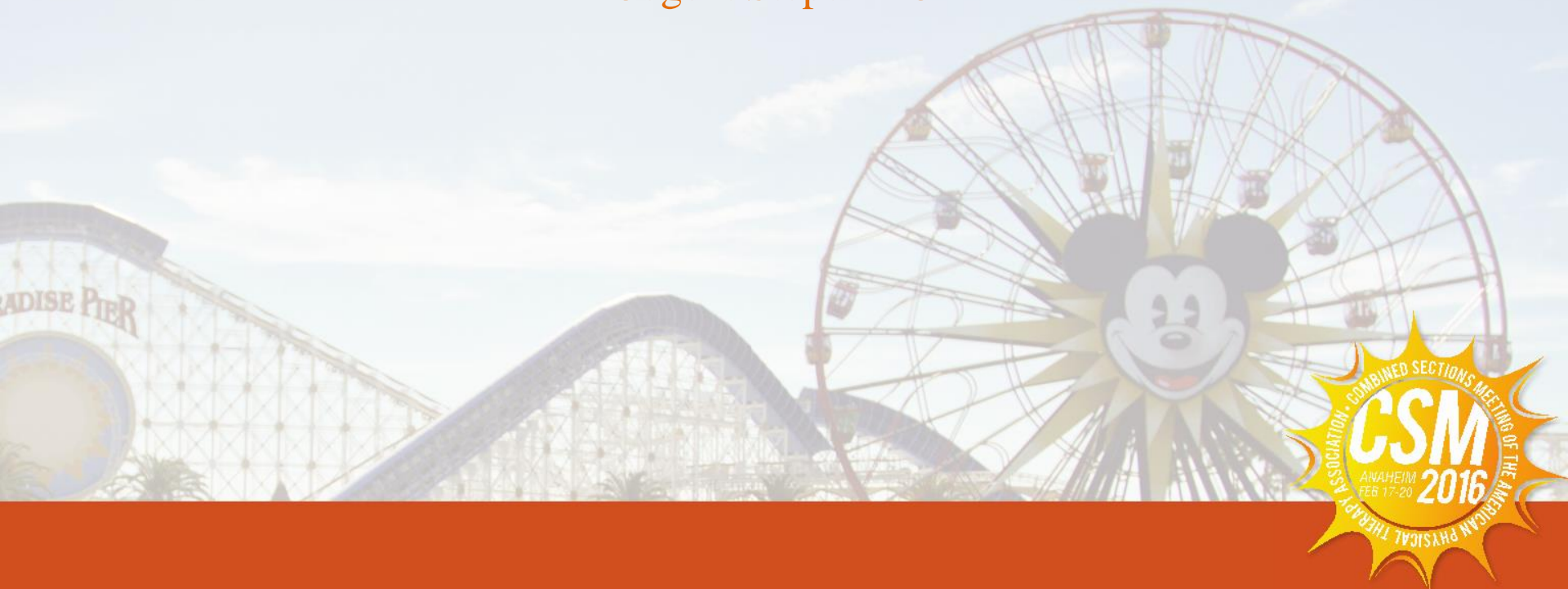


It Takes a Team for Triathlon

Teresa L. Schuemann PT, DPT, SCS, ATC, CSCS / TPT, Inc.

Abigail Smith, PT, DPT, SCS / Forward Motion Physical
Therapy, LLC

Michele “Shelly” Leavitt Weinstein, PT, MS, SCS, ATC /
Cogent Steps LLC



Disclosures

- **Teresa Schuemann** - No relevant financial relationship exists
- **Abigail Smith** - No relevant financial relationship exists
- **Michele “Shelly” Weinstein** - No relevant financial relationship exists



Learning Objectives

Upon completion of this session, you will be able to:

- Identify the different types of triathlon events and distinguish the unique sports medicine coverage needs for each of the event types.
- Identify the components of a triathlon and understand the unique sports medicine coverage needs for each component.
- Identify the role of the PT during sideline emergency response to triathletes at small and large scale running events.
- Understand the planning requirements for emergency response for the triathlete.
- Understand proper triage, diagnosis and treatment of the triathlete.
- Understand strategies for prevention of race day injuries.



Session Outline

- **10 mins:** Introduction- What is Triathlon?
(Schuemann)
- **25 mins:** Venue coverage for Triathlon (Weinstein)
- **35 mins:** Medical Tent coverage for the Triathlete
(Smith)
- **25 mins:** Prevention of Race day Injuries
(Schuemann)
- **15 mins:** Questions and Answer



Questions/Answer Session

Feel free to text questions to

Teresa (970)402-1682

Shelly (703) 963-0922

Abi (814) 777-1722



Triathlon – Introduction

Teresa Schuemann PT, DPT, SCS, ATC, CSCS
TPT, Inc.



Disclosure

- **Teresa Schuemann** is the Program Director of the Sports PT Residency and Certification program for Evidence In Motion (EIM). EIM is a provider of and approved Emergency Response Course and other Sports PT programming.
- Is the a member of the Sports Medicine Team for the International Triathlon Union. She was the Medical Coordinator for the ITU's Sports Development Team.
- **No** financial support was received for this presentation



Triathlon – What is it?

- Components
 - Swimming
 - Cycling
 - Running



Triathlon – History

- **Origin – Southern California**
- First Triathlon September 24, 1974 – 46 athletes
 - 5.3 mile run
 - 5 mile cycle
 - 600 yard swim
- U.S. Triathlon Association – Feb, 1982
- American Triathlon Association – Mar, 1982
- USTA - April, 1982



U.S. Triathlon Association

1982 Membership – 1500

August 2015

- 170,033 Adult & Youth members
- Triathlon Recognized
 - IOC Olympic event
 - NCAA Sport
 - Amateur sport
- Sanctioned Events
 - Tripled since 2004
 - Approx. 2400 Triathlons in 2014



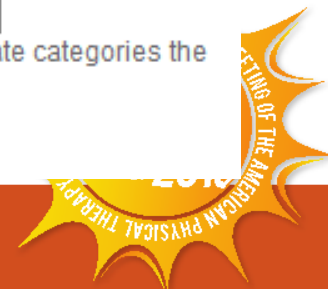
Triathlons – Not all the same . . .

Triathlon

	SWIM	BIKE	RUN
Short			
Kilometer	0.4 - 1	8 - 30	1.6 - 6.3
Mile	0.2 - 0.6	5 - 18.6	1 - 3.9
Intermediate			
Kilometer	1.1 - 2	30.1 - 50	6.4 - 12.8
Mile	0.7 - 1.2	18.7 - 31	4 - 8
Long			
Kilometer	2.1 - 3.1	50.1 - 99.9	12.9 - 29.9
Mile	1.3 - 1.9	31.1 - 62	8 - 18.6
Ultra			
Kilometer	3.2+	100+	30+
Mile	2+	62.1+	18.7+

Triathlon - Distances are categorized by using the category in which two of the distances fall. If all three are in separate categories the distance is categorized by the bike.

Note: Triathlons can be swim, bike, run in any order



Youth Triathlons . . .

Youth Triathlon

Race Age	SWIM	BIKE	RUN	Best Practices
Youth 7-8	50 - 100 meters	2 - 3 K	1 K	Pool swim and closed roads
Youth 9-10	100 meters	3 - 5 K	1 K	Pool swim and closed roads
Youth 11-12	200 meters	5 - 7 K	1.5 - 2 K	Closed roads
Youth 13 - 15	200 - 375 meters	8 - 10 K	2 - 2.5 K	Closed roads



Multi – Sport Variations



- X-Terra
- Duathlon
- Aquathon/Aqua Bike



Triathlon – Venue Coverage

Shelly Weinstein, PT, MS, SCS, ATC



Disclosure

- **Shelly Weinstein** is a partner and senior instructor of Cogent Steps, LLC, the SPTS approved provider for the Emergency Medical Response Course
- Medical Operations Coordinator for the Marine Corps Marathon. These views and comments are hers and do not represent the Department of Defense or the United States Marine Corps.
- Mentor and Faculty of the US Navy Sports Residency, Quantico VA
- **No** financial support was received for this presentation



Medical End State

Understanding the unique aspects of triathlons to prepare medical support for:

- Rapid triage, diagnosis, and treatment of life threatening conditions for race participants
- Rapid triage, diagnosis, and treatment of non life threatening medical conditions to allow return and successful event finish



Planning

- Venue
- Registration
- Jurisdictional Oversight
- Logistical Needs
- EMS Support
- Direct Medical Support



Dr. Bob Laird

- First year in Kona in 1981
- “Dr. Laird stood on the pier watching the swimmers, dressed in running gear, stethoscope around his neck, cap on his head....and he alone was the extent of the medical support.....”



Venue

- Type/Distance
- Time of year
- Weather/ water temperature
- Governing Body
 - USA Triathlon
 - International Triathlon Union

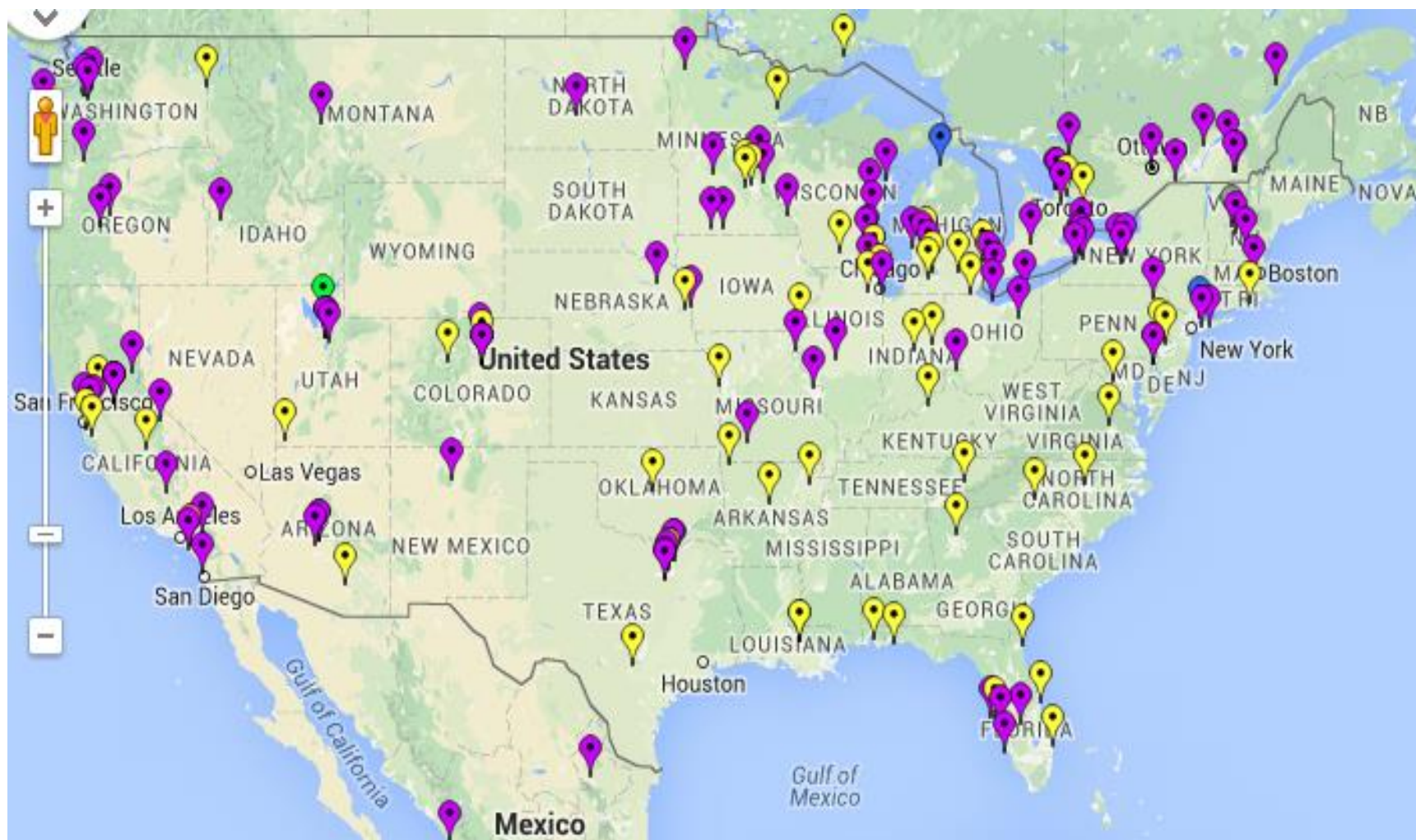


Numbers = 1472



FEB 17-20 2010

Kids = 201



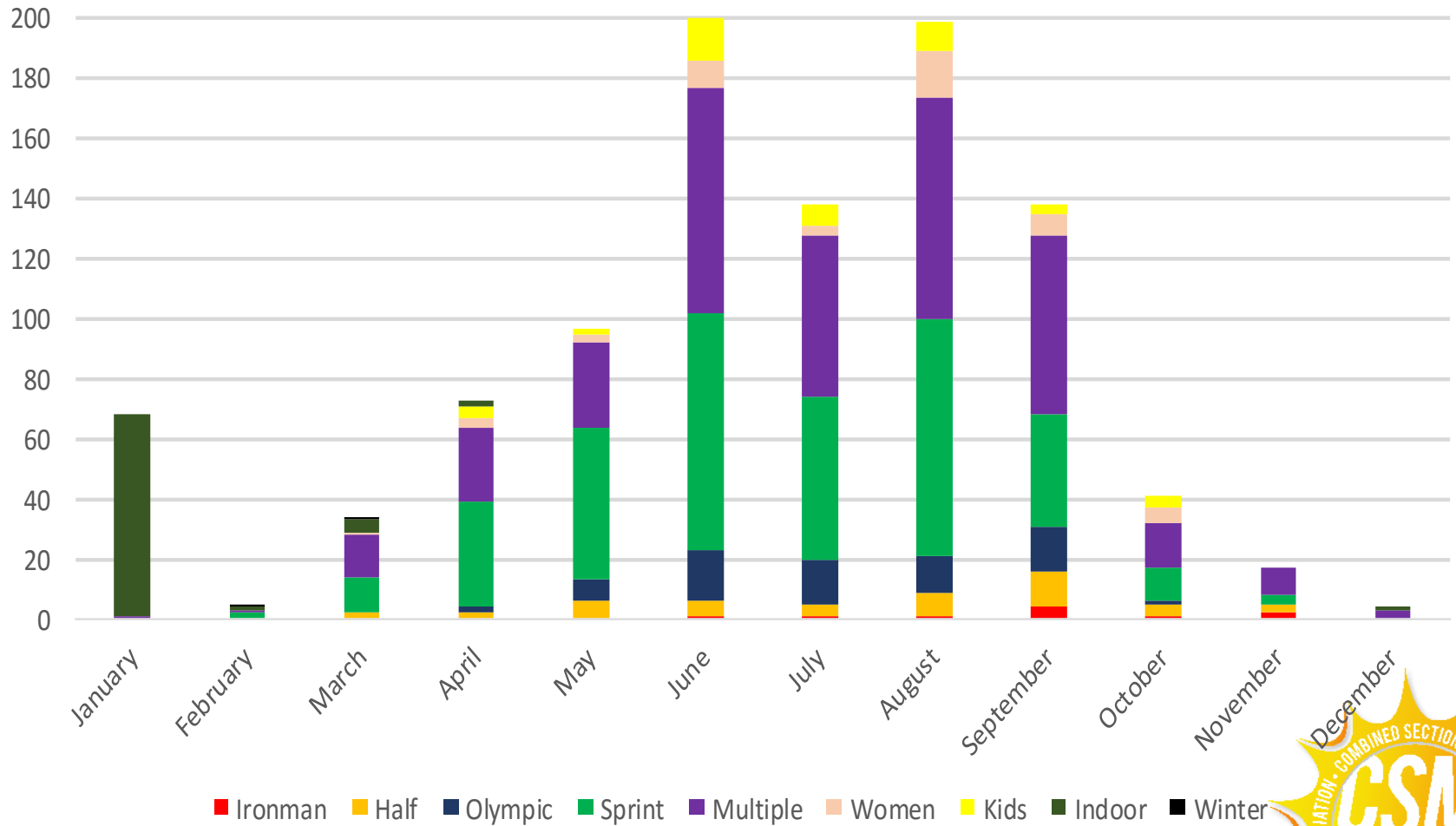
Multiple



Kids



Types/Months



USA Triathlon

- Membership required in USA Triathlon sanctioned races
- A one-day license
 - specific race
 - non-transferable
 - non-refundable
- Excess medical coverage provided
 - extends to participants with a USA Triathlon one-day license or annual license
 - injured while participating in a USA Triathlon sanctioned event
- Secondary to primary health insurance plan
- Complete the USAT Medical Claim form
- Not available to violators USA Triathlon sanction or non members



Know the Rules

Article III General Rules of Conduct and Penalties

- **3.1 Preparation and Training.** No person shall participate in a triathlon or other multi-sport events unless such person:
 - a. is trained adequately for that specific event, as might be expected of a prudent person entering a similar competition, and
 - b. is in excellent health, based on recent training, physical examinations, if any, and generally accepted standards of good health.
- **3.4 Race Conduct.**
 - d. Unauthorized Assistance. No participant shall accept from any person (other than a race official) physical assistance in any form, including food, drink, equipment, support, pacing, a replacement bicycle or bicycle parts, unless an express exception has been granted and approved, in writing, by USA Triathlon.
 - e. Re-entry. Upon leaving the course, a participant shall re-enter the course and continue at the same point of departure. Any violation of this Section shall result in a variable time penalty



4.3 Emergencies

“A swimmer experiencing difficulty and in need of assistance shall raise an arm overhead, and pump it up and down, and call or seek assistance. A swimmer, who has received official assistance, whether voluntary or involuntary, must retire and withdraw from the remainder of the race unless such assistance did not aid the swimmer in making forward progress. No swimmer shall return to the race if the official rendering assistance requests that the participant withdraw from the race or receive medical assistance.”



10.13 Presence of Participants

All race participants are required to be present and to participate in the hearing of any protest in which they were involved..... **Except for medical reasons**, all participants shall remain available for participation in any protests until such time as official race results are announced, the period for filing all protests has expired, or permission to leave the vicinity is granted by the Head Referee.



Para Triathlete

- **P 1.1 Classification.** Athletes may compete in USAT sanctioned races without official classification in categories set out in rule P1.2. In order to compete in USA Paratriathlon National Championships and national teams, Para triathletes must be classified by a certified USA Para triathlete Classifier. Para triathletes shall provide classification to race directors upon registration.
- Each Para triathlete shall be required to:
 - a) Provide medical evidence and documentation describing his/her disability.
 - b) Be available to the classifier for assessment prior to competition.
 - c) Meet the minimum impairment criteria.
- Athletes with miscellaneous conditions such as, but not limited to: intolerance to temperature extremes, organ transplants, joint replacements (endoprosthetics), kidney dialysis, hearing impairments, and or cognitive impairment are not eligible for Para triathlon competition or categories.



Para Classification (PT 1-5)

P 1.2 Competition Categories.

- PT1 - Wheelchair users. Includes athletes with comparable activity limitation and an impairment of, but not limited to: muscle power, limb deficiency, hypertonia, ataxia, athetosis that prevent the ability to safely ride a conventional bike and run. Athletes must use a recumbent handcycle on the bike course and a racing wheelchair on the run segment;
- PT2 - Includes athletes with comparable activity limitation and an impairment of, but not limited to, limb deficiency, hypertonia, ataxia and or athetosis, impaired muscle power or range of movement. In both bike and run segments, amputee athletes may use approved prosthesis or other supportive devices.
- PT3 - Includes athletes with comparable activity limitation and an impairment of, but not limited to, limb deficiency, hypertonia, ataxia and or athetosis, impaired muscle power or range of movement. In both bike and run segments, the athlete may use approved prosthesis or other supportive devices.
- PT4 – Includes athletes with comparable activity limitation and an impairment of, but not limited to, limb deficiency, hypertonia, ataxia and or athetosis, impaired muscle power or range of movement. In both bike and run segments, the athlete may use approved prosthesis or other supportive devices.
- PT5 – Total or partial visual impairment (IBSA/IPC defined subclasses B1, B2, and B3).



Classification (Visual Impairment)

- B1 includes athletes with total visual impairment - no light perception in either eye up to some light perception but inability to recognize shapes at any distance or direction.
- B2 and B3 includes partially sighted athletes with a visual acuity of 6/60 (meters) or visual field of less than 20 degrees with best corrective.
- It is mandatory that only one guide of the same sex may be used throughout the race. Athlete is tethered during the swim portion, must ride a tandem bicycle, and may choose an elbow lead or tether lead.



P 1.3 Swimming Conduct

- a) Wetsuits are allowed for PT1 participants at any water temperature. When the water temperature is greater than 78 degrees, wetsuits are not permitted for PT2, PT3, PT4, or PT5 categories.
- b) In multiple loop swim courses competitors are not required to exit the water before completing additional loops.
- c) Prosthetic and orthotic devices are considered propulsive devices and are not allowed for any category.
- d) PT1 competitors shall have both legs bound together during the swim portion. The athlete may use a brace as long as it does not provide flotation. The binding or brace must remain in place until the competitor exits the swim.



Guidelines for Water Temperature

Race directors can also use the Water Temperature Guidelines as a guide in canceling or shortening the swim in sanctioned events. This chart has been designed to be used as a recommendation, not a requirement. Please download the chart [here](#). Race directors looking for further details can watch a free webinar by Event Services Director, Kathy Matejka by downloading it [here](#). Email eventservices@usatriathlon.org for access to the password for this webinar.



USA Triathlon Recommendations for Multisport Age-Group Swim Segments

	Water Temperature (degree f)																															
	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64-77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
Distance																																
Less than 750 m																																
750 - 1500 m																																
Over 1500 m																																
USAT Wetsuit Rules	Allowed<																No Awards				>Banned											

Legend:

	Less than 750 m	750 - 1500 m	Over 1500 m
Neutral swim conditions	55° - 89° F 12.8° - 31.7° C	56° - 87° F 13.3° - 30.6° C	57° - 86° F 13.9° - 30° C
Shorten swim	51° - 54°; 90° - 92° F 10.6° - 12.2°; 32.2° - 33.3° C	52° - 55°; 88° - 90° F 11/1° - 12.8°; 31.1° - 32.2° C	53° - 56°; 87° - 88° F 11.7° - 13.3° C; 30.6° - 31.1° C
Cancel swim	Below 51°; Above 92° F < 10.6°; > 33.3° C	Below 52°; Above 90° F < 11.1°; > 32.2° C	Below 53°; Above 88° F < 11.7°; > 31.1° C

- Note:**
- 1) These are recommendations to race management, local officials, and athletes.
 - 2) Keep in mind, other factors will influence safety conditions including air temperature, humidity, acclimation, regional adaptation, and wind.
 - 3) Water temperature measurement will conform to USAT methodology in the *USAT Competitive Rules*
 - 4) USAT does not have a rule requiring mandatory use of a wetsuit, however, RD's may establish that rule.



Swim Safety Report

Race Name:			
Sanction ID:			
Race Date:			
Race Type:			
Distance of Race Segments:			
Swim:			
Bike:			
Run:			
Air temperature at start (°F)			
Percent humidity at start <i>(sources such as weather.com or local news stations will suffice)</i>			
Water temperature day prior (°F)			
Water temperature day of (°F)			
Number of athletes who started the swim <i>(include relays)</i>			
Number of athletes who voluntarily withdrew during the swim			
Number of athletes rescued during the swim			
Number of athletes who DNF the swim <i>(include relays)</i>			
Total number of athletes seen in medical tent			

This form must be submitted online via the Event Reporting Tool at:

<https://sanctioning.usatriathlon.org> *

**This paper form will not be accepted, and is intended for the race organization's personal reference only.*

Questions: Contact eventservices@usatriathlon.org or 719-955-2802



Reporting

- If an athlete is injured - incident report must be filed
- Must complete and sign an incident report
- Provide the USAT Medical Claim form to the athlete
- Communication between the medical team and event staff should be kept constant
- The race director should be aware of all serious injuries/accidents
- For serious contact Event Services staff @ 719-955-2813 as soon as possible
 - requires transport, emergency lifesaving procedures, or results in an athlete's inability to care for himself during the incident (head trauma, athlete vs. car) would be considered serious.
- Emergency contact information ?
- An athlete's belongings?
- Consider f/u with injured athlete





USA Triathlon MEDICAL CLAIM FORM

Send completed form to:
NAHGA Claim Services
P.O. Box 189
Bridgton, Maine 04009
Email: claims@nahga.com
Fax: 207-647-4569
Phone Number: (800) 952-4320

This form to be completed whenever a medical claim results from an injury incurred at USA Triathlon sanctioned event.
PLEASE ANSWER ALL QUESTIONS. INDICATE "N/A" IF INFORMATION IS NOT APPLICABLE.

***** TO BE COMPLETED BY INJURED PARTY *****					
NAME (Last Name) (First Name) (Middle Initial)			SOCIAL SECURITY NUMBER	DATE OF BIRTH	SEX M F
ADDRESS (Street) (City) (State) (Zip Code)			TELEPHONE NUMBER ()	OCCUPATION	
USA TRIATHLON MEMBER #:			DATE & TIME OF ACCIDENT: / / AM PM		
INJURED PARTY WAS: PARTICIPANT COACH OFFICIAL VOLUNTEER OTHER:					
IF PARTICIPANT, MEMBERSHIP TYPE (PLEASE CHECK ALL THAT APPLY): ANNUAL MEMBER ONE-DAY MEMBER PRO ATHLETE AMATEUR ATHLETE					
NAME OF EVENT:		RACE DIRECTOR NAME:		PHONE #:	
NATURE OF INJURY					
FOR ALL INJURED, PLEASE COMPLETE THE FOLLOWING:					
A. DESCRIBE ACTIVITY ENGAGED IN AT TIME OF ACCIDENT:					
B. DESCRIBE WHERE ACCIDENT HAPPENED:					
C. DESCRIBE HOW ACCIDENT HAPPENED:					
D. DID THE ACCIDENT OCCUR DURING: COMPETITION PRACTICE TRAVELING TO/FROM OTHER:					
E. WITNESS NAME: PHONE #:					
IF INJURED PARTY IS A MINOR: PARENT/GUARDIAN NAME: HOME PHONE #:					
EMPLOYER NAME: WORK PHONE #:					
IS THE INJURED PERSON COVERED UNDER ANY OTHER HEALTH AND/OR ACCIDENT INSURANCE PLANS, INCLUDING BUT NOT LIMITED TO GROUP OR INDIVIDUAL MEDICAL, MILITARY/GOVERNMENT PLANS SUCH AS MEDICARE, OR AUTOMOBILE PLAN? YES NO					
IF YES, NAME OF INSURANCE COMPANY				POLICY NUMBER	
ADDRESS (Street) (City) (State) (Zip Code)					
AUTHORIZATION TO RELEASE INFORMATION I authorize any Health Care Provider, Insurance Company, Employer, Person or Organization to release any information regarding medical, dental, mental, alcohol or drug abuse history treatment or benefits payable, including disability or employment related information, to Chubb Group of Insurance Companies, NAHGA Claim Services, Inc., the Plan Administrator, or their employees and authorized agents for the purpose of validating and determining benefits payable. I understand that my authorized representative or I will receive a copy of this authorization upon request. This authorization or a photo static copy of the original shall be valid for the duration of the claim.					
NAME OF PATIENT		SIGNATURE OF PATIENT (PARENT/GUARDIAN IF A MINOR)		DATE	
AUTHORIZATION TO PAY PROVIDER - I authorize payment associated with this incident directly to the physician or providers.		IF YES, SIGNATURE		DATE	
I certify that the foregoing information is true and correct.		SIGNATURE		DATE	

Note: If you do not sign the above authorization to pay benefits directly to the provider and would like payment made directly to you, you MUST submit paid receipts for each bill.
Note: The issuance of this blank is not an admission of the existence of any insurance nor does it recognize the validity of any claim and is without prejudice to the Company's legal rights in the premises.



Injury Prevalence

- Very demanding activity + competitive nature = injury
- Varied formats of Triathlon (Sprint, Olympic and Ironman) & lack of standardisation in injury surveillance variation in the published studies
- Depending on the type of Triathlon event research reports that 35%-90% of Triathletes suffer a related injury
 - Overall incidence of injury, 17 injuries have been reported to occur per 1000 hours of Triathlon competition
 - Compared to 5 injuries per 1000 hours of Triathlon training
 - More Triathlon injuries tend to be due to overuse, rather than trauma



Serious Injuries

- Participation gruelling; huge stresses on the cardiovascular, musculoskeletal and heat regulating systems
- Energy demands can be increased by a factor of 10-15 fold
- Successful training requires acclimatisation and training as well as fluid and fuel intake
- On-going intensive exercise for several hours is associated with heat generation, high circulating lactate concentration, dehydration and depletion of ATP.
- These factors may produce exercise associated collapse, exercise induced hyperthermia and heat stroke, hypothermia, shock and cardiovascular morbidity (in predisposed individuals)



Reports of Death

- American College of Cardiology Conference showed there were 14 deaths among almost one million competitors, a rate of 1.5 per 100,000
- USA Triathlon has recorded 23 deaths in the event since 2004 of which 18 have occurred during the swim



Common Triathlon Injuries

- Blisters
- ITBS
- Patellar Pain
- Achilles Tendinopathy
- MTSS
- Shoulder Overuse



Initial Planning - Internal

- Coordination with:
 - Race Director
 - Spotters
 - Lay out of course
 - Overall logistical support
 - Insurance
 - Chain of command and responsibilities
 - Medical Director
 - Protocols
 - Algorithms
 - Medical Supplies



Initial Planning - External

- Coordination with:
 - EMS
 - Incident Action Plan
 - Transportation Plan
 - Communication
 - Triage
 - LEA
 - Security
 - Road closures
 - Accident investigation
 - Public Affairs
 - Spokesperson



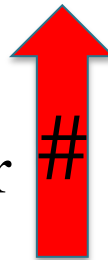
Medical Logistical Support

- AS Location & Number
 - Registrants
 - Athlete Skill Level
- Staffing
 - Direct Support
 - Physicians
 - Nurses
 - PT
 - Indirect Support
 - “eyes” on course
 - Administrative
- Equipment & Supplies



Aid Stations

- Identification
- Shelter
- Water & First Aid
 - Water hand off points (bike)
- Longer races
- Run portion fatigue factor
- Finish
 - Additional Resources
 - Changing Area



Equipment & Supplies

- Tent – generator?
- AED
- Oxygen
- Cots
- Mobility devices
- Coolers
- ISTAT
- Rectal thermometers and probes
- Ice
- Blankets
- Meds
- IV fluids
 - Hypertonic
- Vaseline
- Needles & syringes
- Medications
- Consumables



Staffing

- Physicians
 - Medication oversight
- Nurses
 - IV skills
- Physical Therapists
- Podiatrists
- Water Handlers
- Administrative Support



SHIFTS – BREAKS – IDENTIFICATION -- TEAMS



Inclement Weather Plan

- Four recommended options:
 - Change of start time
 - Modification of format
 - Change of date
 - Cancellation
- Type of Weather concerns
 - Lightning
 - Heavy Rains
 - Wind/ Tornados
 - Extreme Heat
 - Ice/ Snow
- EAP
- Clearly Designated Decision Maker
- Weather Watcher 10 days
- List of Safe Havens
- Clear Criteria for Resumption/ Cancellation
 - EMS, Volunteers, Skill of Athletes, Logistics
- Communication
 - Message & Format
- Secondary Risks
 - Equipment





THANK YOU !



Triathlon – Medical Tent

Abigail Smith, PT, DPT, SCS



Objectives

Knowledge of:

- Identify the different types of triathlon events and distinguish the unique sports medicine coverage needs for each of the event types.
- Identify the components of a triathlon and understand the unique sports medicine coverage needs for each component.
- Identify the role of the PT during sideline emergency response to triathletes at small and large scale running events
- Understand the planning requirements for emergency response for the triathlete
- **Understand proper triage, diagnosis and sideline treatment of the triathlete**
- Understand strategies for prevention of race day injuries





Running Athlete vs. Triathlete^{9,17,32}

Swim

- Water Emergency
 - Drowning or near drowning events
- Marine-life encounters

Bike

- Crash
 - Poor handling skills
 - Debris
 - Poor signage
 - Pedestrians/cyclist/ MVA
- Mechanical
 - Extended wait for repair
 - metabolic considerations

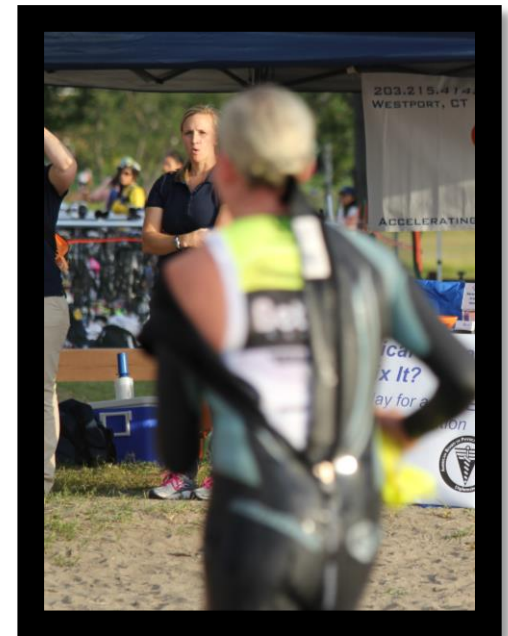
Run

- Electrolyte Imbalances
- Dehydration
 - Athlete's inability to drink and ride at the same time
- Thermoregulation Pathologies



Injuries...Who & Where & When

- Who
 - Likelihood of injury is positively associated with experience in triathlon₍₁₉₎
 - Risk of injury_(11,13)
 - Level
 - Age
 - Race distance



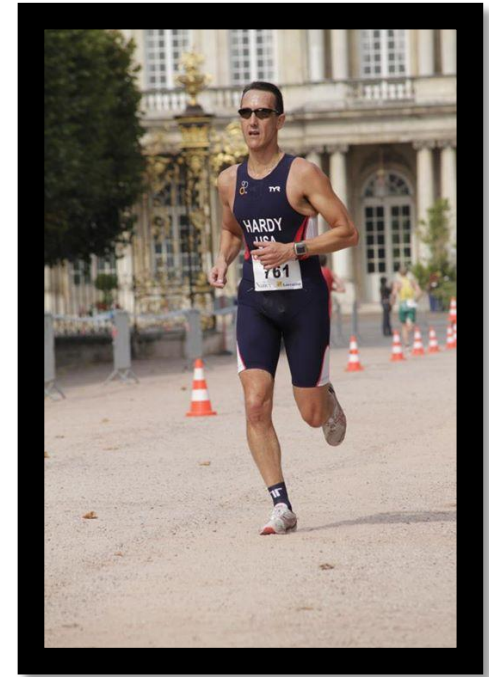
Injuries...Who & Where & When

- Where

- Injuries are predominately during the run₍₁₂₎
 - Athletes perceive that most injuries occur during cycling
- Running events
 - Most injuries and health problems at the finish line₍₂₃₎
 - 64.3 % 2009 race
 - 58.2 % 2010 race

- When

- Ironman Injuries – around 14 hours₍₁₇₎
- Half Ironman Injuries-around 6-7 hours



Triage



Triage Groups

Major Medical

- Cardiac
- Pulmonary
- Thermal
- Metabolic

Minor Medical

- Orthopedic
- Dermatological



Diagnosis- Subjective Assessment

- Verbal
 - c/o
 - a/o
- Note:
 - What was the CHANGE??
 - Behaviors
 - » fluid and/or nutrition intake
 - » over-performance
 - Weather elements



4 Most Important Questions

(when suspecting a metabolic pathology)

1) What was your fluid intake (amount and type)

“I had only ½ a cup of water during the run”

2) What was your fuel intake (amount and type)

“I had one gel, I didn’t want to over-do it”

3) Did you do anything different today compared to training?

“Yes, I usually drink a lot more Gatorade when I train.”

4) Is this your first (*insert distance)?

“4th Ironman, this happens every time b/c I drink too much water”



Other Questions...

- Vomiting/Diarrhea?
 - During /after race
- Pre /Post race weight?
- Urine color and volume?
- Medications/supplements?
- Pre race injury/illness?



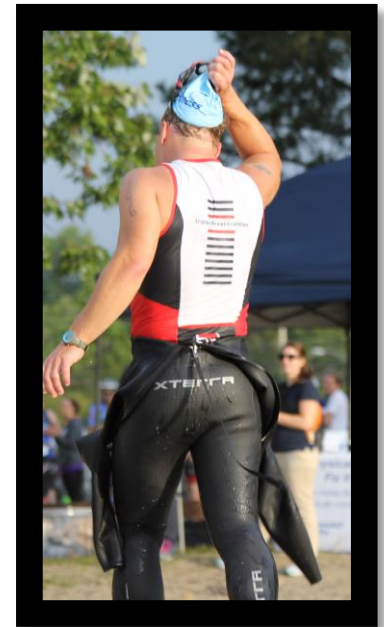
Treat, Transport or Both?

Always applying first response treatment

- AED/ CPR
- First aid

Transport - PRN for definitive care

- Heat Emergency₍₂₄₎
 - treat prior to transport



Treatment...

(not a typical day at the office)

- Treatment Pace
Turn over quickly
- Proper Protective Equipment
 - Gloved for each athlete
 - Eliminate cross contamination
 - Mylar covers for cots
 - wool blanket use





Diagnosis & Treatment



Major Medical



Cardiac- Collapsed Athlete Pre Finish (7,17,32)

- Collapse during race
 - cardiac event
 - R/O
 - hyperthermia
 - hyponatremia
- Dx/Tx
 - Primary Assessment
 - Vitals, Airway, Level of Consciousness
 - AED /CPR
 - EKG if available
 - Prepare for transport



Cardiac

Collapsed Athlete Post Finish_(7,21,33)

- Exercise related Collapse
 - Exercise Associated Postural Hypotension (EAPH)
 - Most common reason for collapse post finish
 - Cause:
 - Pulling of blood in legs and to skin for cooling
 - Pumping action of muscles stops with stopping running
 - Blood vessels remain open
 - Decrease blood to brain = syncope
 - Dehydration can contribute to EAPH
 - 7% loss of BW



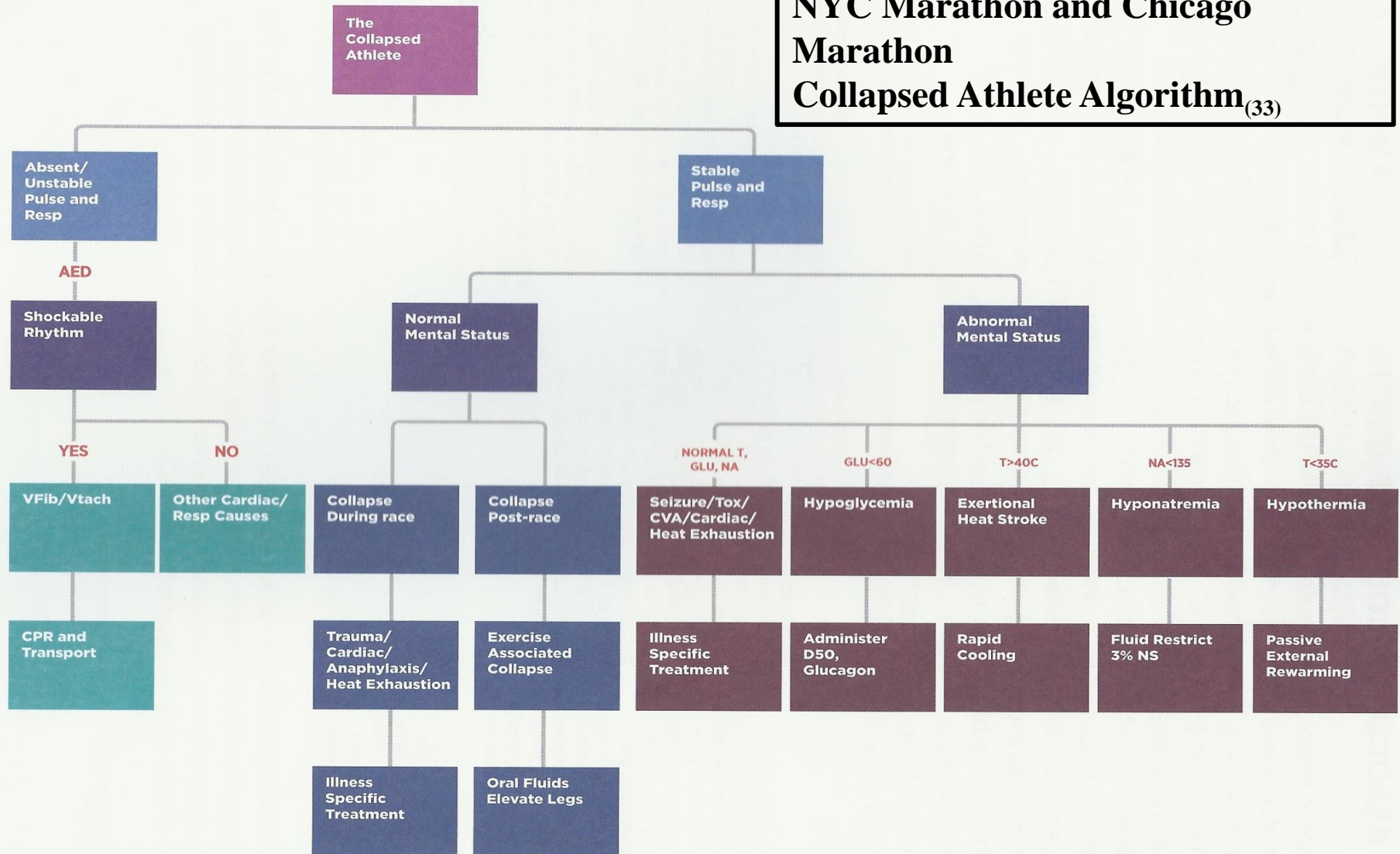
Cardiac

Collapsed Athlete Post Finish_(7,18,33)

- Presentation:
 - May have altered level of consciousness
 - Inability to stand
 - Light headed
 - Nausea
 - visual changes
- Most Common tx
 - Elevate legs
 - Oral fluids
 - If not responding to oral fluids check electrolytes
 - Set up in stages-15/20 minutes
- Proper Eval
 - Airway & Vitals
 - AED/CPR
 - r/o heat stroke



NYC Marathon and Chicago Marathon Collapsed Athlete Algorithm⁽³³⁾



Metabolic Pathologies



Metabolic Related Injuries⁽³²⁾

- Running in a marathon
 - jeopardize fluid balance
 - create exercise induced dehydration
 - alter
 - fluid electrolyte homeostasis
 - cardiovascular function
 - thermal balance



Metabolic Pathology Presentation_(2,7,8,15,33)

Hyponatremia

- HA
- Dizziness
- Nausea
- Cramping
- Vomiting
- Light headed
- Altered MS
- Delirium
- Pallor
- Seizures
- Normal BP, Pulse & Temp
- Rales and Crackles
- Pathological Reflexes
- Weight gain
- Asymptomatic

Dehydration

- HA
- Dizziness
- Nausea
- Cramping
- Vomiting
- Irritability
- General discomfort
- Weakness
- Chills
- Head or neck heat sensations (pulsing)

Hypoglycemic

- HA
- Dizziness
- Nausea
- Altered LOC
- Light headed
- Rapid Pulse
- Shakiness
- Visual changes
- Poor Coordination



i-Stat Use

- Handheld blood analyzer
- bedside & pt point of care diagnostic testing



Hyponatremia^(1,2,15,30,31, 33)

Lowered Na Levels

- Mild 130-135 mmol/L
- Moderate 121-129 mmol/L
- Critical <120 mmol/L

- * over hydrated athletes
- * slower athletes
- * weight gain
- * females

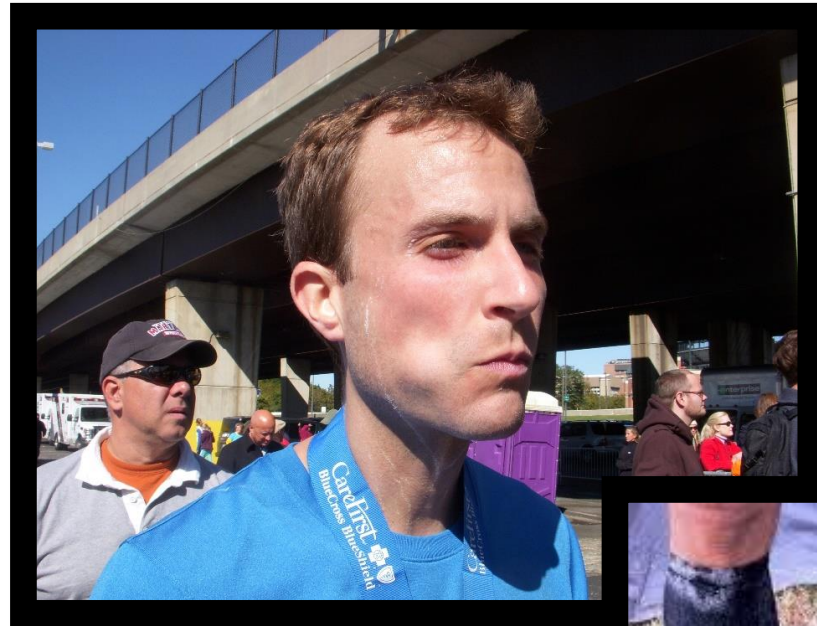


Diagnosing Hyponatremia

- Verbal Exam
- Visual Inspection
 - Pallor
 - Very salty skin

Or:

- Non Verbal
 - i-Stat blood draw



Hyponatremia Treatment (7,10, 33)

- Salty foods
- limit fluid intake
 - Electrolyte drink or broth
- IV
 - Unable to take in nutrition PO
 - $\text{Na} < 120 \text{ mmol/L}$
 - Only after i-Stat
 - 3% hypertonic saline



Dehydration Diagnosis ^(2,33)

- Diagnosis
 - Verbal exam
 - Atypical Performance
 - 3% BW loss = 20-25 % reduction in performance
 - Physical exam
 - Skin turgor
 - Capillary refill
 - Mucous membranes-saliva
 - Vitals- tachycardia and/or hypotension
 - i-Stat
 - Increase in Hemoglobin
 - Low Electrolytes



Dehydration Treatment^(2,33)

- Treatment
 - Oral hydration
 - IV NS PRN



Hypoglycemia^(7,33)

- Diagnosis
 - Verbal exam
 - or
 - i-Stat- glucose levels
- Presentation
 - Shakiness
 - Rapid Pulse
- Treatment
 - Oral glucose
 - tablets
 - IV - 50 cc of D5W



Thermal Pathologies

Hyperthermia



Hypothermia



Hypothermia^(2,6,7,33)

- Hypothermia
 - Drop of core body temperature

96.8°F - initial increase in metabolism

95.0°F - max shivering

93-91°F- apathy

91°F- profound apathy



Hypothermia_(2,6,7,33)

- Presentation
 - Shivering, or lack of
 - Increased RR
 - Apathy
 - Slurred speech
 - Poor judgment
- Diagnosis
 - Verbal exam
 - Temp



Hypothermia Treatment^(2,7)

- Remove from cold and wind
- ***Remove sweaty/wet clothing***
- Wrap in mylar and wool blankets
- Warmed oral fluids
- Place:
 - near forced air in tent
 - in emergency vehicles



Hyperthermia

- Heat Cramps
- Heat Exhaustion
- Heat Stroke
 - Presentation_(1,4,33)
 - Altered Level of Consciousness
 - Non responsive, (or to pain only)
 - Non verbal
 - Agitation
 - Seizures
 - Hypertonicity

Medical Emergency



Heat Emergency (2,3,7,28,33)

- Heat stroke
 - Diagnosis
 - Elevated core temp $>104^{\circ}\text{F}$
 - Immediate rectal temp
- Causes
 - Biological factors
 - Dehydration
 - Metabolic rate
 - Gender
 - Illness
 - Environmental factors
 - weather



***ACSM guidelines**
Cold Water
Emersion

- **Protocols vary**



Heat Emergency Treatment (2,7,33)

– Rapid cooling via Ice bath

- monitoring of rectal temp
 - Temp below 103
- i-Stat blood values
- IV access obtained
 - NS
- Active cooling providers
- Recorder

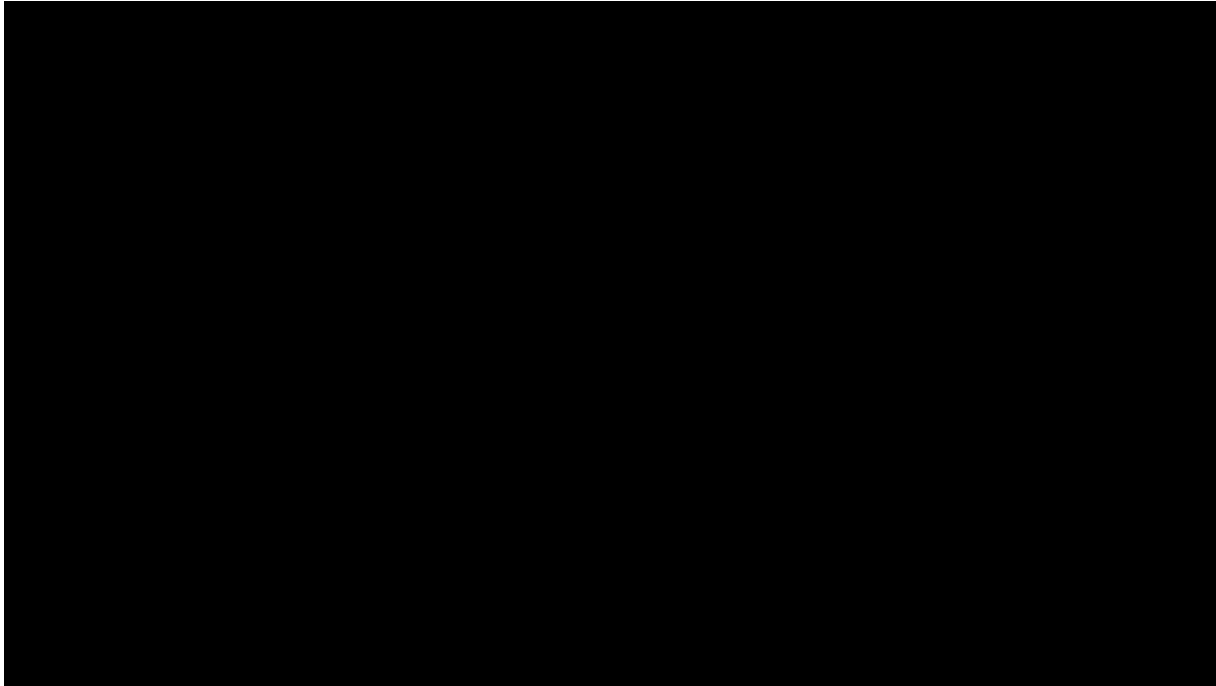
15-20 min process
Team of Providers

– Remove from ice

- prevent hypothermia
- sensorium should return within 30 min
- prepare for transport



Heat Video Part 1



Heat Video Part 2



Pulmonary



Pulmonary

- Acute Bronchospasms
 - Presentation
 - SOB
 - No reports of chest pain
 - No “true” wheezing
 - Lung sounds
 - » Throat sounds
 - Expiratory wheezing
 - Colder weather



Pulmonary Treatment

- Treatment
 - Albuterol inhaler
 - Nebulizer treatment
 - Albuterol
 - Protocols vary



Minor Medical



Orthopedic



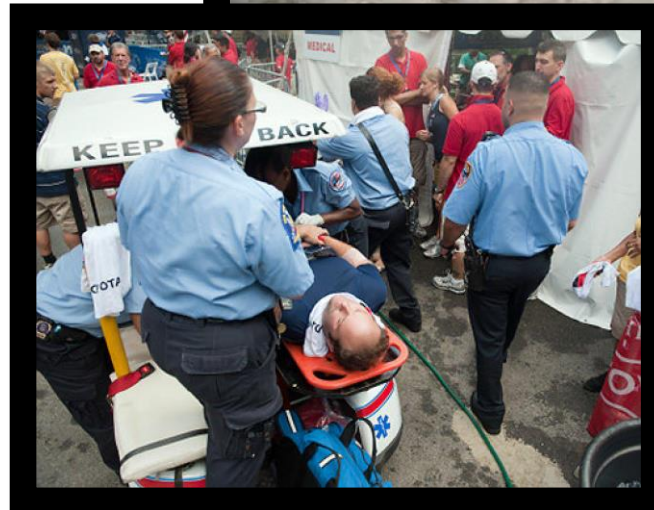
Orthopedic “Clinical Pearls”

- Turn over!
- Be aware of change in status
 - reassess
- Massage
 - Does not alleviate physiological symptoms of endurance activities compared to no treatment_(8,12)



Crash Considerations₍₂₀₎

- Head trauma
- SCI- restrict c-spine motion
 - 2015 NATA protocol update
 - Remove helmet
 - Spine board
 - Multiple casualty
 - Other cyclists
 - MVA
 - Pedestrians
- Common Pathologies
 - Clavicular fractures
 - Facial fractures
 - A/C separations



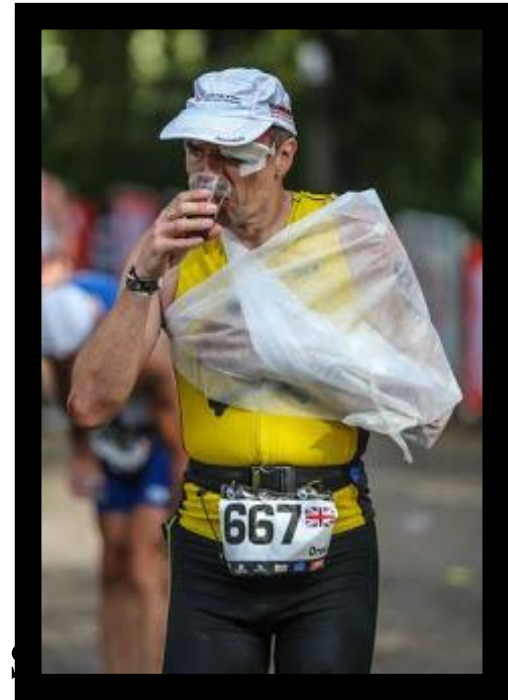
Orthopedic Common Pathologies

- Stress Fractures
 - Metatarsal fx
 - Swelling at top of foot
 - Unable to WB
- Muscle Strains
- LBP
- Ligament Sprains
- Cramping



Orthopedic Treatment

- Ice, Elevation, Compression
- Get pts walking
 - AD if absolutely needed
- Light stretching
- Mobilizations
- Splinting
 - Fractures (clavicular), ligament

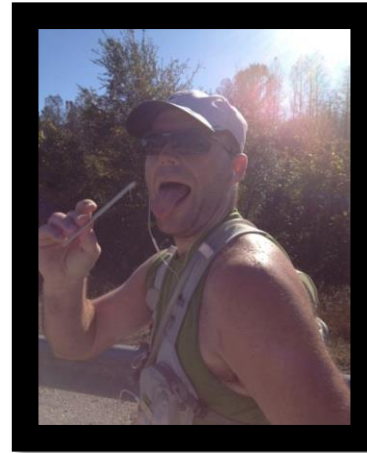


Dermatological



Dermatological

- Chaffing
 - Vaseline sticks
- Blisters
 - Large blisters
 - clean with alcohol
 - drain
 - apply antibiotic ointment
 - bandage
 - Subungual Hematoma
 - acute decompression



Dermatological

- Wounds
 - Road Rash and lacerations
 - clean with NS and antiseptic
 - dress
 - refer for sutures PRN
 - Foot Lacerations
 - objects in water or during T1
- Sunburn/Wind burn
 - Aloe spray
- Marine-Life Encounters
 - Vinegar



Discharge



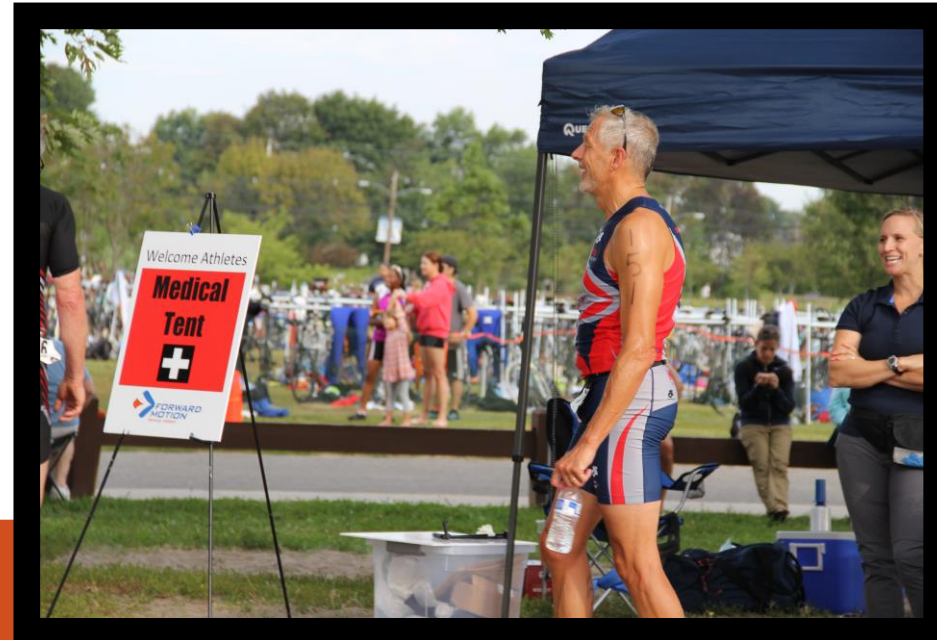
Prepare for D/C

- PT education
 - dx & tx
 - change in sxs
 - referral for f/u
- Consider
 - athlete's travel plan
 - ambulation to hotel
 - flight
 - pressurization



General Discharge Criteria⁽³³⁾

- Athlete can:
 - ambulate independent or mod independence
 - demo a clear sensorium
 - take in liquids
 - urinate



Final Treatment Considerations

- GI symptoms
 - 93% endurance athletes experienced some type (25)
- Acetaminophen
 - Identification system- (mark runner's bib)
 - NSAIDs
 - harmful to kidney function
 - Increase risk of hyponatremia,⁽³⁴⁾
- Consider the unexpected
 - MVA/ watercraft





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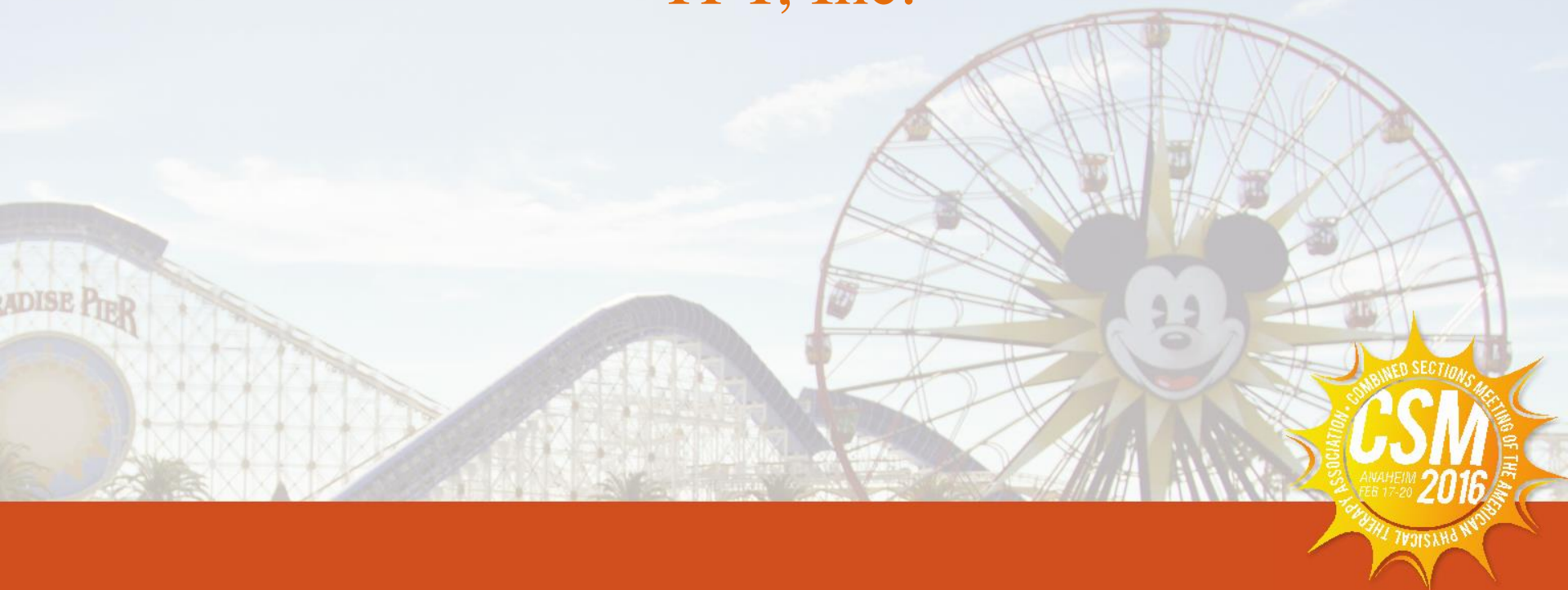
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Triathlon – Injury Prevention

Race Day

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Injury Prevention

- Proper Fluid Status & Replacement
- Proper Fueling
 - Nutritional needs
- Environmental Injury Prevention
 - Hyperthermia
 - Hypothermia
- Proper Preparation
 - Training
 - “Know thyself”
 - Practice with ALL equipment and fueling/hydration



Fluid Replacement

	Purpose	How to
Pre-event	Ensure Proper Pre-exercise hydration status	<p>Approx. 17 – 20 fl oz (500 – 600 mL) of water or sports drink 2 – 3 hours before exercise</p> <p>7 – 10 fl oz. (200 – 300 mL) of water or sports drink 10 – 20 minutes before exercise</p>
During event	<p>Approximate sweat and urine losses</p> <p>Maintenance of hydration at LESS than 2% body weight reduction</p>	7 – 10 fl oz. (200 – 300 mL) of water or sports drink every 10 – 20 min
Post event	<p>Correct any fluid loss accumulated during practice and/or event.</p> <p>Should be completed within 2 hours of exertion if bladder tolerates bolus</p>	<p>Water to restore hydration status to return athlete to proper body weight – replenishing lost water weight</p> <p>Electrolytes to speed rehydration per athlete tolerance</p>



Fluid Status

AM I HYDRATED?

Urine Color Chart

1		
2		If your urine matches the colors 1, 2, or 3, you are properly hydrated.
3		Continue to consume fluids at the recommended amounts.
4		If your urine color is below the RED line, you are
5		DEHYDRATED and at risk for cramping and/or a heat illness!!
6		<u>YOU NEED TO DRINK MORE WATER!</u>
7		
8		



Proper Fueling (Training)

Athletes with Moderate levels of Intense training

❑ Exercising 2 -3 hours/day, 5-6X/week OR

High volume 3 – 6 hours/day in 1 – 2 workouts, 5 – 6 days/week, 600 – 1200 kcal/hr

❑ Normal diet

- 2,500 - 8,000 kcals/day
- 50 - 80 kcals/kg/day for a 50 - 100 kg athlete



Proper Nutrition

	“Average” adult person, assuming 2000 kcal/day
Protein (g)	50
(% of calories)	10 – 35
Carbohydrates (g)	300
(% of calories)	45-65
Fats (g)	65
Total Fats (% of calories)	25 – 35
Saturated Fat (% of calories)	< 10
Fiber (g)	25

Adapted from Food & Nutrition Board, Institute of Medicine: Dietary Reference Intake (DRI)
http://www.iom.edu/Activities/Nutrition/SummaryDRIs/~media/Files/Activity%20Files/Nutrition/DRIs/1_%20EARs.pdf



Event Fueling

	Purpose	How to
Pre-event	Ensure Proper Pre-event fueling	3 hours prior: 150-200g carbohydrates 90 minutes prior – 60-100g carbohydrates Within one hour of race start – 25-50g carbohydrates
During event	Ensure proper fueling for performance maintenance	Emphasis on fluid replacement although some studies advocate a CHO/Protein replacement drink to supplement 15 – 20% of calories burned per gut tolerance
Post event	Replenish glycogen stores, 300-400 total calories for events that last about one hour and increase with longer events Should be completed within 30 – 60 minutes of exertion if gut tolerates bolus	Carbohydrates in a tolerable form Electrolytes to speed rehydration



Pre-Event Nutrition Plan

Dependent upon Type of Event

- **Sprint Distance**
 - No need to increase CHO or glycogen load the night before the race.
- **Olympic Distance Event**
 - Top off fluid and glycogen stores by eating an additional serving of CHO the night before the race.
- **Long and Ultra-distance**
 - Start the week before event with decreasing alcoholic intake and increasing CHO and glycogen stores
 - 3 days before event – decrease fiber and spice to reduce GI distress
 - If “heavy” sweater – Sodium load 12 – 15 hours before race



Environmental Injury Prevention

Hyperthermia

- *Proper hydration*
- Appropriate sun protection
- Layering of clothing
- Appropriate Training
 - Race effort level
- Appropriate BMI
- Pre-cooling
- Acclimatization

Hypothermia

- Biggest risk is in the Swim
- Appropriate layering
- Use of Wetsuit
 - Allowance
 - Type
- Extra
 - 2 swim caps – top being neoprene
 - Ear plugs
 - Neoprene socks
- Acclimatization



“Know thyself”

- Plan
 - Splits
 - Hydration
 - Fueling
 - Transitions
- Pace yourself
 - Know your splits
 - Race day “magic”



Practice, Practice, Practice . . .

- Open Water starts
 - Podium
 - Beach Start
- Open Water Swims
 - Decrease anxiety
 - Increase efficiency



Plan, Practice, Practice . . .

- Hydration
 - Water
 - Electrolyte drinks
- Fueling
 - Pre-event
 - During event



Practice, Plan, Practice



- *Mental practice*
- *Actual practice*
- *Organize your equipment needs*
 - Clothing
 - Equipment
 - Swim – goggles, swim cap
 - Cycling – helmet
 - Running – footwear, sunglasses, headgear
 - Fueling & Hydration



Practice, Pyramids, Plan . . .



Pyramids

Finishes

Recovery



Practice, Practice, Practice . . .





Thank You!



WHAT IS A DUATHLON?



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Questions/Answers . . .

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