Commander's, Senior NCO's and Instructor's Guide to Risk Management of Heat Casualties

Risk Management is the process of identifying and controlling hazards to protect the force.

Possible Outcomes of inadequate climatic heat management:

Casualty	Risk Severity
Heat Cramps	Marginal
Heat Exhaustion	Critical
Heat Stroke	Critical-Catastrophic
Water Intoxication (Over Hydration)	Critical-Catastrophic

The Five Steps of Risk Management are:

1 Identify Hazards

High heat category, especially on several sequential days
(Measure WBGT when ambient temperature is over 75º F)

Exertional level of training, especially on several sequential days

Acclimatization (and other individual risk factors – see table below)

Temperature at night / rest overnight

Individual Risks for Heat Casualties (The more factors, the higher the risk)

- **Not acclimatized** to heat (need 10-14 days to get trainees adequately acclimated)
- Exposure to cumulative days (2-3 days) of any of the following
  - Increased heat exposure
  - Increased exertional levels.
  - Lack of quality sleep
- Poor fitness (Unable to run 2 miles in < 16 minutes)
- Overweight
- Minor illness (cold symptoms, sore throat, low grade fever, nausea, vomiting)
- Taking medications (either prescribed or over the counter)/ supplements/ dietary aids Ex: Allergy or cold remedies. Ephedra supplement
- Use of Alcohol in the last 24 hours
- Prior history of heat illness (any heat stroke, or >2 episodes of heat exhaustion)
- Skin disorders such as heat rash and sun burn which prevent effective sweating
- Age > 40 years

2 Assess Hazards

- When ambient temperature is over 75º F, constantly assess the **heat category** using Wet Bulb Globe Temperature (WBGT)
- Know your soldiers! Identify early who will be at increased risk based on **individual risk factors**.
- Check **hydration status** at the end of each training day. Give extra fluid at night and in the morning if hydration is inadequate.
  - Review Riley (water) card or Ogden cords
  - Ask about urine color. Urine is clear if well hydrated
- Daily **assess the overall risk** for developing a heat casualty (may use a risk matrix).

Example of a Heat Injury Risk Management Matrix

Scores assigned to different conditions based on risk for developing a heat injury.
This scoring system: 0= Low risk; 1=Medium risk, 2=High risk; 3=Extreme risk

RISK FACTORS	Level of Risk (For each Factor Circle the Appropriate Condition)			
	0	**1**	**2**	**3**
Risk Management Worksheet	All control measures implemented			Not all control measures implemented
Heat (WBGT at site)	Category 1 or less	Category 2 and 3	Category 4	Category 5
No. Sequential Days Heat Cat 5	0	1	2-3	≥4
Any Heat Injuries in the Past Two Days	None	Heat Cramps	Heat Exhaustion	Heat Stroke
Work in Past Two Days (see below)	Easy	Easy or Moderate	Moderate or Hard	Hard
Projected Work for the Present Day	Easy	Easy or Moderate	Moderate or Hard	Hard
Heat Acclimatization Days	>13	7-13	3-6	<3
Leader/Cadre Presence	Full time	Substantial	Minimal	None
Level of Training of Cadre	18 Months	7-18 Months	1-6 Month	< 1 Month
Communication System	Radio and Phone	Phone Only	Radio Only	None
Rest in Previous 24 Hours	> 7 Hours	5-7 Hours	2-4 Hours	< 2 Hours

A cumulative score of 25-33 means extreme risk, 16-24 means high risk, 7-15 means medium risk, and 0-7 means low risk.

Easy Work	Moderate Work	Hard Work
• Weapon Maintenance • Walking Hard Surface at 2.5 mph, < 30 lb Load • Marksmanship Training • Drill and Ceremony	• Walking Loose Sand at 2.5 mph, no Load • Walking Hard Surface at 3.5 mph, < 40lb Load • Calisthenics • Patrolling • Individual Movement Techniques. i.e. low crawl, high crawl	• Walking Hard Surface at 3.5 mph, ≥ 40 lb Load • Walking Loose Sand at 2.5 mph with Load • Field Assaults

3 Develop Controls

Education

- Establish SOPs. Ensure all personnel are trained and follow SOPs for Heat Casualty Prevention.
- Ensure all bulletin boards have Heat Casualty Prevention posters and all leaders have Heat Casualty Prevention aids.

Planning

- Adjust the training schedule to minimize consecutive days of heavy physical training, especially if other heat stressors exist (eg. heat exposure and lack of quality sleep)
- Plan communications, medical and evacuation support.
- Plan and provide adequate hydration for *all* personnel (including Cadre and Drill Instructors).
- When planning training events, keep in mind:
  1. Time of day the training is conducted – morning is cooler
  2. Location of training
     - Sun vs. shade
     - Open vs. protection from wind - wind has cooling effect
  3. Clothing
     - Heavy, restrictive vs. loose, lightweight
  4. Where in training cycle
     - Most Heat Casualty occur in the 2nd or 3rd week of Recruit training.
     - Acclimatization can take 7-14 days, depending on the physical condition of the trainee.

Identification

- Identify previous heat exhaustion or heat stroke soldiers and mark visibly on uniform (tape or cord).
- Identify overweight soldiers and soldiers who are unfit.
- Identify soldiers on medications and mark visibly on uniform (tape or cord).
- Seriously consider taking soldiers out of training who have had alcohol within the last 24h. Seriously consider having ill soldiers seen on sick call.
- Note and document heat category hourly. Position WBGT at site of training.

Develop a Hydration Monitoring System

- Examples of monitoring methods:

  - Riley (water) card

WATER CONSUMPTION TABLE

Heat Category	Easy Work	Moderate Work	Hard Work
	Amount to Drink Qt/Hr (one canteen = 1QT)		
1	½	¾	¾
2	½	¾	1
3	¾	¾	1
4	¾	¾	1
5	1	1	1

Do not drink more than 1½ qts per hour or 12 qts per day.
Eat meals! Important for sodium and other electrolytes.

Name:

Time	Mon	Tue	Wed	Thur	Fri	Sat	Sun
0500-0600							
0600-0700							
0700-0800							
0900-1000							
1000-1100							
1100-1200							
1200-1300							
1300-1400							
1400-1500							
1500-1600							
1600-1700							
1700-1800							
1800-1900							
1900-2000							
2000-2100							
2100-2200							

On the back of card: (Battle buddy is to write the amount of water the soldier has drunk).

  - Ogden Cord is 550 cord, parachute cord or shoestring that is tied to a uniform buttonhole or ear protection case. Soldiers tie a knot in the cord each time they finish a canteen (1 quart) of water.



3 DEVELOP CONTROLS CONTINUED

Know Standardized Guidelines for Warm Weather Training Conditions

Fluid Replacement and Work/Rest Guide

Acclimatized (after approx two weeks training) Wearing BDU, Hot Weather

		EASY WORK		MODERATE WORK		HARD WORK	
Heat Category	**WBGT Index, (F°)**	**Work/ Rest**	**Water Intake (Qt/h)**	**Work/ Rest**	**Water Intake (Qt/h)**	**Work/ Rest**	**Water Intake (Qt/h)**
1	78-81.9	NL	½	NL	¾	40/20 min	¾
2 (Green)	82-84.9	NL	½	50/10 min	¾	30/30 min	1
3 (Yellow)	85-87.9	NL	¾	40/20 min	¾	30/30 min	1
4 (Red)	88-89.9	NL	¾	30/30 min	¾	20/40 min	1
5 (Black)	> 90	50/10 min	1	20/40 min	1	10/50 min	1

- The work-rest times and fluid replacement volumes will sustain performance and hydration for at least 4 h of work in the specified heat category. Fluid needs can vary based on individual differences (± ¼ qt/h) and exposure to full sun or full shade (±¼ qt/h).
- NL= no limit to work time per hour.
- Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.
- **CAUTION:** Hourly fluid intake should not exceed 1½ quarts.
- Daily fluid intake **should not exceed 12 quarts.**
- If wearing body armor add **5°F** to WBGT in humid climates
- If wearing NBC clothing (MOPP 4) add **10°F** to WBGT.

Easy Work = Walking hard surface 2.5 mph <30# load, Weapon maintenance, Marksmanship training
Moderate Work = Patrolling, Walking sand 2.5 mph no load, Calisthenics
Hard Work = Walking sand 2.5 mph w/load, Field assaults

Continuous Work Duration and Fluid Replacement Guide

Acclimatized (after approx two weeks training) Wearing BDU, Hot Weather

It is assumed the trainees performing these continuous effort tasks have not had heat stress or dehydration prior to this activity and will have extended rest afterwards!

		EASY WORK		MODERATE WORK		HARD WORK	
Heat Category	**WBGT Index, (F°)**	**Work (min)**	**Water Intake (Qt/h)**	**Work (min)**	**Water Intake (Qt/h)**	**Work (min)**	**Water Intake (Qt/h)**
1	78-81.9	NL	½	NL	¾	70	1
2 (Green)	82-84.9	NL	½	150	1	65	1 ¼
3 (Yellow)	85-87.9	NL	¾	100	1	55	1 ¼
4 (Red)	88-89.9	NL	¾	80	1 ¼	50	1 ¼
5 (Black)	> 90	180	1	70	1 ½	45	1 ½

- NL can sustain work for at least 4 hours in the specified heat category.
- Fluid needs can vary based on individual differences (± ¼ qt/hr) and exposure to full sun or full shade (± ¼ qt/hr).

4 Implement Controls

Decision to accept risk is made at the appropriate level

- Local SOP may dictate at what level the risk must be evaluated by a higher commander.

Identified controls are in place

- Update WBGT hourly.
- Adhere to work/rest cycle in high heat categories. Rest in shade.
- For tasks requiring continuous effort, adhere to guideline and allow extended rest afterwards.
- Training event incorporates good prior planning.

Monitor and enforce hydration standard

- Encourage frequent drinking, but not to exceed **1** ½ quarts per hour or **12** quarts per day. Make water more palatable, if possible, by cooling.
- Do not allow soldiers or trainees to empty canteens to lighten load (consider imposing a penalty in timed events).
- Ensure soldiers are well hydrated before training. Ask about urine; urine is clear if well hydrated.
- Check Riley (water) card or Ogden Cord frequently.

Monitor and enforce eating of meals

- Ensure all meals are eaten during the meal break
- Ensure adequate time to eat and drink meals
- Table salt may be added to food when the heat category is high. Salt tablets are *not* recommended

Execute random checks

- Spot checks by Cadre, Senior NCO's, and Drill Instructors
- Enforce battle buddy checks – need to be aware of each other's eating, drinking and frequency of urination
- Plan placement of leaders to observe and react to heat injuries in dispersed training

Follow clothing recommendations:

- Heat category 1-2: no restrictions
- Heat category 3: Unblouse trouser legs, unbuckle web belt
- Heat category 4-5:
  - Unblouse trouser legs, unbuckle web belt
  - Remove t-shirt from under BDU top or remove BDU top down to T-shirt (depends whether biting insects are present)
  - Helmets worn when needed for safety reasons
- MOPP 4: 10°F to WBGT.

5 Supervise & Evaluate

- Enforce SOPs
- Delegate responsibilities to ensure control measures have been implemented
- Monitor adequacy/progress of implementation of control measures
- Conduct spot checks of cadre. Do cadre have current WBGT? Are cadre implementing work/rest/drink cycles? Make on-the-spot corrections. Lead by example.
- Conduct spot checks of recruits. Ask recruits questions while observing their mental status and physical capabilities. Look out for common signs and symptoms which can rapidly progress to serious signs and symptoms.
- If 1-2 recruits become heat casualties, stop all training and evaluate each soldier for early signs and symptoms of becoming an impending heat casualty.
- When controls fail, heat injuries occur. The ability to recognize heat injury is paramount. Take immediate action if any heat injuries are observed or suspected. Stop-rest-cool then evaluate in accordance with warning signs and symptoms. If in doubt, evacuate.

Warning Signs and Symptoms of Heat Casualty and Water Intoxication

Indications of possible Heat Casualty

More Common Signs / Symptoms	Immediate Actions
• Dizziness • Headache • Nausea • Unsteady walk • Weakness • Muscle cramps	• Remove from training • Allow casualty to rest in shade • Take sips of water • While doing the above, call for Medic evaluation of the soldier (Medic will monitor temperature and check for mental confusion) **If no medic is available call for ambulance or Medevac**
Serious Signs / Symptoms	**Immediately call Medevac or ambulance for emergency transport while doing the following:**
• Hot body, high temperature • Confusion (Mental Status Assessment) • Vomiting • Involuntary bowel movement • Convulsions • Weak or rapid pulse • Unresponsiveness, coma	• Lay person down in shade with feet elevated until Medevac or ambulance arrives • Undress as much as possible • Pour cool water over person and fan • Give *sips* of water while awaiting ambulance (if conscious) • Monitor airway and breathing until ambulance or Medevac arrive

5 SUPERVISE & EVALUATE CONTINUED

Indications of possible Water Intoxication (Over Hydration)

Signs and Symptoms	What to do:
Confusion Weakness Vomiting	**Ask these questions to the soldier or battle buddy:** 1. Has soldier been eating? Check rucksack for # of MRE's left. 2. Has soldier been drinking a lot? (suspect water intoxication if soldier has been drinking constantly). 3. How often has soldier urinated? (frequent urination seen with water intoxication; infrequent urination with heat illness) 4. What color is urine (clear urine may indicate over hydration) If soldier has been eating, drinking and urinating a lot, yet has these symptoms, **immediately call Medevac or ambulance for emergency transport**

Mental Status Assessment

An important sign that the soldier is in a serious life-threatening condition is the presence of mental confusion (with or without increased temperature). Anyone can do a mental status assessment asking some simple questions.

Call for emergency Medevac or ambulance if *any* of the following exist:

What is your name?
(Does not know their name.)

What month is it? What year is it?
(Does not know the month or year.)

Where are we/you?
(Does not know the place where they are at.)

What were you doing before you became ill?
(Does not know the events that led to the present situation.)

