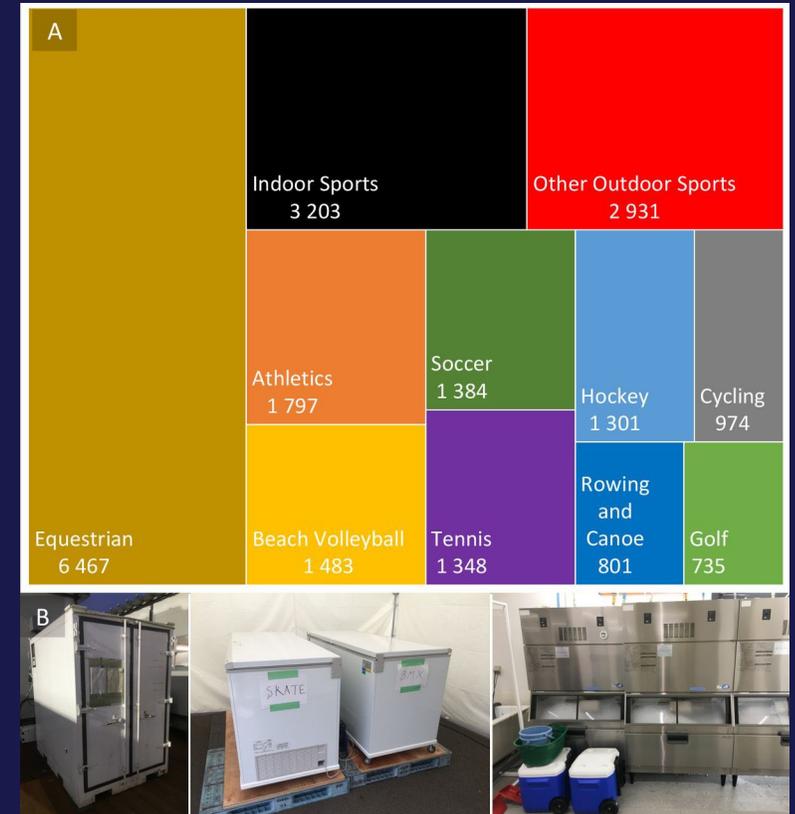
HIS 150- 200  
Water Breaks, cooling  
measures in place



HIS 150- 200  
Caution: Extended  
Breaks

# PLAN

- **Cooling measures**
  - Pre-hydration
  - Shade
  - Ice
  - Mist-fans
- Air-conditioned changing rooms
- Water breaks
- Extended half-time (20mins)



# MANAGEMENT PLAN

## In game measures

### Emergency measures

- Rectal thermometer
    - Rectal temp  $>38^{\circ}\text{C}$
  - Neurological status
  - Immersive cooling -  $1^{\circ}\text{C}/5\text{mins}$
  - IV fluids
  - Hospital transfer
- 
- **All players suffering unexplained collapse should be treated as heat injury even if core temperature not high**

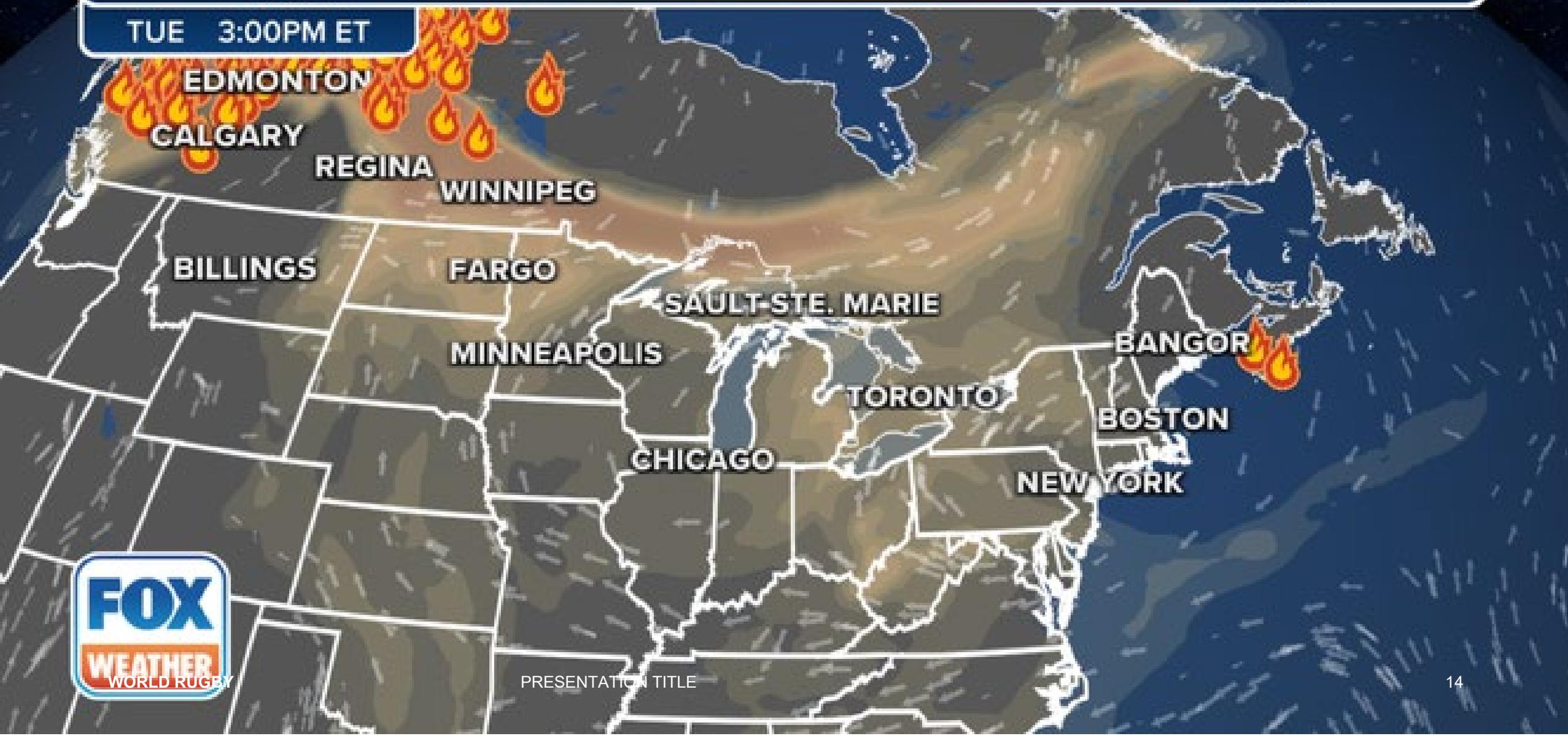


# SMOKE TRACKER

LIGHT

THICK

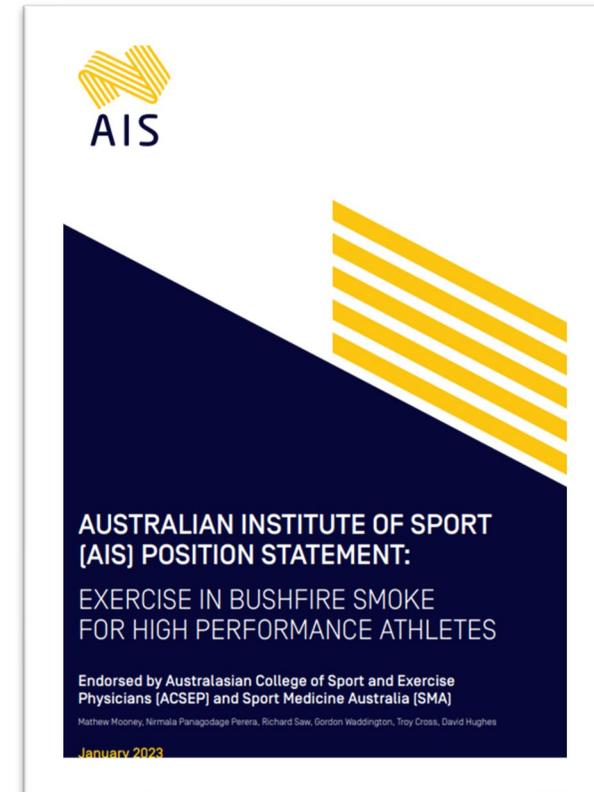
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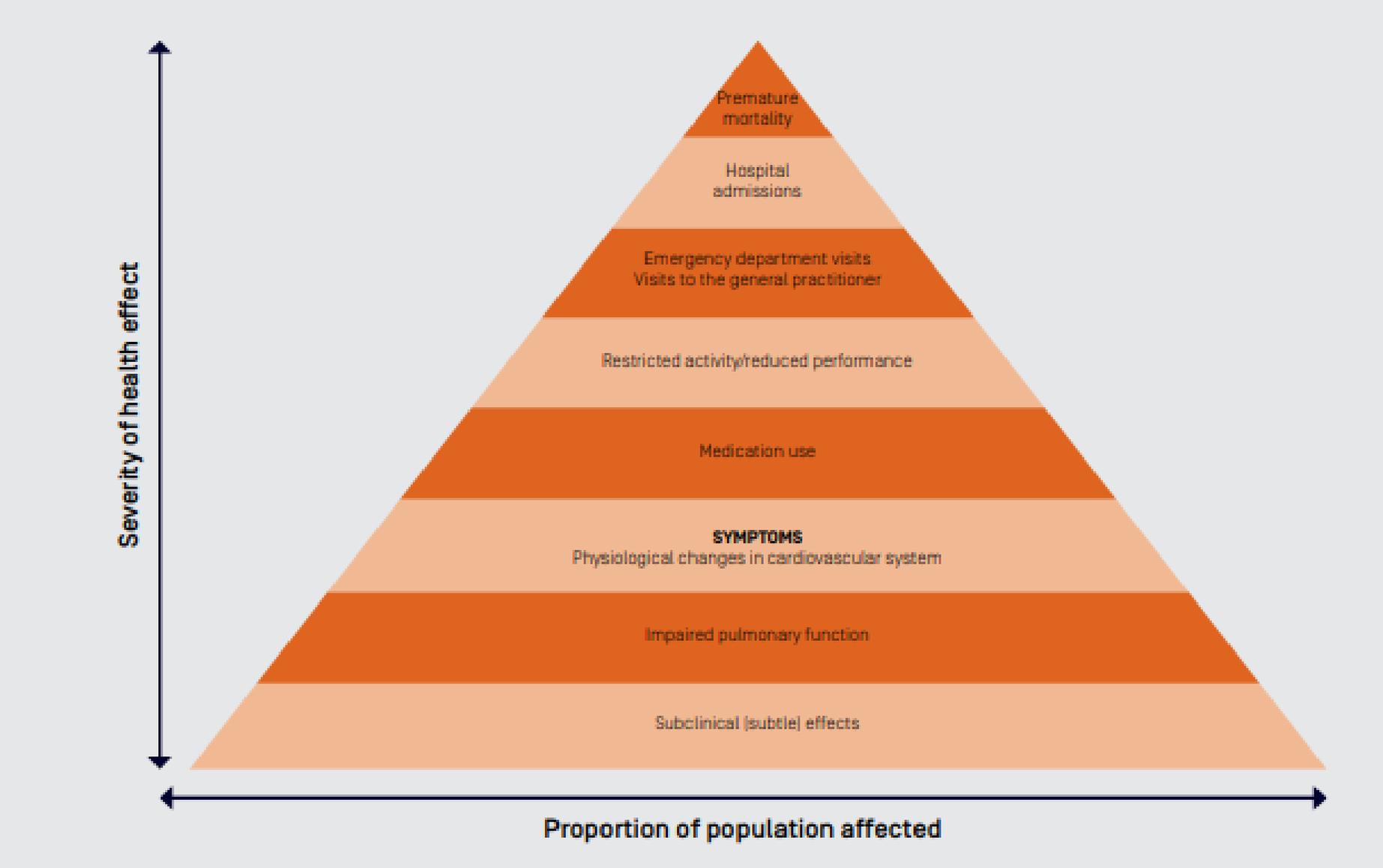


PRESENTATION TITLE

# AIR QUALITY GUIDELINES

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# AIR QUALITY INDEX

Air Quality Index (AQI) Values	Levels of Health Concern
0 to 50	Good
51-100	Moderate
101-150	Unhealthy for Sensitive Groups
151-200	Unhealthy
201-300	Very Unhealthy
301 to 500	Hazardous

# HEALTH IMPACT OF SMOKE INHALATION

**Carbon Monoxide – 200% more potent binding to Hb than O<sub>2</sub>**

**Carboxyhaemoglobin**

**Inhibited ATP production**

**Aggravated respiratory conditions**

**Potential Systemic Effects**

**Increased oxidative stress**

**Pro-coagulative state**

**Elevated pro inflammatory cytokines**

**Modulation of the autonomic nervous system**

# SPORT PARTICIPATION & SMOKE INHALATION

**Athletic population similar or higher rates of Asthma**

- **Bronchial Hyperreactivity**
- **Endurance Sports**

**Performance effects**

- **Tidal volume increases with increasing exercise intensity.**
- **Switch from nasal to oral breathing - more particulate matter may be deposited in the lower airways.**
- **Increasing minute ventilation increases the particle deposition fraction in the lungs.**

# SPORT PARTICIPATION & SMOKE INHALATION

- High intensity physical exertion can increase the dose of bushfire smoke that athletes are exposed to by 4 to 5 orders of magnitude compared to the same duration of rest.
- Asthmatic and airway sensitive individuals will likely experience symptoms with a pollution dose increase of only 1 order of magnitude of increased dose exposure.
- Modify activity according to Particulate Matter exposure

# PRE-TOURNAMENT PLAN

- **Organisers:**
  - Early planning for indoor training facilities
  - Contingency planning
- **Medical staff:**
  - Identify players with history of respiratory illness
  - Update each individual's asthma action plan (in consultation with their respiratory consultant)
- **All Players:**
  - Beware recent respiratory infection



IQAir

# AirVisual App



# Cork air quality index (AQI)

22:00, Apr 8

	<b>3</b> US AQI	<b>Good</b> PM2.5   0.8 µg/m <sup>3</sup>
 6°	 81%	 37 km/h

Monday

**3**

 3°  
7°

Tuesday

**6**

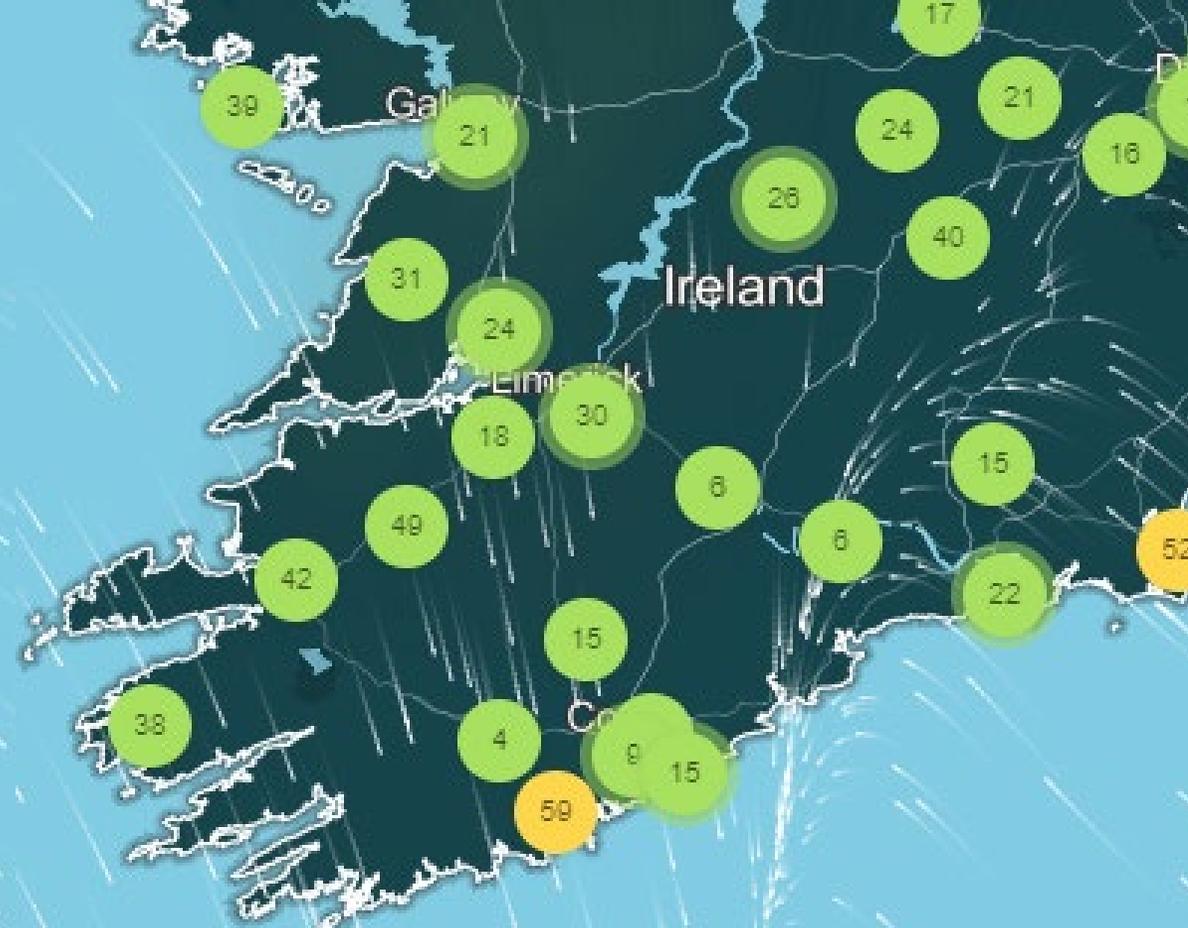
 5°  
11°

Wednesday

**22**

 6°  
13°

7-DAYS FORECAST



US AQI

178

LIVE AQI INDEX

Unhealthy



### OVERVIEW

What is the current air quality in Lahore?

Air pollution level	Air quality index	Main pollutant
Unhealthy	178 US AQI	PM2.5

Pollutants

Concentration

PM2.5



107.5  $\mu\text{g}/\text{m}^3$



PM2.5

x21.5

**PM2.5 concentration** in Lahore is currently 21.5 times the WHO annual air quality guideline value



[Canada.ca](#) > [Environment and natural resources](#) > [Weather, climate and hazards](#) > [Air quality](#)

# Air Quality Health Index

Local conditions, forecasts, wildfire smoke, health risks, pollutants, weather, educational tool kits and publications.

## Services and information

### [Local Air Quality Health Index conditions](#)

Current conditions, forecasts, air monitoring station locations.

### [Your health risks](#)

Air pollution, respiratory illnesses, cardiovascular conditions, elderly, children.

### [Categories and health messages](#)

Measurement scale, health risk categories, health messages, at risk individuals, general

### [Frequently asked questions](#)

Air pollution, Air Quality Health Index, community value, station observation.

## Most requested

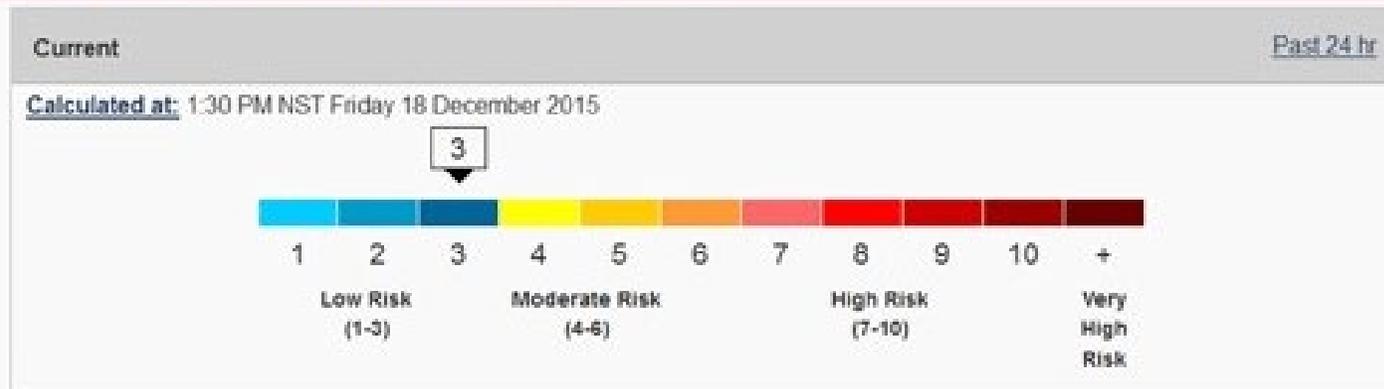
- [Local AQHI conditions](#)
- [Wildfire smoke, air quality and your health](#)

## Contributors

25

- Environment and Climate

# St. John's - Air Quality Health Index



**Step 1:** Check the forecast and current AQHI conditions

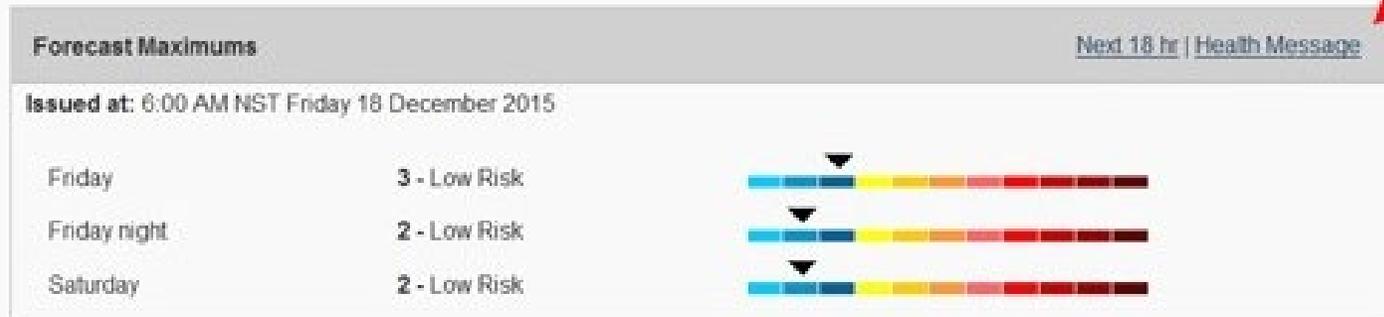
### At-Risk Population:

- Enjoy your usual outdoor activities.
- [Find out if you are at risk](#)

### General Population:

- Ideal air quality for outdoor activities.

**Step 3:** Review health messages



**Step 2:** Are you at risk?

### Who is at risk?

People with heart and lung conditions are most affected by air pollution.

To find out if you are at risk, consult [the health guide](#), or your physician.

Visit the [national AQHS Web site](#) to learn more about the AQHI.

### Did you know...?

You should avoid spilling gas when filling cars and tanks.

**Step 4:** Take Action!

# PM<sub>2.5</sub> <25 mcg/m<sup>3</sup>

Exercise risk category	Rationale	Exercise-specific Recommendations	PM <sub>2.5</sub> mcg/m <sup>3</sup>
Normal exercise conditions	<ul style="list-style-type: none"><li>Highest "safe" level over a 24-hour period as per the NEPH</li></ul>	<ul style="list-style-type: none"><li>All forms of exercise are encouraged.</li><li>Consider the previous 5 days air quality exposure for susceptible individuals</li><li>At risk individuals may still get increased symptoms and need to seek medical advice</li></ul>	<25

# PM<sub>2.5</sub> 25-50 mcg/m<sup>3</sup>

## Moderate Caution for those who are sensitive to air pollution

- Epidemiological studies indicate increased risk of emergency presentations for asthma and breathing difficulty independent of exercise this increased risk may last 3 to 5 days
- Short-term one-off exposure studies of non-susceptible people at concentrations including this level with moderate intensity exercise have not demonstrated clinically relevant changes
- Individuals who are sensitive to air pollution may need to alter their training to reduce their potential exposure. Prolonged high intensity endurance exercise (e.g. rowing, cycling, long distance running) may need to be completed indoors. If exposure is unavoidable (ie scheduled match) defer the next exposure 3-5 days to allow recovery
- Most individuals will tolerate exercise as normal, without symptoms.

25-50

# PM<sub>2.5</sub> 51-150 mcg/m<sup>3</sup>

## Poor conditions for exercise

- For asthmatics and individuals sensitive to air pollution, expert opinion is it highly likely that any exercise in these conditions will contribute to worsening symptoms, increase use of reliever medications and need for medical review
- Short-term on- off exposure studies of non-susceptible people at concentrations including this level with moderate intensity exercise have not demonstrated clinically relevant changes
- It is unclear what effects repeated exposures prior to recovery have at these concentrations and how long it takes to recover. Estimated recovery time may be 3-5 days following high exposure
- It is recommended that individuals who are sensitive to air pollution limit their exposure as much as practical
- It is highly recommended to complete prolonged high intensity endurance activities [e.g., rowing, cycling, long-distance running] in a facility with better air quality
- Intermittent exercise [e.g., tennis, netball, beach volleyball, cricket] and power activities [e.g., sprint training, javelin training, jump training, rugby skills training] represent less risk than prolonged high intensity endurance activities. However, risk remains elevated above baseline and susceptible athletes should have a current asthma management plan and relevant medications accessible during the session
- Non susceptible individuals may unexpectedly develop symptoms at these concentrations and should seek medical review early

51-150

# PM<sub>2.5</sub> > 150 mcg/m<sup>3</sup>

Likely to be hazardous to exercise outdoors

- No population data describes prolonged exposure at these consequences
- Expert opinion indicates the likely harm associated with exercising at or above this concentration will outweigh the potential benefits associated with exercise.
- Expert opinion is that individuals who are not known to be sensitive (and therefore not prepared) to air pollution may become symptomatic.

- All efforts should be made to reduce smoke exposure as much as is practical.
- Reschedule events, relocate them indoors, shorten overall time outdoors etc.
- Where there is an intention to play organised high level sport and there are medical staff on site to advise, these levels of pollution should trigger a discussion between medical staff and officials about the advisability or otherwise of proceeding with the event.

>150

**THANK YOU**

