The Warfighters' Guide to Performance Nutrition

Healthy and Intentional Fueling Supports the Mission

Objectives

- USMC Fueled to Fight® program
- Macronutrient Education
- Nutrient Timing Considerations
- Performance Hydration
- Operation Supplement Safety (OPSS)

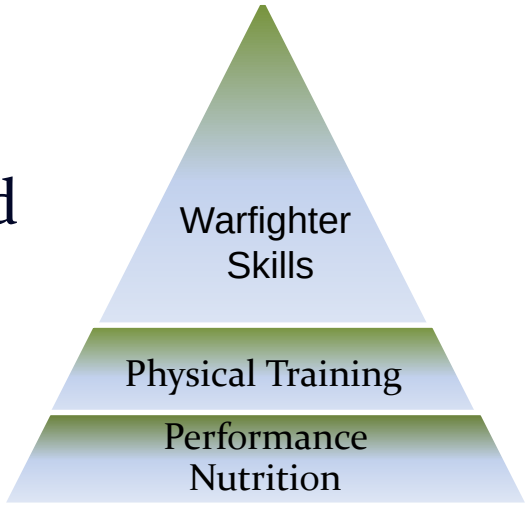
USMC Fueled to Fight® Program

Fueled to Fight® Purpose

- To define a single system for product identification which enhances the Marine's ability to make ***healthy choices***
- Establish a policy for color coding menu items within USMC mess halls for ease of use
- System intent:
  - Provide identifiable choices
  - ***NOT*** to prevent options

Fueled to Fight® Concept

- The Corps
  - Teaches Marines to locate, close with and destroy the enemy by fire and maneuver and to repel enemy's assault by fire and close combat.



- USMC Fueled to Fight®
  - Empowers and educates Marines on how to make informed fueling decisions in order to maintain a high level of performance to support the mission.
  - All foods can fit into a performance nutrition meal plan at USMC warrior athlete training tables.
  - Performance Nutrition Messaging is Key!!

System Logistics

- USMC Registered Performance Dietitians
  - Established color-coding policy (stoplight system)
  - Analyzed menu items and categorized foods
  - Considered system flexibility for both males and females
  - Ensure all Master Menus meet the Military Dietary Reference Intake (MDRI) values
- Mess Hall Management and Operations
  - Label menu items on serving line
  - Hang informational posters

Stoplight System

- Linked with Master Menus that are intentionally designed for Marines to include nutrient density and quality.

- Color code designation requires an examination of each food as a whole, including additives, degree of processing, and nutrient values.

  - GREEN – Engage At Will: These foods are great choices for overall health, physical and mental performance.
  - YELLOW – Well Aimed Shots: These foods should be consumed occasionally because they are higher in total fat and saturated fat.
  - RED – Check Fire: Limit the intake of these foods because they are the highest in unhealthy fat and may decrease performance.

Program Criteria

	Green	Yellow	Red
	Engage at Will	Well Aimed Shots	Check Fire
Overall Nutrition Quality	Least-processed Wholesome, nutrient dense High fiber Low in added sugar Healthy fats	Moderate-processed Lower in fiber Added sugars or artificial sweeteners Lower quality fats	Most-processed Lowest-quality nutrients Added sugar Excess fats and/or trans fats Fried foods
Nutrient Specifics: FATS	≤30% of calories from total fats and ≤10% of calories from saturated fat Foods with ≥30% calories from fats are considered healthier if mainly from unsaturated fats, including omega-3 fatty acids	31–49% of calories from total fats and 11–15% of calories from saturated fat Some fats can be consumed daily with close attention to portion size	≥50% of calories from total fats and ≥16% of calories from saturated fat Trans fats are not authorized in dining facilities and must be avoided Saturated fats
Nutrient Specifics: CARBOHYDRATES	Higher in fiber containing >3 grams of fiber Most foods that have <10 grams of added sugar	Most products made with white or refined flour or other refined grains Non-naturally occurring fibers: inulin, chicory root, polydextrose, maltodextrin	Low in fiber containing <2 grams Most foods that contain >18 grams of added sugar
Nutrient Specifics: PROTEIN	Plant-based protein is almost always considered healthier Leaner cuts of animal-based protein is considered healthier based on the amount and type of fat it contains	Highly processed plant proteins such as soy protein isolate Lean cuts based on percentage of fat	Highly processed meats and meat products Fried animal proteins or cuts with visible fat
Other Specifics: ADDITIVES	No artificial sweeteners Naturally occurring foods generally do not have additives	Artificial sweeteners, including acesulfame potassium, aspartame (Equal®), saccharin (Sweet'N Low®), sucralose (Splenda®)	Trans fats Artificial colors are usually a marker of a highly processed food

Macronutrient Education

80/20 Rule

- Each meal and snack is an opportunity to fuel your body optimally.
- Choose the foods that are best for you 80% of the time.
- Incorporate some of those foods that may not be the best, but are your favorites, 20% of the time.
- All foods can fit into a nutritional fitness plan.

Total Calories

- Marines need to consume adequate Calories to support high-intensity or long-duration training.
- This is often overlooked as there seems to be a priority placed on protein consumption rather than overall Calories.
- Inadequate Calories can result in loss of muscle mass, loss of bone density and an increased risk of fatigue, illness, injuries and poor recovery.

Macronutrients and Food Sources

The 3 macronutrients:

Carbohydrate = Fuel

Protein = Build

Fat = Energy Density

	Carbohydrate	Protein	Fat
Fruit	x		
Bread/Cereal	x	x	
Milk	x	x	x
Meats/Fish		x	x
Poultry		x	x
Fats/Oils			x

Carbohydrates

- Main Sources: breads, cereals, grains, beans, fruit, vegetables
- Supply blood glucose, liver and muscle glycogen, decreases protein catabolism
- Think brown and found close to the ground – Best choices have >3g of fiber
- 3-4.5 grams per pound body weight for intake

Protein

- Main Sources: lean meats, low fat dairy, eggs, beans/legumes
- Slows glycogen depletion, builds muscle, maintains immune system
- Protein needs increase with activity
- Never will more than 1g per pound for health or muscle gains be necessary

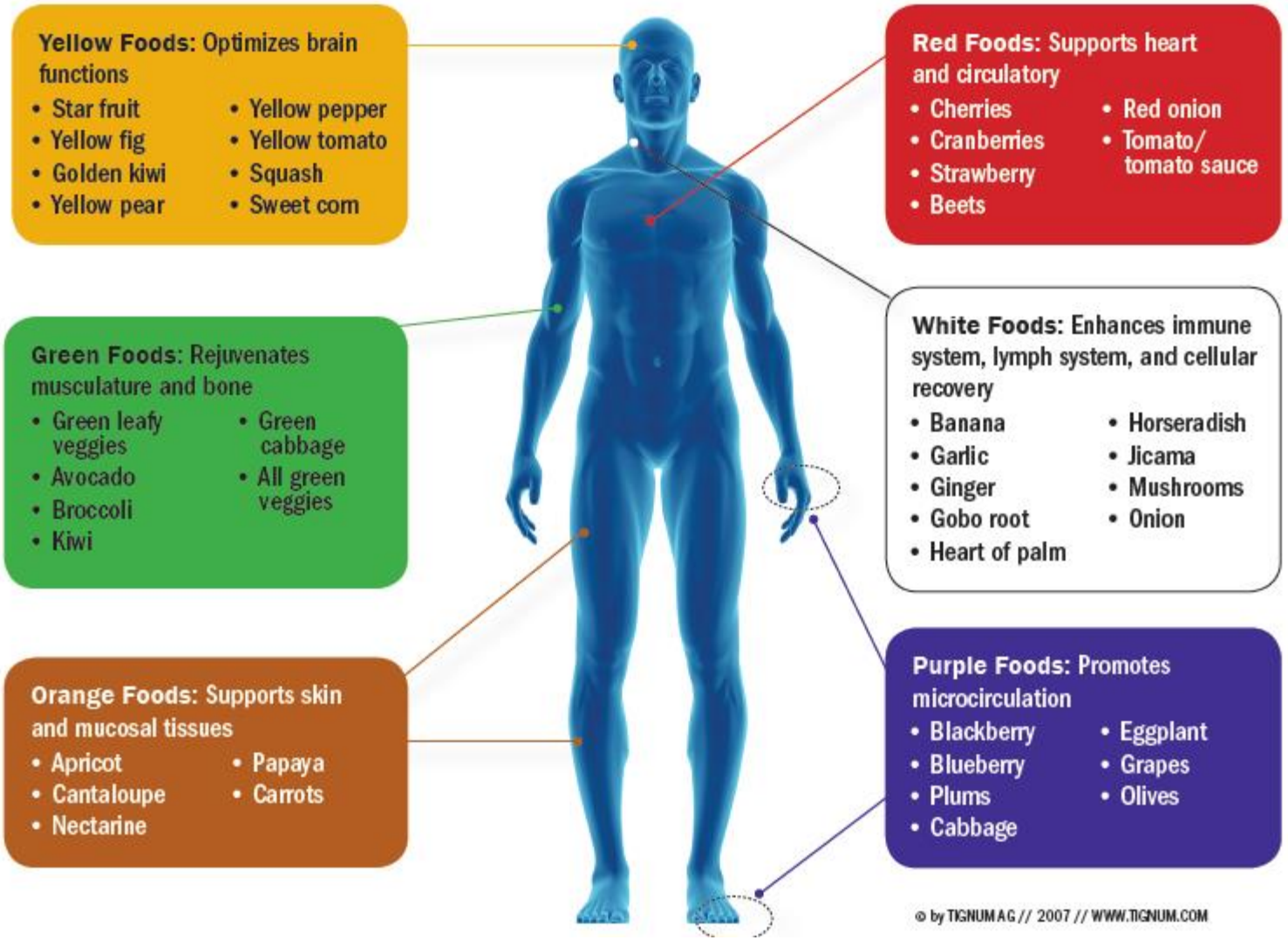
Fats or Lipids

- Main Sources: olive oil, canola oil, flax, nuts/seeds, avocado, tuna, salmon
- Healthy fats provide energy, help regulate blood sugar, improve cholesterol, and keep you feeling full.
- Omega-3 fatty acids improve cognition, decrease inflammation, and enhance heart health. Natural sources have an increased bioavailability.
- Try to get one serving of healthy fat per meal

Vitamins and Minerals

- Best Food Sources: fruits ,vegetables, whole grains, beans, dairy, fish, eggs, nuts and seeds
- The darker in color the more vitamins and minerals a food contains
- No one food provides all the nutrients one needs
- Variety is Key!
  - Provides Antioxidants and Phytochemicals
  - Required for oxygen transfer and delivery
  - Required for tissue repair
  - Supports growth and development
  - Needed for many metabolic processes

Restorative Nutrition



Meal Guidance

For maximum physical and mental performance, at every meal, eat carbohydrates, protein and drink milk.

Carbohydrates = Fruits & vegetables, low fat milk/yogurt/soy milk, whole grain bread, pasta, cereal, oatmeal, beans, peas, corn, potatoes.

*Choose 100% WHOLE WHEAT OR WHOLE GRAIN products.

Protein = Low fat milk, yogurt, cottage cheese, & cheese, lean meats, eggs, fish & poultry, beans, nuts, and seeds, whole grains, soy products.

Nutrient Timing Considerations

Nutrition Science Support

- Meals/snacks are designed for versatility and practical application for a large population
  - Resupply nutrients for the next training event
  - Provide carbohydrates to maintain blood glucose and glycogen levels
  - Maximize nutrient absorption without physiological overload
  - Stress of entry-level training environment reduces nutrient absorption
  - Match body's ability to absorb nutrients with body's demand for fuel
  - Provided as needed based on timing and intensity requirements
- Optimize the absorption in the gut microbiome with the consideration of the impact of stress in Warfighter training
- Leverage the timing strategy for caloric distribution
- Practical application that supports a demanding training environment en masse

Goal: Enhance performance and resilience of the Warfighter

Phases of Timing

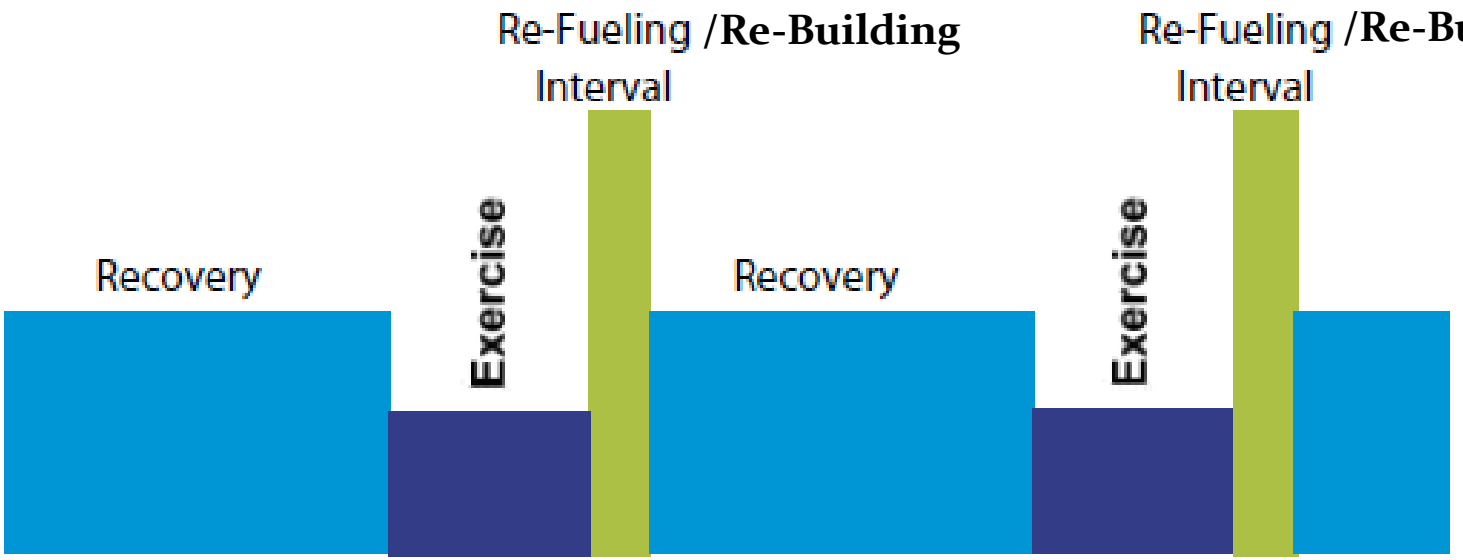
- The timing of "when" nutrients are consumed is just as critical as "what" nutrients are consumed.

- The timing of nutrients should be viewed as three very distinct phases:
  - Recovery or maintenance.
  - Exercise when energy stores are being depleted.
  - The refueling interval (RFI), or critical period after exercise.

Phases of Timing

- During exercise the environment is “catabolic” so that energy can be delivered to the working muscles.
- After exercise the environments must become “anabolic,” so the process of recovery, restoring and building up what was lost begins.
- Thus, immediately after exercise, when glycogen stores are low and muscle protein synthesis are suppressed, is the critical time to provide what the body or muscle needs: CHO with a small amount of protein.

Timing of Nutrient Intake



Phases of Timing Nutrient Intake

Carbohydrate = Re-Fuel **Protein = Re-Build**

Post Exercise Nutrition Supplement

- PENS was implemented via 2011 TECOM message.
- This provision is recommended for individuals engaged in rigorous physical training and targeted for training cycle events where a recovery fuel was validated.
- Timing of this nutrient bar is paramount within 30-45 mins after exercise which is the most critical time for recovery.
  - Based on strong evidence from numerous studies
  - Comprised of a ~4:1 ratio of CHO:PRO

AN ATHLETE'S GUIDE TO EVERYDAY NUTRIENT TIMING

Pre-Workout Fueling

WHY

To fuel up for the body's next challenge.

WHAT

High-carbohydrate snack of 200-300 calories

WHEN

30–60 minutes prior

During Exercise

WHY

To replace sweat loss and provide carbs to maintain blood sugar levels

WHAT

Sports drinks that contain sodium, potassium, glucose, and fructose

WHEN

During exercise up to one hour: 3–8 oz of water every 15–20 min

During exercise longer than one hour: 3–8 oz of sports drinks every 15–20 min

Post-Workout Refueling

WHY

To replenish glycogen, restore electrolytes, replace fluid losses, and repair damaged tissues

WHAT

25–50 grams of carbs

20–25 grams of protein

Plenty of fluids

WHEN

Within 45 minutes after a workout

Daily Fueling

WHY

To support normal activities, repair damaged tissues, and promote muscle growth

WHAT

Meals and snacks that emphasize a balanced diet of carbs, lean protein, healthy fats, and fluids – especially water

WHEN

Throughout the remainder of the day

CHAMP
USU Consortium for Health and Military Performance
A Defense Center of Excellence

HPRC

CREATED BY THE HUMAN PERFORMANCE RESOURCE CENTER / HPRC-ONLINE.ORG

FITNESS • ENVIRONMENT • NUTRITION • DIETARY SUPPLEMENTS • FAMILY & RELATIONSHIPS • MIND TACTICS

AN ATHLETE'S GUIDE TO EVERYDAY NUTRIENT TIMING

Pre-Workout Fueling

Choose foods low in fat and fiber to prevent digestive upset.

WHAT

- Jam*/jelly* on bread*
- Fruit*, low-fat granola*, low-fat milk*
- First Strike Bar*/**
- Pudding cup* or low-fat Greek yogurt with fruit
- Small muffin (muffin top*), low-fat milk*

*IN MEAL READY TO EAT (MRE)

**IN FIRST STRIKE RATION (FSR)

Exercise Hydration

Weigh before and after working out; replace 16-24 oz fluid per pound lost throughout the day (not more than 12 quarts per day).

WHAT

- Water
- Sports drinks*/**

Where do you find these foods? Anywhere!

Home, chow halls, even fast-food restaurants!

Post-Workout Refueling

Choose easily digestible foods and beverages that provide electrolytes and fluids.

WHAT

- Low-fat yogurt with fruit and granola, juice
- Chocolate milk, fruit
- Pita with hummus, tomatoes, cucumbers, tea
- Tuna, crackers, fruit, water
- Pocket sandwich**, sports drink**
- Fruit and nut mix**, sports drink**
- Chicken fajita with tortilla, beans, salsa*, water
- Stir-fried tofu with veggies, rice, soymilk

Daily Fueling

Choose lean protein (such as meat, poultry, fish, beans, nuts, or eggs), whole grains, fruits and vegetables, and low-fat dairy products.

MEALS

- Egg-white omelet with spinach and mushrooms, whole-grain bread, jam, low-fat milk*
- Whole-wheat pita sandwich with turkey and veggies, pretzels, applesauce, low-fat milk*
- Cheese tortellini in tomato sauce*, tossed salad, grapes, water
- Lamb kebabs, pita, spinach, mango-yogurt beverage

SNACKS

- Yogurt or cottage cheese with fruit
- Granola bar and milk
- Trail mix

Enhancement Support

- Enhancement support is provided only to Marines who are authorized to subsist at government expense.

- Beverage Support

- Fruit Support

Troubleshooting Tips

TROUBLESHOOTING NUTRITION TIPS

Problem	What should you do?	Food Sources	Result
Low energy; sluggish; easily tired	Eat foods rich in CARBOHYDRATES	Whole wheat bread, cereal, pasta, rice, peas, corn, potatoes, fruits, veggies	Carbohydrates provide fuel for muscles and brain
Muscle strains, injuries; slow to recover	Eat good food sources of PROTEIN	Chicken, fish, beef, cheese, milk, nuts, seeds, peanut butter	Faster recovery from injury; repair muscles
Trouble sustaining energy output	Eat healthy FAT sources	Nuts, seeds, peanut butter, olive oil, olives, fish, canola oil, avocado	Greater energy output; build muscle more efficiently;
Constipation	Increase FIBER in diet	Whole grain bread & cereal; beans, peas, fruits and vegetables	Relief!
Difficult maintaining body temperature; low energy	Increase IRON rich food sources	Beef, chicken, turkey, fish, spinach, kale, beans, peas, fortified breads, cereal s and juice	Greater energy; better tolerance to cold
Broken bones; stress fractures; brittle teeth	Increase CALCIUM rich foods. Increase VITAMIN D food sources.	Milk, yogurt, cheese, salmon, broccoli, kale, calcium fortified foods. Vit D fortified milk, eggs, seafood, fortified cereals	Strengthen bones and teeth; Vitamin D helps body absorb calcium and thus helps prevent fractures and bone weakness.
* Increase muscle mass	Increase CALORIES and PROTEIN rich foods	Fish, chicken, lean beef, pork, milk, eggs, cheese yogurt, peanuts, nuts/seeds, beans, lentils	Protein intake must be combined with weight training to build muscle mass.

Please note that some of these symptoms may require medical consult in addition to nutrition troubleshooting

Performance Hydration

Thirst is not the first indicator the body needs water.

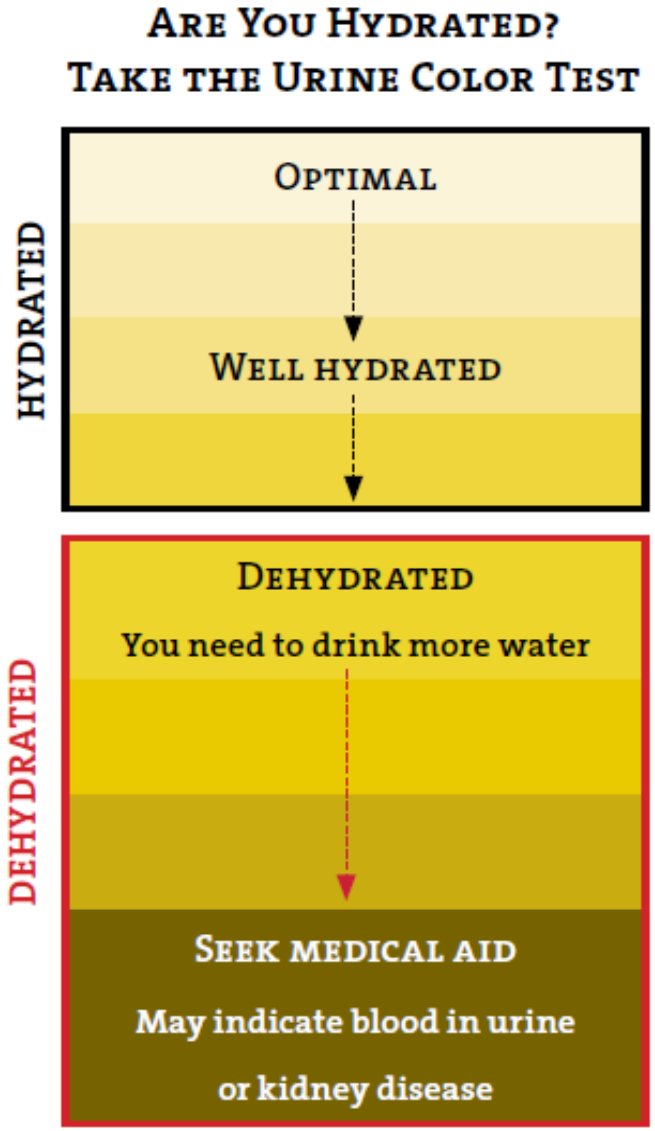
Functions of Water

- Necessary for maximum performance
- Plays a critical role in regulating body temperature
- Carries nutrients throughout the body
- Improves digestion
- Eliminates waste and toxins from the body
- Majority of muscle is comprised of water

Symptoms of Dehydration

- **Moderate**
  - Thirsty
  - Headache
  - Dry Mouth
  - Dry Skin
  - Fatigue
  - Dizzy
- **Severe**
  - Chills
  - Increased Heart Rate
  - Muscle Cramps
  - Nausea/vomiting
  - Swollen stomach
  - Confusion

Hydration Chart



This color chart is not for clinical use.

Some vitamins and supplements may cause a darkening of the urine unrelated to dehydration.

Dehydration Causes Early Fatigue and Decreases Performance

- **Loss of 2% body weight can**
  - Increase Perceived Effort
  - Reduce Performance by 10 – 20%
  - 2% loss = 3.0 lbs. for 150 lb person
- **Loss of 3 – 5% body weight impairs**
  - Reaction Time
  - Judgment
  - Concentration
  - Decision Making Ability
  - Body Temperature Regulation
  - Brain Function
  - 3-5% loss = 4.5 – 7.5 lbs for 150 lb person

Water Requirement

- The first step to being well hydrated is to drink fluids and eat foods high in water content throughout the day.

- Try to drink half your body weight in fluid ounces per day.

  For example, 150 lbs / 2 = 75 fluid oz.

Half Gallon = 64 ounces

1 Gallon = 128 ounces

Water and Exercise

- With Exercise add approximately:

- 16 ounces → 2 hours prior to exercise
- 4-8 ounces* → 10 minutes prior to exercise
- 4-8 ounces* → every 20 minutes during
- 16-24 ounces → after exercise

- * For most people, 1 large gulp = 1 ounce

Extreme Environments Considerations

- It is even more important to be aware of your fluid intake, fluid loss and electrolyte needs.
- Do NOT skip meals.
- Take time to drink.
- Maximize taste/palatability (temperature, sweetness) of your beverage.
- Minimize body water loss.
- Consider engineered food products when cramping risks are high, if you area salty sweater, or if you are sweating more than usual.
- Leverage whole foods that are higher in sodium. (V8 juice, pickles, pretzels, adding a little extra salt to you meals).

Troubleshooting

Environment	Consideration	Hydration Recommendations
Dry Extreme Heat	The extreme dry heat greatly increases the risk for dehydration and heat injury.	Suggested Fluid Intake: 5-12 liters/day Tips: Sweat rates can be reduced by working at night. During daylight hours, sweating rates can be reduced by covering the skin with light, vapor-permeable clothing. If and when possible, drink COLD water and sports drinks.
Hot and Humid	Relative humidity can increase water requirements independent of temperature. The humidity makes the evaporation of seat off the skin difficult, which decreases the body's ability to cool itself. This increase the risk for dehydration and heat exhaustion. Excessive sweating can also cause a large loss of electrolytes, specifically sodium and potassium.	Suggested Fluid Intake: Up to 2x needs of Extreme Dry Heat Tips: If and when possible, drink COLD water and sports drinks.
Altitude	Altitude presents a greater risk of dehydration. More fluid is lost through urine output and breathing. Layers of clothing may cause increased sweating with little evaporation. The elevation causes one to feel less thirsty.	Suggested Fluid Intake: 4-6 liters/day Tips: Drinking small quantities of fluid frequently results in less urine production than drinking large quantities of fluid less frequently.
Altitude and Cold	The addition of cold to altitude can cause greater risk for dehydration because of the sweat losses that occur in insulated clothing, low rates of fluid ingestion, and concern of having to remove clothing to urinate.	Suggested Fluid Intake: 5.5-7.5 liters/day Tips: Make sure to consider the ventilation of clothing to allow for sweating to dissipate heat. Drinking small quantities of fluid frequently results in less urine production than drinking large quantities of fluid less frequently. If and when possible consume hot fluids, tea, chicken/vegetable broth.

Endurance Events (> 60 minutes)

- Use sports drinks during exercise for hydration, glucose and electrolytes
- Can improve endurance performance
  - Carbohydrate (6-8%)
  - Potassium (K)
  - Sodium (Na)
  - Water
- Powerade, Gatorade (CHO)
- MILK (CHO & PRO)
- Sports drinks are NOT energy drinks
- Energy drinks are NOT good recovery drinks

Sports Drinks

- Do NOT dilute sport's drinks

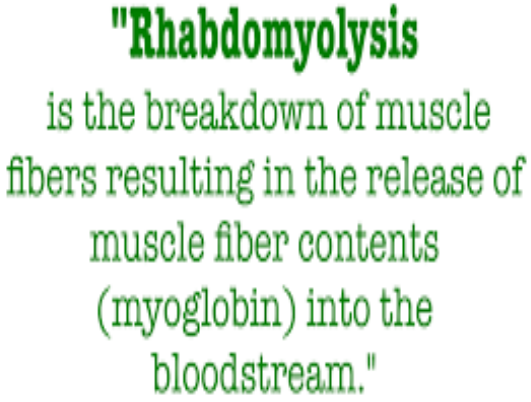
- What to look for:
  - 20 to 50 milligrams of **potassium** per 8 ounces
  - 12 to 24 grams of **carbohydrate** per 8 ounces
  - 110 to 170 milligrams of **sodium** per 8 ounces

Overhydration?

- No more than 12 quarts (1 canteen = 1 quart)/day
- Hyponatremia – low sodium level in the blood
- Adequate salt exists at USMC training table meals
- Master menus meet the MDRI sodium requirement

Rhabdomyo-what?

- Rhabdomyolysis: Rapid breakdown (lysis) of skeletal muscle (rhabdomyo) due to injury to muscle tissue.
- Destroys muscle tissue and can lead to kidney failure.
- What increases your chances?
  - Eccentric movements
  - Ego – Doing more than your body can handle
  - Heat
  - Dehydration
  - Over-exertion – Heavy weight, fast-paced



What to look for?

- Muscle pain
- Weakness
- Range of motion deficits
- Muscle tenderness (doughy feeling)
- Parathesis (pins and needles)
- Absence of deep tendon reflexes
- Redness
- Edema/swelling
- Ecchymosis (bruising)

Prevention

- Know your body and its limits.
- Continually work on improvement by setting new and higher training stimuli.
- Do not ramp up training too fast.
- Smart training is the only way to strengthen muscles and the body as a whole, thus reducing the risk of this disease.
- Health always comes first!

Operation Supplement Safety

OPSS

OPERATION SUPPLEMENT SAFETY

Dietary Supplements

GET THE SCOOP ON SUPPLEMENTS

Realize, Recognize, and Reduce Your Risk

OPSS

OPERATION SUPPLEMENT SAFETY

It Is Always Better To Use FOOD!

Supplements:

- Are not FDA regulated – No Government testing required
- Are expensive
- Often don't work
- Don't come close to what whole food offers

Be Smart……

- Use well-known brands
- Know that there is no guarantee of quality, purity, composition, safety, or effectiveness of dietary supplements.
- Take only the recommended dose
- Avoid ordering supplements on the Internet, especially banned supplements!

Regulation of DS in the United States:

BOTTOM LINE:

- FDA has "post-market" responsibility to ensure compliance with regulations.
- DS do not require pre-market approval.
- Many DS contain banned or harmful substances not declared on the label.
- **Understand some supplements may cause a positive result on a urinalysis.**

Guidelines for Evaluating DS

- What is in it?
- Does the label conform to FDA rules?
- Is it the right stuff?
- Is it safe?
- Does it make sense?
- Does it work?
- Does it reach its target?
- What other sources exist?
- Why take it?

High Risk Supplement List can be found at:
http://hprc-online.org/dietary-supplements

Where can I find more info?

Summary

Every Marine needs to focus on nutritional fitness the same way as physical fitness.

Objectives Review

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- Nutrient Timing Considerations
- Performance Hydration
- Operation Supplement Safety (OPSS)

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CHAMP
USU Consortium for Health and Military Performance
A Defense Center of Excellence

Installation Resource

- SEMPERFIT Health Promotion Professionals
- Offices are located at each installation's main fitness center.
- http://usmc-mccs.org/services/fitness/health-promotion/

Questions??