HEAT STRESS

BLUE COLLAR SILVICULTURE LTD.

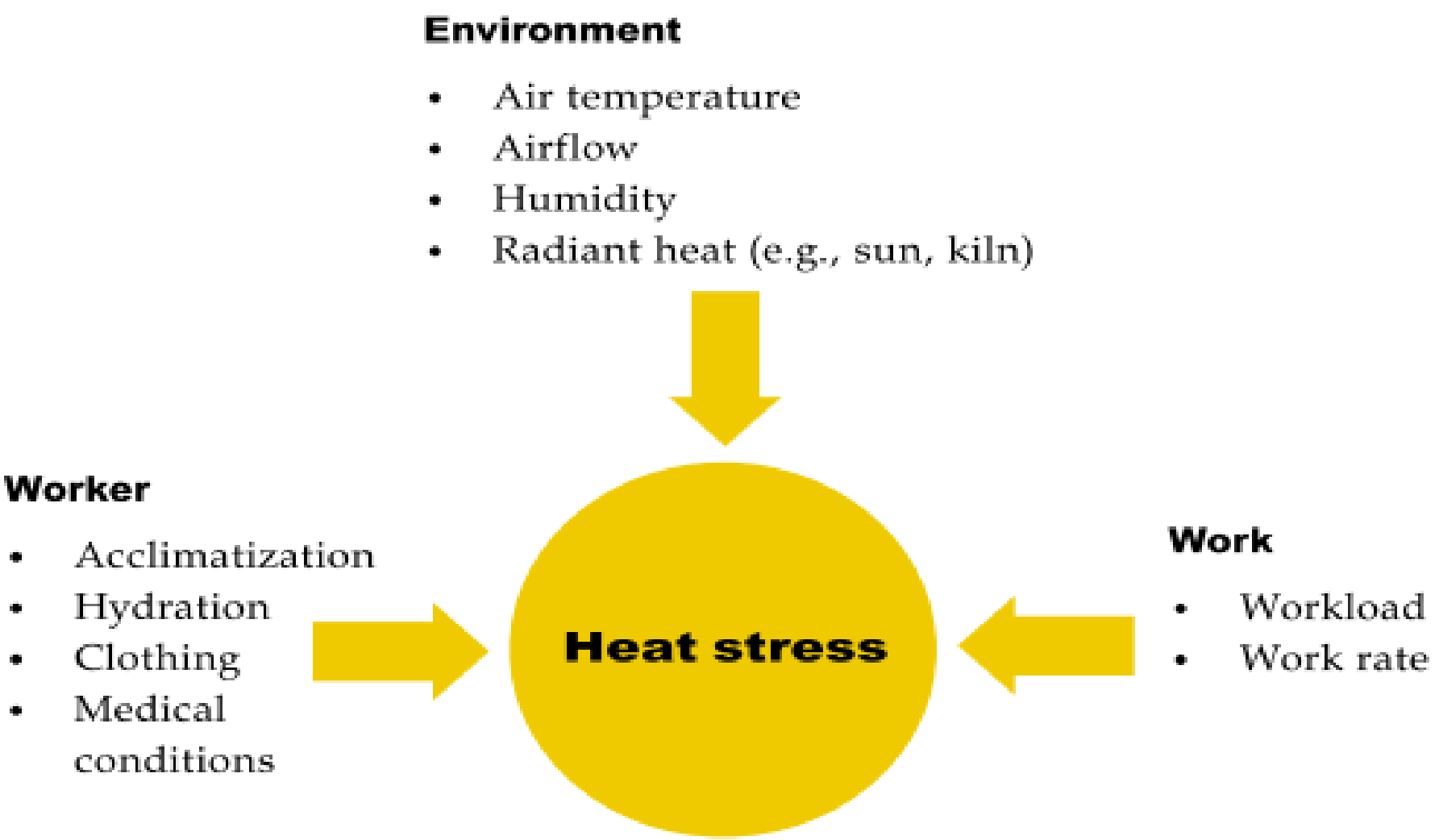
TRAINING OVERVIEW

- 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 and 38 degrees. 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



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

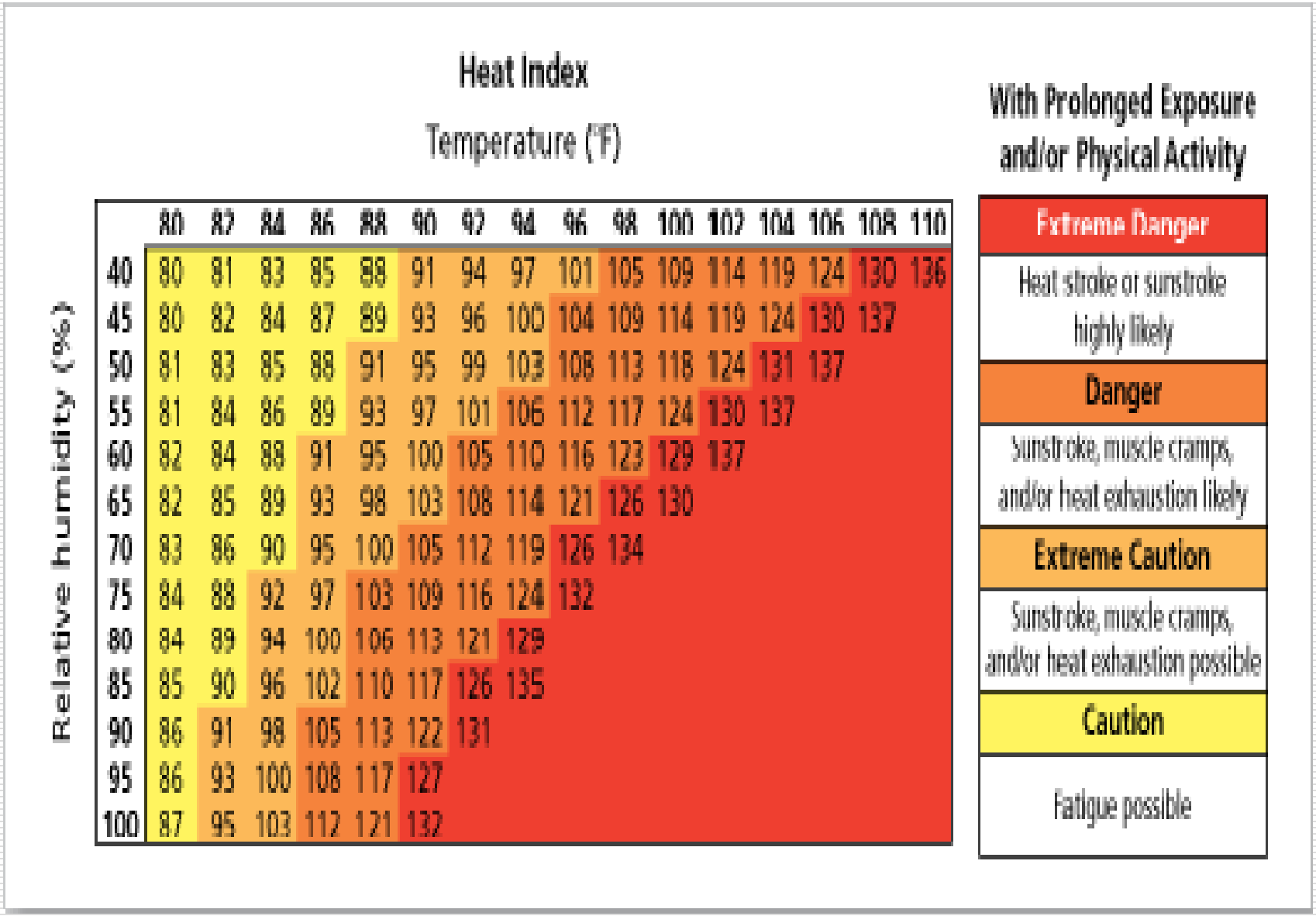
- Sitting with moderate movement of arms and legs
- Standing, doing light work, with mostly arm movement
- Casual walking

Moderate

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

Heavy

- 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

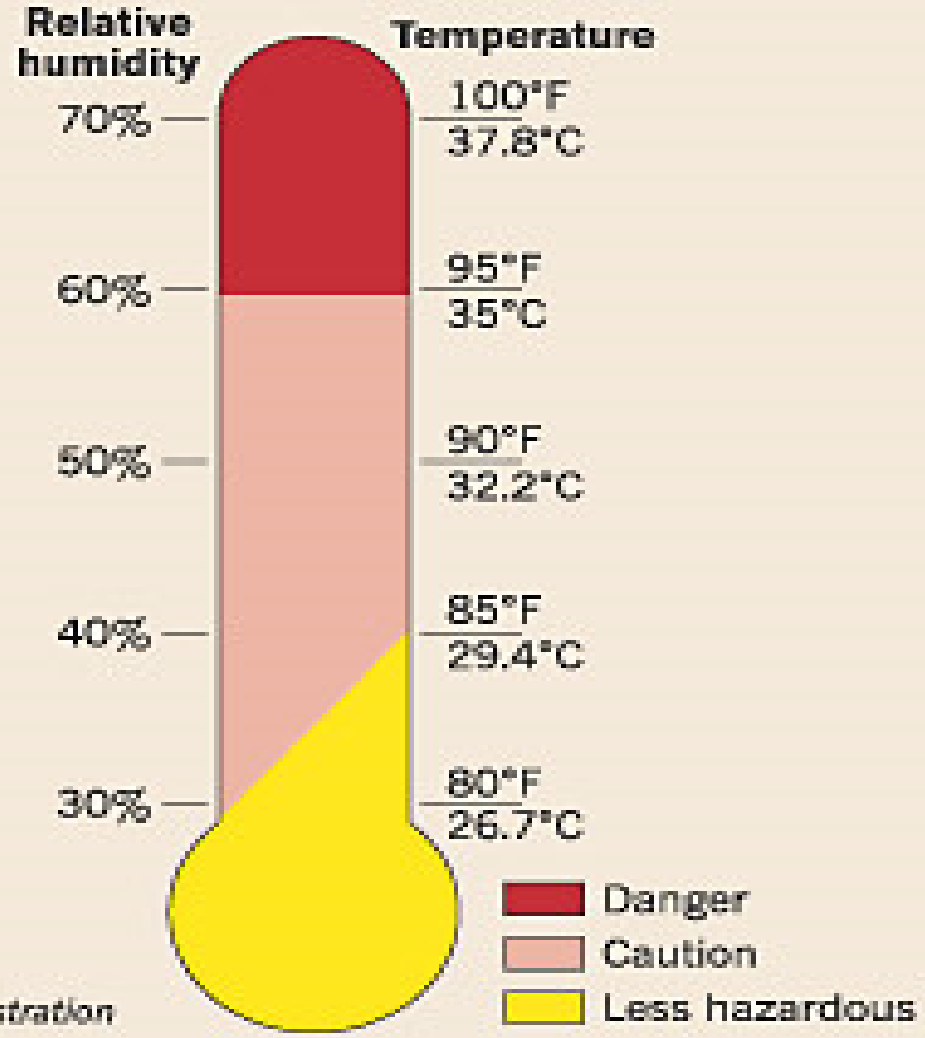
The body has two main ways of getting rid of excess heat:

- Sweating
- Increasing blood flow (e.g. cooler air)

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 persons level of physical activity.

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

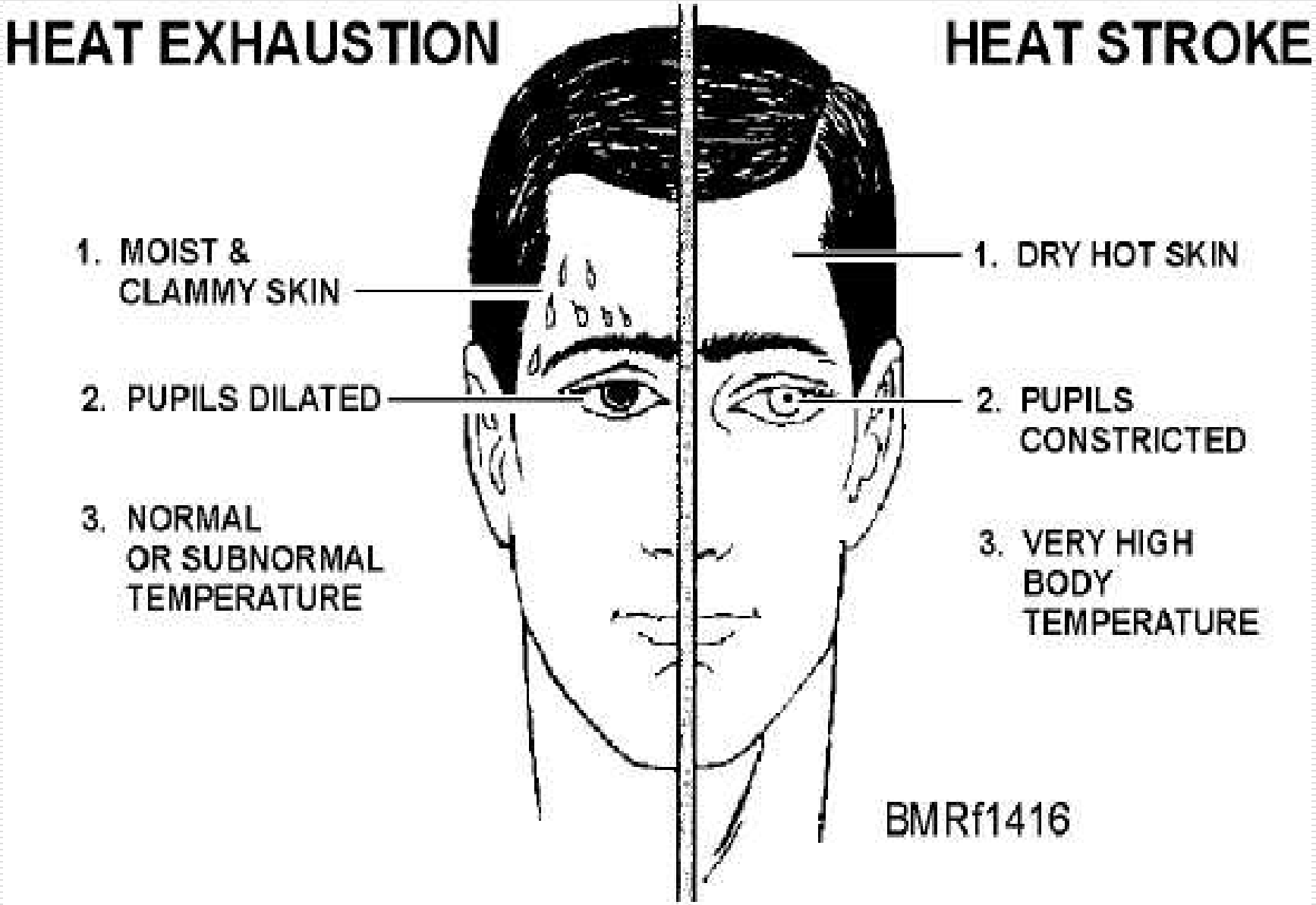
Heat exhaustion – signs and symptoms

- 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
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HEAT STRESS TREATMENT

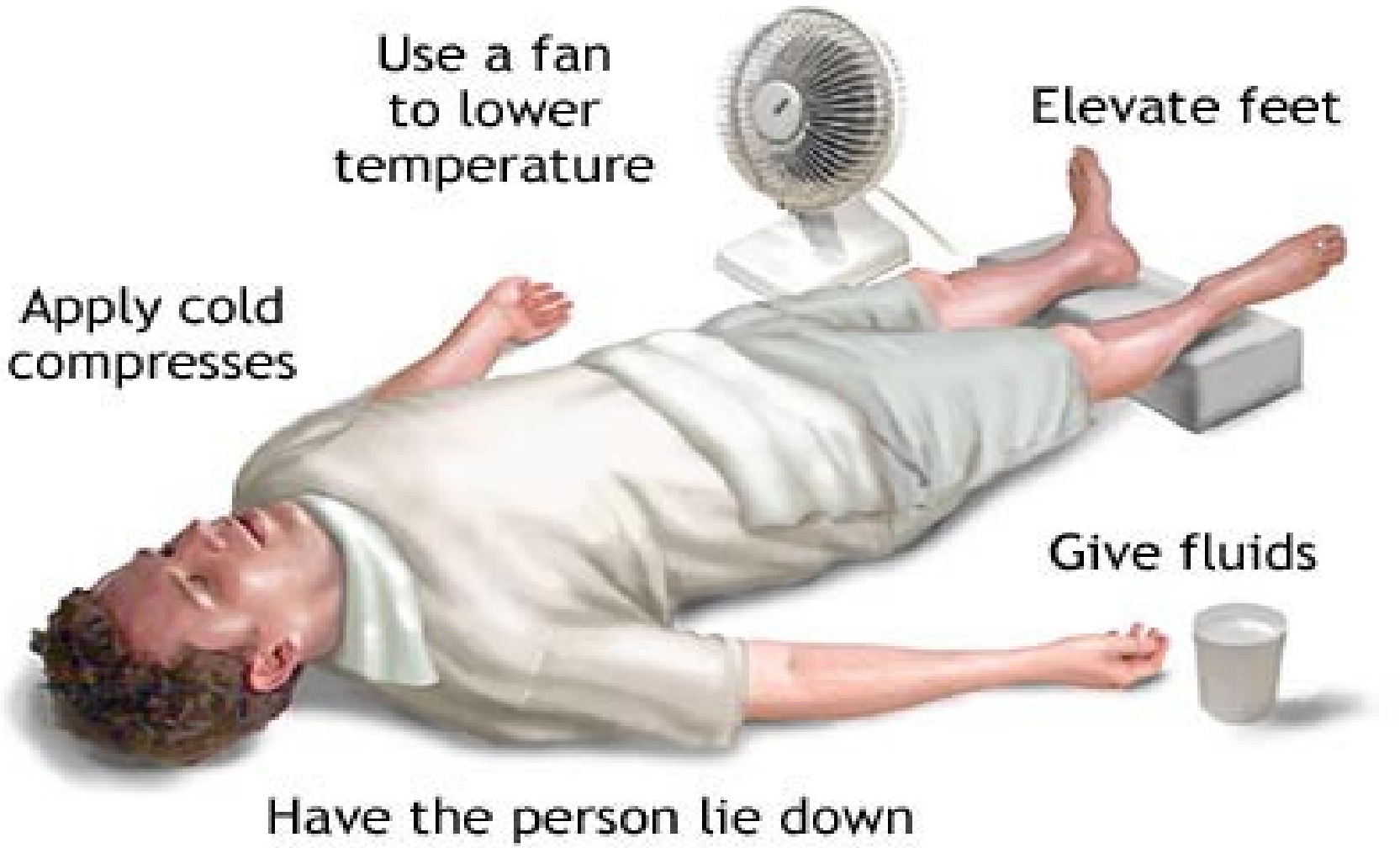
Heat Cramps and Heat Exhaustion:

- 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 worker starts to shiver, stop cooling).
- If the worker is fully alert and not nauseated provide fluids.

HEAT STRESS TREATMENT

Heat Stroke:

- 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 brakes 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