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
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
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

<table>
<thead>
<tr>
<th>Overall Nutrition Quality</th>
<th>Green</th>
<th>Yellow</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least-processed</td>
<td>Engage at Will</td>
<td>Rts</td>
<td>Check Fire</td>
</tr>
<tr>
<td>Wholesome, nutrient dense</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High fiber</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low in added sugar</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Healthy fats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90% of calories from total fats</td>
<td></td>
<td>31-49% of calories from total fats</td>
<td>50% of calories from total fats</td>
</tr>
<tr>
<td>5-10% of calories from saturated fat</td>
<td></td>
<td>11-15% of calories from saturated fat</td>
<td>16-20% of calories from saturated fat</td>
</tr>
<tr>
<td>Foods with &gt;30% calories from fats are considered healthier if mainly from unsaturated fats, including omega-3 fatty acids</td>
<td></td>
<td>Some fats can be consumed daily with close attention to portion size</td>
<td>Trans fats are not authorized in dining facilities and must be avoided</td>
</tr>
<tr>
<td>Higher in fiber containing &gt;3 grams of fiber</td>
<td></td>
<td></td>
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<tr>
<td>Most foods that have &gt;10 grams of added sugar</td>
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<td></td>
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<tr>
<td>Plant-based protein is almost 100% of fat</td>
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<tr>
<td>Leaner cuts of animal-based protein is considered healthier based on the amount and type of fat it contains</td>
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<tr>
<td>No artificial sweeteners</td>
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<tr>
<td>Naturally occurring foods generally do not have additives</td>
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<tr>
<td>Most products made with white or refined flour or other refined grains</td>
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</tr>
<tr>
<td>Non-naturally occurring fibers: inulin, chicory root, polydextrose, maltodextrin</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Highly processed plant proteins such as soy protein isolate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highly processed meats and meat products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fried animal proteins or cuts with visible fat</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Artifical colors are usually a marker of a highly processed food</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Low in fiber containing &lt;2 grams</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most foods that contain &gt;18 grams of added sugar</td>
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</tbody>
</table>
Macronutrient Education
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.
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

### Table of Macronutrient Sources

<table>
<thead>
<tr>
<th></th>
<th>Carbohydrate</th>
<th>Protein</th>
<th>Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Bread/Cereal</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Milk</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Meats/Fish</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Poultry</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Fats/Oils</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
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

The Top 5 Grains

- Oatmeal
- Brown Rice
- High Fiber Cereal
- Quinoa
- 100% Whole Wheat Bread
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

The Top 5 Proteins
- Tuna/Fish
- Chicken/Turkey Breast
- Lean Red Meat
- Low Fat Dairy
- Eggs
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**

**Yellow Foods: Optimizes brain functions**
- Starfruit
- Yellow fig
- Golden kiwi
- Yellow pear
- Yellow pepper
- Yellow tomato
- Squash
- Sweetcom

**Green Foods: Rejuvenates musculature and bone**
- Green leafy veggies
- Avocado
- Broccoli
- Kiwi
- Green cabbage
- All green veggies

**Orange Foods: Supports skin and mucosal tissues**
- Apricot
- Cantaloupe
- Nectarine
- Papaya
- Carrots

**Red Foods: Supports heart and circulatory**
- Cherries
- Cranberries
- Strawberry
- Beets
- Red onion
- Tomato/tomato sauce

**Purple Foods: Promotes microcirculation**
- Blackberry
- Blueberry
- Plums
- Cabbage
- Eggplant
- Grapes
- Olives

**White Foods: Enhances immune system, lymph system, and cellular recovery**
- Banana
- Garlic
- Ginger
- Gobo root
- Heart of palm
- Horseradish
- Jicama
- Mushrooms
- Onion

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6) BTCNUMAC/2007 // WWW.NQUM.COM
## Meal Guidance

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

<table>
<thead>
<tr>
<th>Carbohydrates = Fruits &amp; vegetables, low fat milk/yogurt/soy milk, whole grain bread, pasta, cereal, oatmeal, beans, peas, corn, potatoes.</th>
<th>Protein = Low fat milk, yogurt, cottage cheese, &amp; cheese, lean meats, eggs, fish &amp; poultry, beans, nuts, and seeds, whole grains, soy products.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Choose 100% WHOLE WHEAT OR WHOLE GRAIN products.</em></td>
<td></td>
</tr>
</tbody>
</table>
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
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

Recovery | Exercise | Recovery | Exercise

Carbohydrate = Re-Fuel

Protein = Re-Build
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
<table>
<thead>
<tr>
<th>Pre-Workout Fuelling</th>
<th>During Exercise</th>
<th>Post-Workout Refuelling</th>
<th>Daily Fueling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHY</strong></td>
<td>To fuel up for the body’s next challenge.</td>
<td>To replace sweat loss and provide carbs to maintain blood sugar levels</td>
<td>To replenish glycogen, restore electrolytes, replace fluid losses, and repair damaged tissues</td>
</tr>
<tr>
<td><strong>WHAT</strong></td>
<td>High-carbohydrate snack of 200-300 calories</td>
<td>Sports drinks that contain sodium, potassium, glucose, and fructose</td>
<td>25–50 grams of carbs</td>
</tr>
<tr>
<td><strong>WHEN</strong></td>
<td>30–60 minutes prior</td>
<td>During exercise up to one hour: 3–8 oz of water every 15–20 min</td>
<td>20–25 grams of protein, plenty of fluids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>During exercise longer than one hour: 3–8 oz of sports drinks every 15–20 min</td>
<td>Within 45 minutes after a workout</td>
</tr>
</tbody>
</table>

**CHAMP**

USU Consortium for Health and Military Performance

**HPRC**

A Defense Center of Excellence

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

Where do you find these foods? Anywhere!
Home, chow hans, even fast-food restaurants!

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*/**

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 Nutrition Tips

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

Please note that some of these symptoms may require medical consult in addition to nutrition troubleshooting.
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
ARE You HYDRATED?
TAKE THE URINE COLOR TEST

This color chart is not for clinical use.

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

You need to drink more water

May indicate blood in urine or kidney disease
Dehydration Causes Early Fatigue and Decreases Performance

β Loss of 2% body weight can
   • Increase Perceived Effort
   • Reduce Performance by 10 – 20%
   • 2% loss = 3.0 lbs. for 150 lb person

β 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
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
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
- 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 are a 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 your meals).
# Troubleshooting

<table>
<thead>
<tr>
<th>Environment</th>
<th>Consideration</th>
<th>Hydration Recommendations</th>
</tr>
</thead>
</table>
| 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 sweat off the skin difficult, which decreases the body's ability to cool itself. This increases 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
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
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

"Rhabdomyolysis is the breakdown of muscle fibers resulting in the release of muscle fiber contents (myoglobin) into the bloodstream."
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!
GET THE SCOOP ON SUPPLEMENTS

Realize, Recognize, and Reduce Your Risk
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
Maintaining strength and flexibility in the lower extremities is one of the many important steps toward decreasing the likelihood of developing the small cracks in a bone commonly known as stress fractures.
Every Marine needs to focus on nutritional fitness the same way as physical fitness.
Objectives Review

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

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• SEMPERFIT Health Promotion Professionals

• Offices are located at each installation’s main fitness center.

• [http://usmc-mccs.org/services/fitness/health-promotion/](http://usmc-mccs.org/services/fitness/health-promotion/)
Questions??