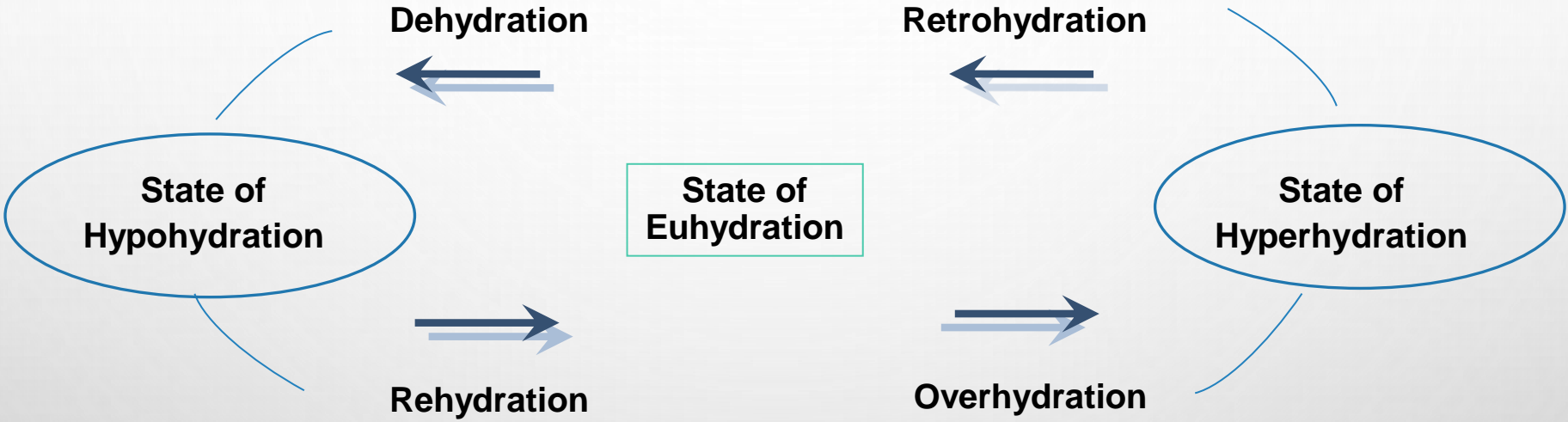




# THE PREVALENCE AND MEASURES OF DEHYDRATION IN STUDENT-ATHLETES

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# Hydration Terms



# CLINICAL RAMIFICATIONS

## Hypohydration

1. CARDIOVASCULAR STRAIN
2. THERMOREGULATORY STRAIN
3. DECREASED CENTRAL DRIVE



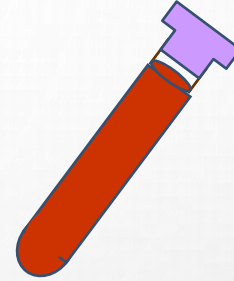
Performance Decrease  
Heat Illness Concerns

## Hyperhydration

1. HYPONATREMIA

# MEASURES OF HYDRATION STATUS

- SERUM OR PLASMA OSMOLALITY
- URINE VOLUME
- BIOIMPEDANCE SPECTROSCOPY
  
- CHANGES
  - PLASMA VOLUME SHIFTS



# MEASURES OF HYDRATION STATUS

- **URINE SPECIFIC GRAVITY**
  - REFRACTOMETER
    - CLINICAL OR DIGITAL



# MEASURES OF HYDRATION STATUS

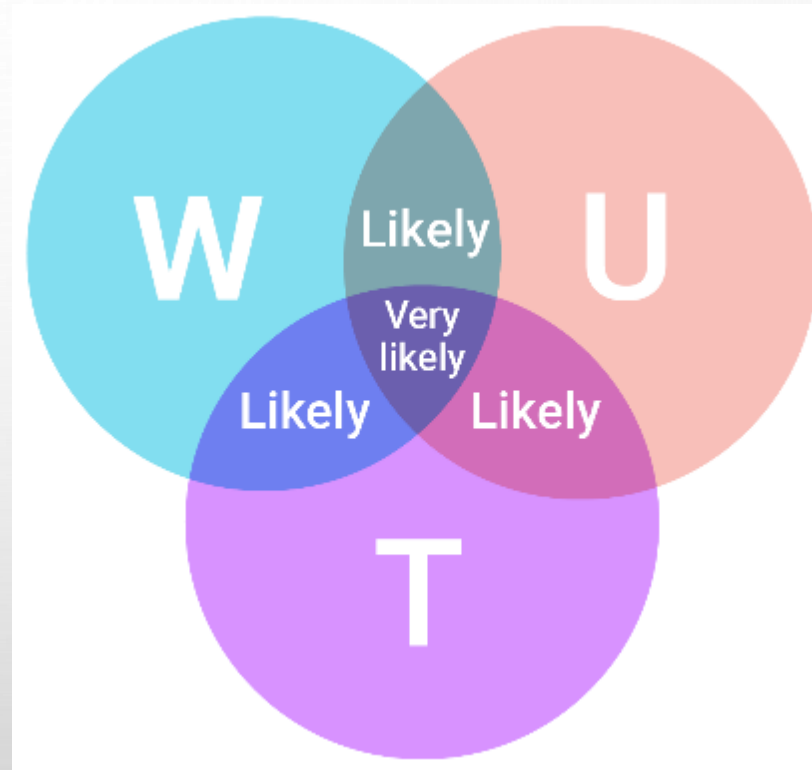




# OVERALL HYPOHYDRATION ASSESSMENT

“WUT” IS THE ANSWER?

- **W** EIGHT (% LOSS)
- **U** RINE (DARK COLOR)
- **T** HIRST (PRESENT)
- F R E Q U E N C Y



# CALCULATIONS: ABSOLUTE LOSS

**ABSOLUTE = PRE ACTIVITY WEIGHT – POST ACTIVITY WEIGHT**

- **ADVANTAGES**

- EASY-QUICK
- IMMEDIATE FLUID INTERVENTION
  - 1 KILOGRAM = 1 LITER

- **DISADVANTAGES**

- DOESN'T TAKE INTO ACCOUNT THE SIZE OF THE ATHLETE





## CALCULATIONS: PERCENT DEHYDRATION (WITHIN)

Percent  
Dehydration =

Pre-activity weight – post activity  
weight

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Pre-activity weight

x  
100

### Advantages

- Takes into account size of the athlete

### Disadvantages

- Logistics of calculating (hand or computer)

## CALCULATIONS: PERCENT DEHYDRATION (ACROSS)

$$\text{Percent Dehydration} = \frac{\text{Baseline weight} - \text{post activity}}{\text{Baseline weight}} \times 100$$

### Advantages

- “Big Picture”: hydration status across days

### Disadvantages

- Logistics of calculating (hand or computer)
- Logistics of creating a baseline weight

# HYPOHYDRATION

<b>% Dehydration</b>	<b>Physiological Affects</b>
$\geq 2\%$	Performance
$\geq 3\%$	Cardiovascular strain Thermoregulation impairment
$\geq 4-5\%$	Significant effects (all of the above)

Casa et al, 2010  
Gonzalez-Alonso et al, 1995  
Sawka et al, 1985  
Sawka et al, 2001  
Judelson et al, 2007

## Practices of Athletic Trainers Using Weight Charts to Determine Hydration Status and Fluid-Intervention Strategies

Jeremy M. Eith, MS, LAT, ATC<sup>†</sup>; Clint R. Haggard, MA, ATC, NREMT-B<sup>†</sup>;  
 Dawn M. Emerson, PhD, ATC<sup>‡</sup>; Susan W. Yeargin, PhD, ATC<sup>†</sup>

**Table 2. Use of Weight Charts by Athletic Trainers (n = 143)**

Implementation Categories	Survey Options	No. (%)
Method	Paper	67 (47.2)
	Computer	27 (19.0)
	Both	48 (33.8)
Start date	Preparticipation physical examination	19 (13.9)
	Preseason: First day	113 (82.5)
	Regular season: First day	5 (3.6)
Length of time	≥1 wk	4 (3.2)
	2–3 wk	77 (60.2)
	1 mo	24 (18.8)
	Entire season	23 (18.0)
Writing or inputting weights	Athletic training student or aide	44 (32.6)
	Athletic trainer	19 (14.1)
	Strength and conditioning coach	15 (11.1)
	Athlete	57 (42.2)
Unit of measurement	lb	137 (99.3)
	kg	1 (0.7)
Person in charge of calculating	Do not calculate	18 (13.8)
	Athletic training student or aide	3 (2.3)
	Athletic trainer	73 (56.2)
	Team coach	8 (6.2)
	Computer	27 (20.8)
Calculations	Athlete	1 (0.8)
	Do not calculate changes	12 (9.4)
	Absolute difference from baseline	5 (3.9)
	Absolute difference pre- to postexercise	54 (42.2)
	Percentage difference from baseline	10 (7.8)
Percentage difference from pre- to postexercise	47 (36.7)	

# PREVALENCE OF HYPOHYDRATION

- SOCCER: 63%
- NCAA D1 53%
- CLUB ATHLETES 40%

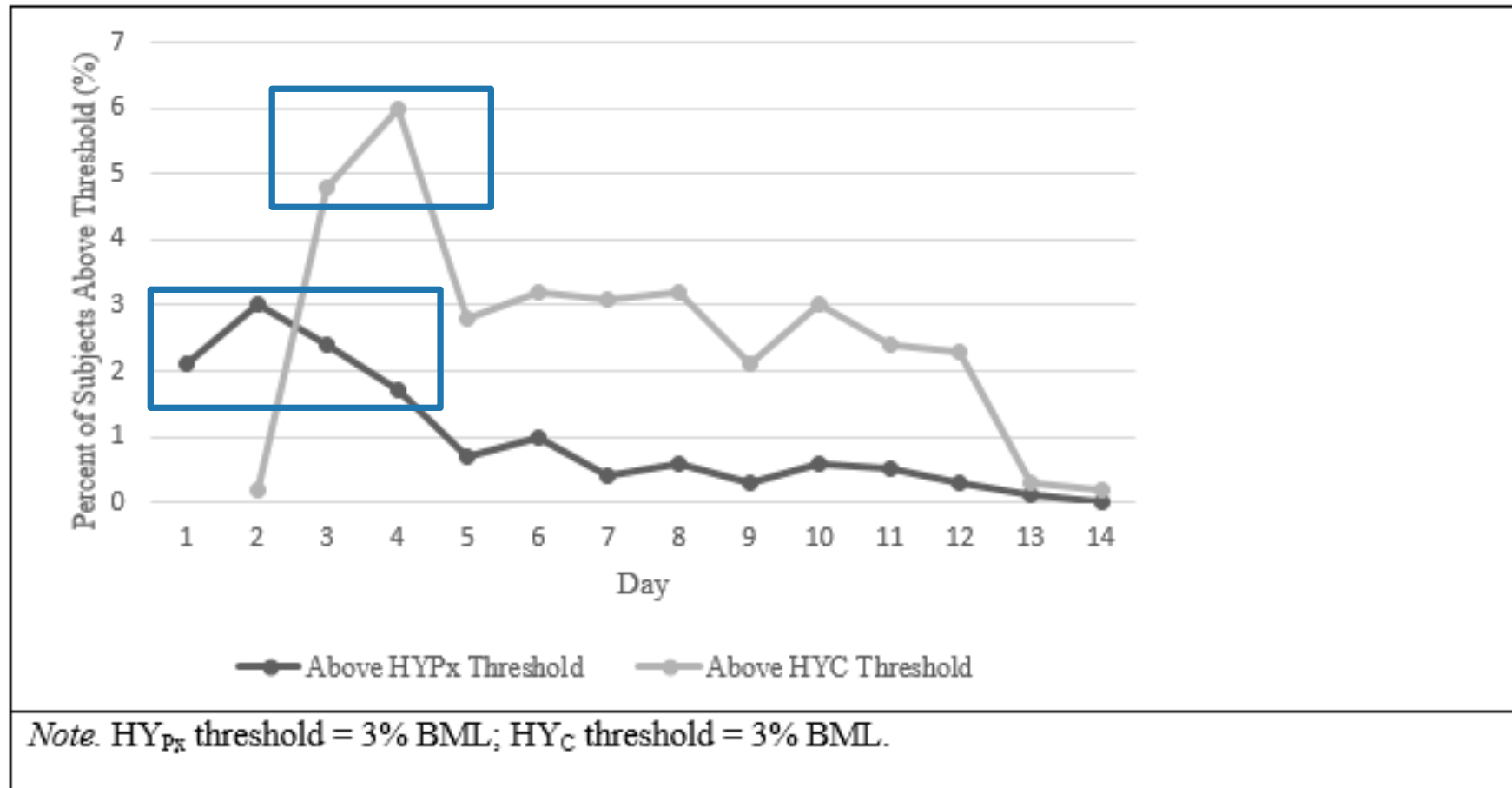
McCartney D, Desbrow B, Irwin C. The effect of fluid intake following dehydration on subsequent athletic and cognitive performance: a systematic review and meta-analysis. *Sports medicine-open*. 2017 Dec;3:1-23.

Volpe SL, Poule KA, Bland EG. Estimation of prepractice hydration status of National Collegiate Athletic Association Division I athletes. *J Athl Train*. 2009 Nov-Dec;44(6):624-9.

Magee PJ, Gallagher AM, McCormack JM. High prevalence of dehydration and inadequate nutritional knowledge among university and club level athletes. *International journal of sport nutrition and exercise metabolism*. 2017 Apr 1;27(2):158-68.

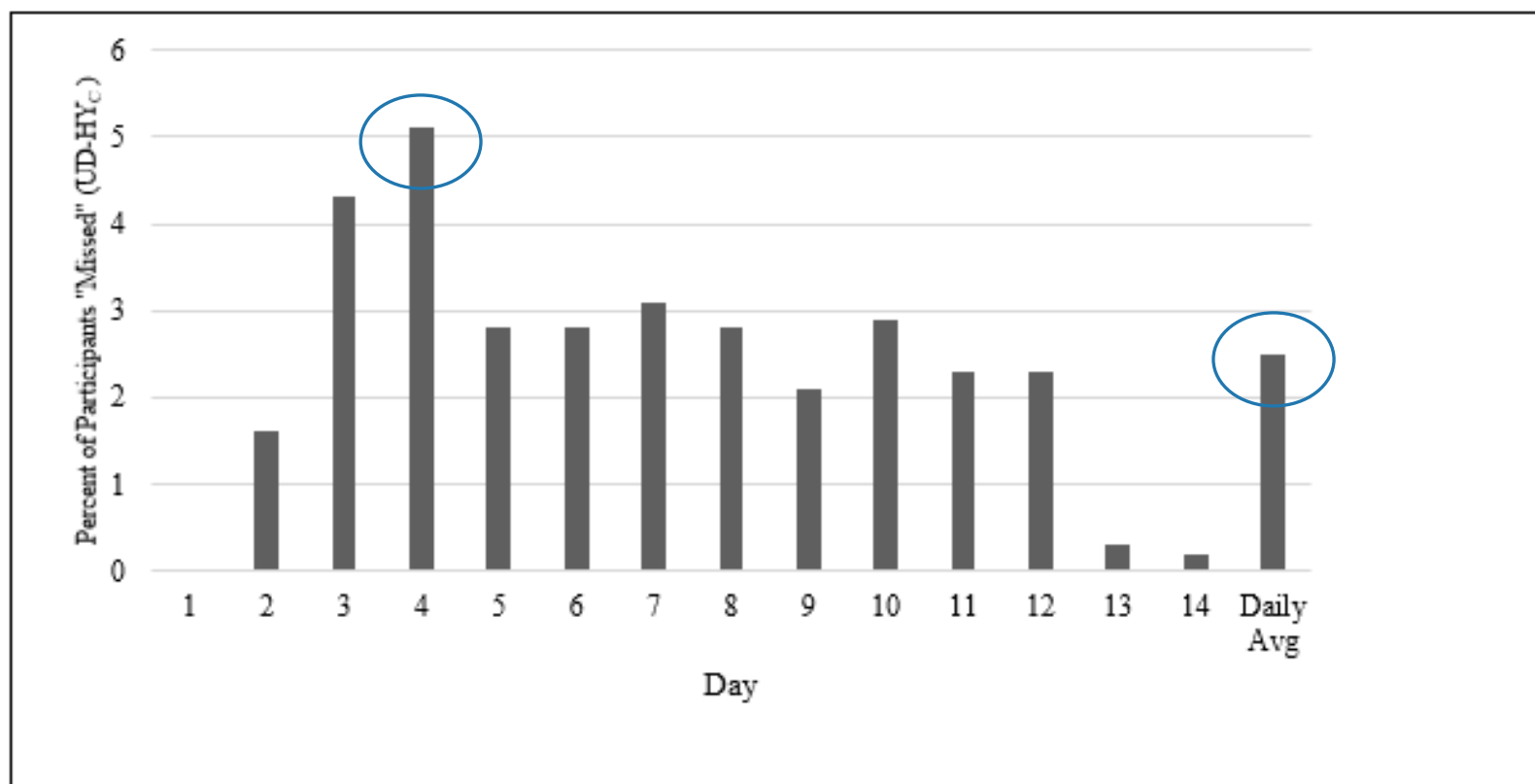
# THE PREVALENCE OF HYPOHYDRATION IN SCHOOL SPONSORED ATHLETES ACROSS AND WITHIN PRACTICE SESSIONS

**FIGURE 1** PROPORTION OF ATHLETES ABOVE HYPOHYDRATION THRESHOLDS BY DAY





**FIGURE 2** DAILY PERCENTAGE OF ATHLETES WITH UNDETECTED CUMULATIVE HYPOHYDRATION



*Note.* Cumulative hypohydration was not calculated on the first day. Day 1 was not included for the daily average calculation.

The image features a light gray background with a subtle, circular, embossed watermark in the center. The watermark is a faint, circular emblem with intricate details, possibly a logo or seal, but it is too light to be clearly discernible. Scattered around the perimeter of the image are several realistic water droplets of various sizes, rendered with soft shadows and highlights to give them a three-dimensional appearance. The droplets are most concentrated in the top-left and bottom-right corners, with a few smaller ones scattered elsewhere.

**THANK YOU!**