Heat Stress

PRE EMPLOYMENT TRAINING FOR:

blue collar silviculture

BCC Blue Collar Camps

FIRST NATIONS YOUTH TRAINING

BLUE COLLAR GROUP

www.bluecollargroup.ca

TRAINING OVERVIEW

- What is heat stress
- Primary contributing factors
- Sources of heat
- Removal of heat from the body
- Personal risk factors
- Recognizing heat stress
- Heat stress treatment
- Preventing heat stress

WHAT IS HEAT STRESS?

Human bodies naturally maintain temperatures between 36^{o} C and 38^{o} C. When body temperature rises above this range, the body will react to get rid of excess heat. However, if the body continues to gain heat faster than it can get rid of it, body temperature increases and the person experiences heat stress.

Primary factors contributing to heat stress

Environment

- Air temperature
- Airflow
- Humidity
- Radiant heat (e.g., sun, kiln)

Worker

- Acclimatization
- Hydration
- Clothing
- Medical conditions

Work

- Workload
- Work rate

SOURCES OF HEAT

The body can gain heat in two ways:

- Generate heat itself through work activity.
- Absorb heat from the environment.

Both work activity and the environment are important sources of heat, and sometimes work activity itself can be the main source of heat stress.

HEAT FROM ACTIVITY

Light

- Sitting with moderate movement of arms and legs
- Standing, doing light work, with mostly arm movement
- Casual walking

Moderate

- Brisk walking
- Sitting with vigorous arm and leg movement
- Standing, doing light to moderate work, including some walking
- Moderate lifting or pushing

High

- Construction tasks
- Intermittent heavy lifting, pushing or pulling
- Climbing hills/stairs with heavy gear

Heat Index

Temperature (°F)

Relative humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	126	130					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

With Prolonged Exposure and/or Physical Activity

Extreme Danger

Heat stroke or sunstroke highly likely

Danger

Sunstroke, muscle cramps, and/or heat exhaustion likely

Extreme Caution

Sunstroke, muscle cramps, and/or heat exhaustion possible

Caution

Fatigue possible

HEAT FROM THE ENVIRONMENT

The amount of heat gained from the environment (external heat) depends on the surrounding air temperatures, the amount of air movement, and any radiant heat. Some examples of radiant heat sources are:

- Heaters
- Boilers
- Fires
- Sunlight
- Reflected from the ground

REMOVAL OF HEAT FROM THE BODY

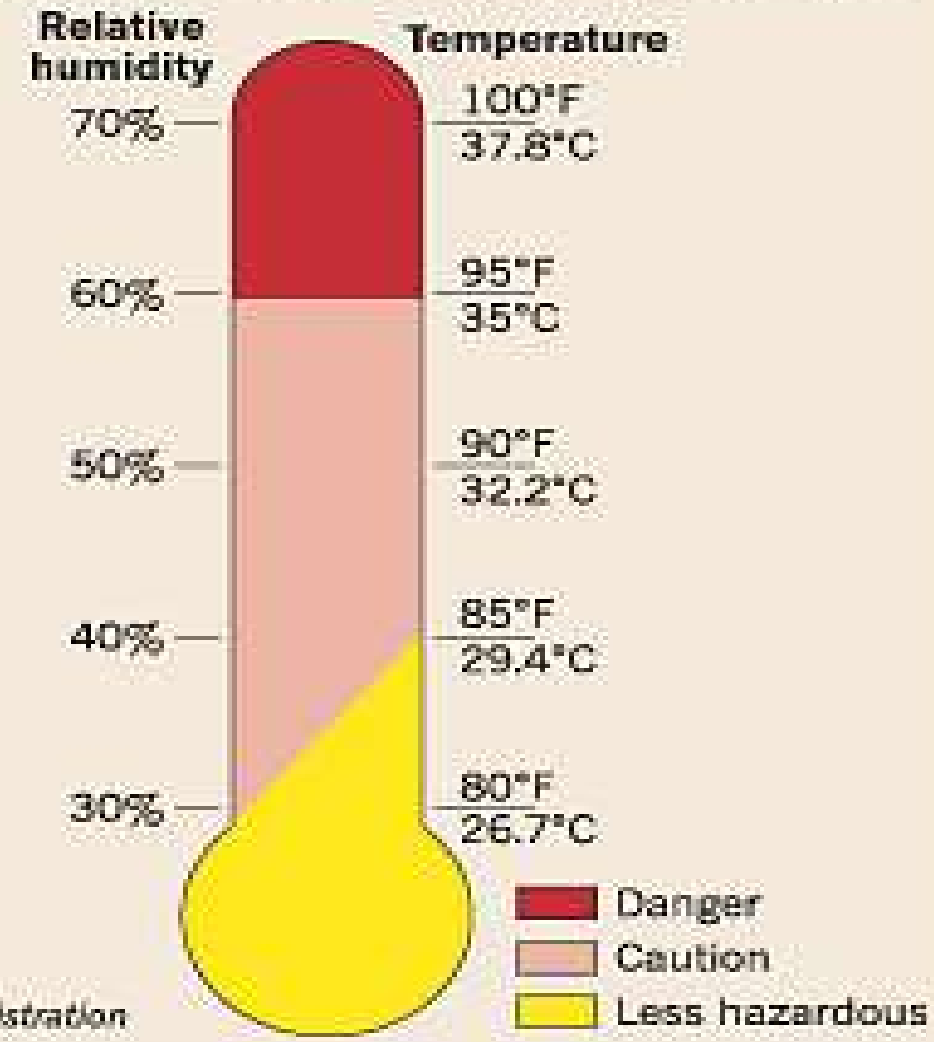
The body has two main ways of getting rid of excess heat:

- Sweating
- Increasing blood flow

The Heat Equation

High Temperature + High Humidity + Physical Work = Heat Illness

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are heat exhaustion and heat stroke. If left untreated, **heat exhaustion** could progress to **heat stroke** and possible **death.**



Source: U.S. Department of Labor, Occupational Safety and Health Administration

PERSONAL RISK FACTORS

Lack of acclimatization

- Conditioning of the body to a hot working environment is known as acclimatization. A person who regularly works in a hot environment will be at a lower risk of developing heat disorders than a person who does not.

PERSONAL RISK FACTORS

Poor physical fitness

- Physically fit people are generally better able to cope with heat stress and are less likely to develop disorders. Regular aerobic activity such as walking, running, cycling or swimming can increase a person's level of physical fitness.

PERSONAL RISK FACTORS

- Obesity
- Increased age
- Pre-existing medical conditions and treatments
- Short-term disorders and minor illnesses
- Chronic skin disorders
- Use of medication
- Alcohol and drugs
- Previous heat stroke

RECOGNIZING HEAT STRESS

Heat cramps – signs and symptoms

- Muscular pains or spasms
- Excessive sweating

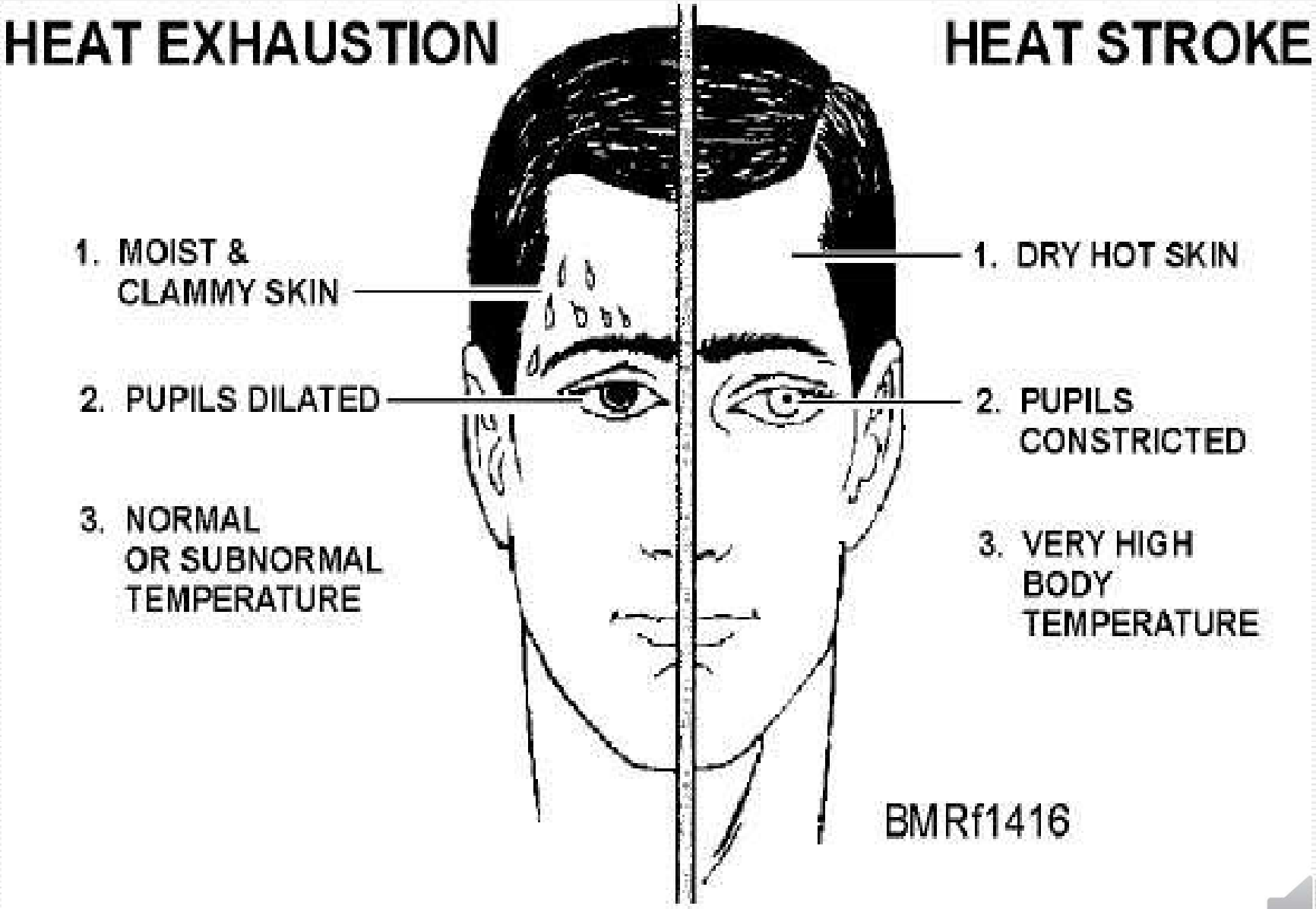
Heat exhaustion – signs and symptoms

- Shallow respiration
- Increased respiratory rate
- Weak, rapid pulse
- Cool, pale, clammy skin
- Sweating
- Weakness, fatigue, dizziness
- Headache and nausea
- Fainting
- Muscle cramps

RECOGNIZING HEAT STRESS

Heat stroke - signs and symptoms

- Hot, dry, flushed skin
- Absence of sweating
- Agitation, confusion
- Decreased level of consciousness
- Headache
- Nausea and vomiting
- Seizures
- Increased respiratory rate
- Irregular pulse rate
- Shock
- Cardiac arrest


HEAT EXHAUSTION
HEAT STROKE
1. MOIST & CLAMMY SKIN
2. PUPILS DILATED
3. NORMAL OR SUBNORMAL TEMPERATURE
1. DRY HOT SKIN
2. PUPILS CONSTRICTED
3. VERY HIGH BODY TEMPERATURE
BMRf1416

HEAT STRESS TREATMENT

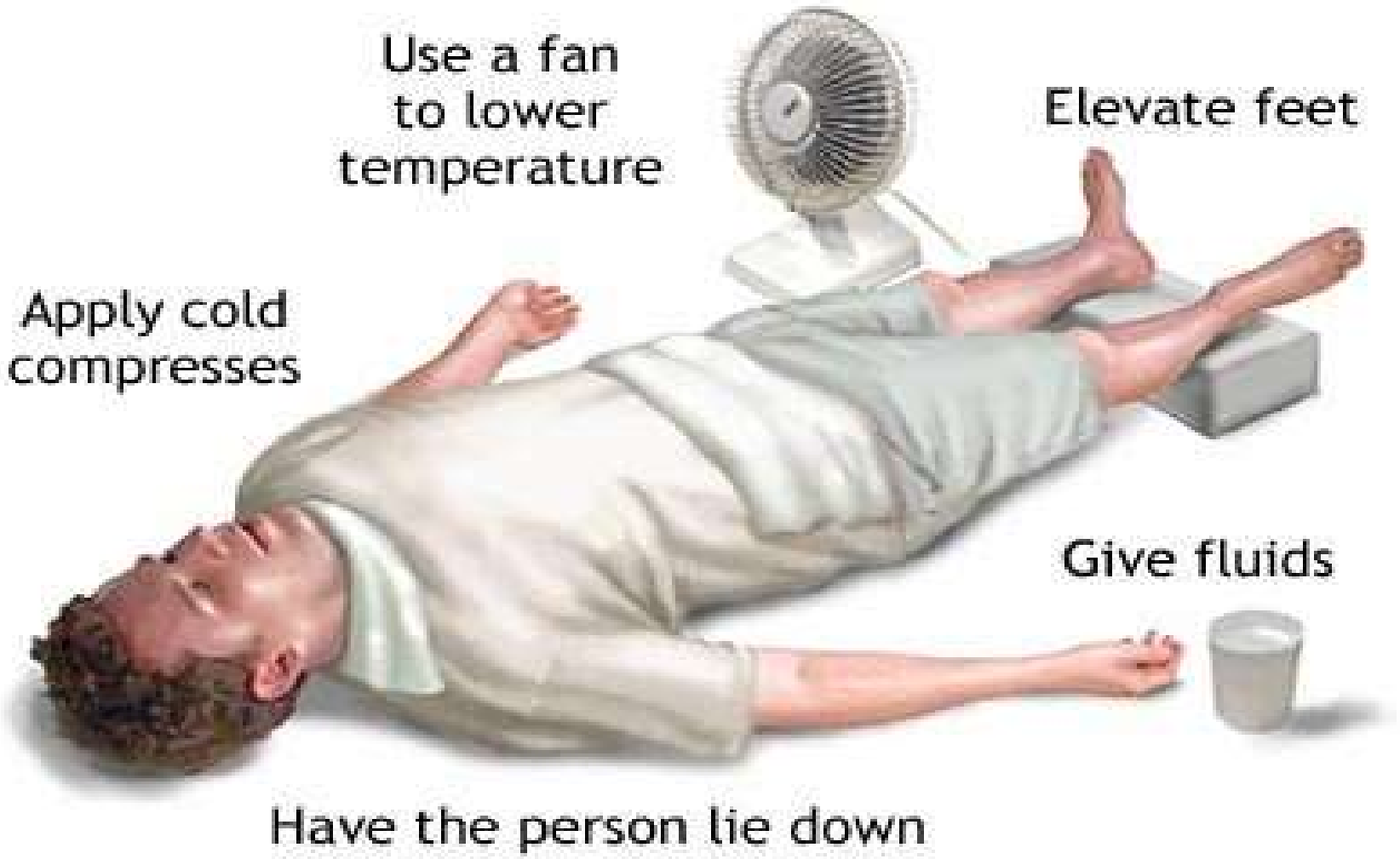
Heat Cramps and Heat Exhaustion:

- Move the worker to a cooler environment. If possible lay the worker down and remove or loosen any tight fitting clothing.
- Cool the worker down by sponging with cool water and fanning. Take care not to cool the worker to much; if they start shivering, stop cooling.
- If the worker is fully alert and not nauseated, provide oral fluid (juice or other non-caffeinated, non-alcoholic beverages).

HEAT STRESS TREATMENT

Heat Stroke:

- Heat stroke is a life-threatening medical emergency and the patient is in the "rapid transport category."
- Maintain airway, breathing, and circulation as required
- Move the worker to the coolest possible place
- Lay worker down on their back unless actively vomiting or having a seizure, then place them down on their side
- Remove all outer clothing and apply cool water by either dousing or applying wet cool sheets
- If the worker is fully alert and not nauseated, provide oral fluid (juice or other non-caffeinated, non-alcoholic beverages)


Use a fan to lower temperature
Elevate feet
Apply cold compresses
Give fluids
Have the person lie down
A.D.A.M.

HEAT RASH

Prevention

- Avoid repeated exposure to heat
- Change clothing often when sweating
- Wear clean, light coloured, loose fitting clothing made of a breathable fabric

Treatment

- Leave the hot environment, preferably until the rash has healed
- Keep the areas clean, cool and dry as much as possible

PREVENTING HEAT STRESS

- Learn to recognise the key signs and symptoms of heat stress in yourself and co-workers
- Acclimatize your body
- Drink plenty of water (avoid caffeine and alcohol)
- Take rest breaks in a cool ventilated area and allow body to cool down before beginning again
- Schedule work to minimise heat exposure and try to do the hardest physical work in the cooler part of the day

PREVENTING HEAT STRESS

- Allow for slower paced work during the hottest periods of the day
- Move or relocate the work away from direct sunlight or radiant heat sources whenever possible
- For outside work, schedule routine maintenance and repair work during cooler periods of the year
- For inside work, schedule routine maintenance and repair work for a time when hot operations are shut down

FOR MORE INFORMATION

- The information and guidelines provided were obtained from WSBC. For more information please visit WorkSafeBC.com