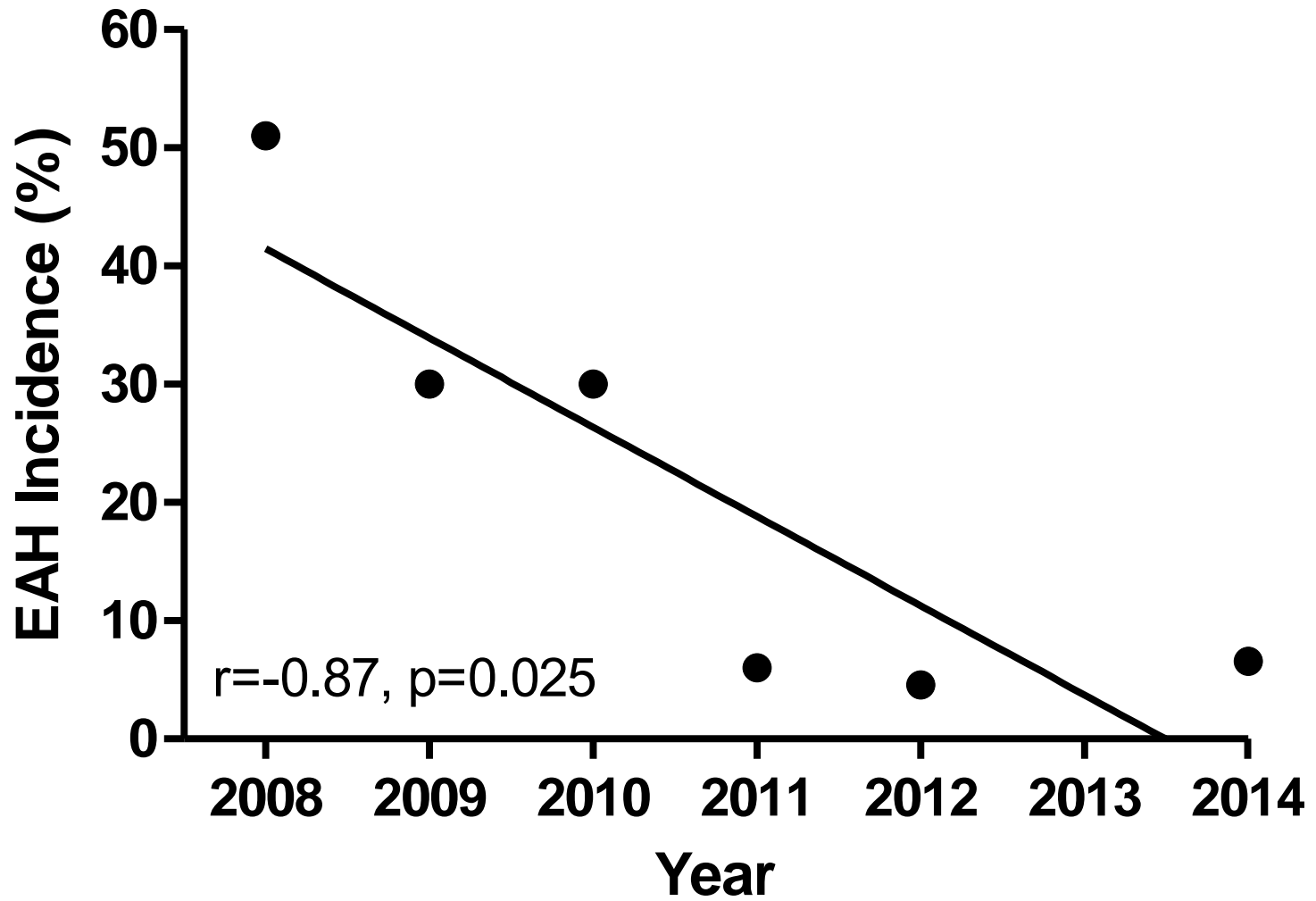


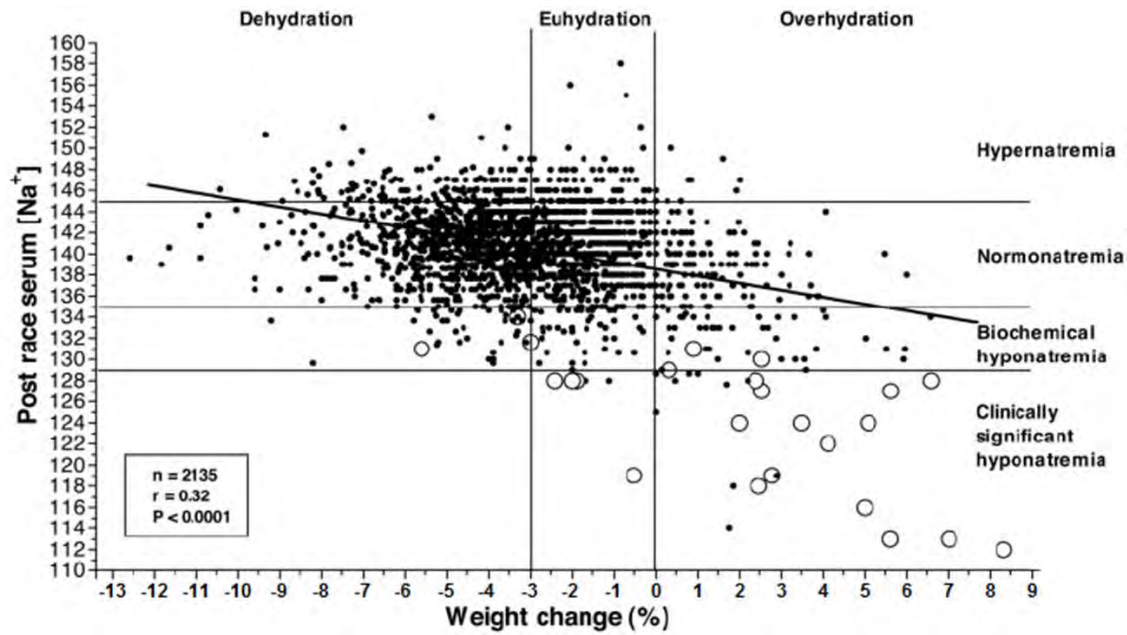
New Knowledge from WSER Research Fact and Fiction about Sodium and Hydration

Martin D. Hoffman, MD, FACSM, FAWM

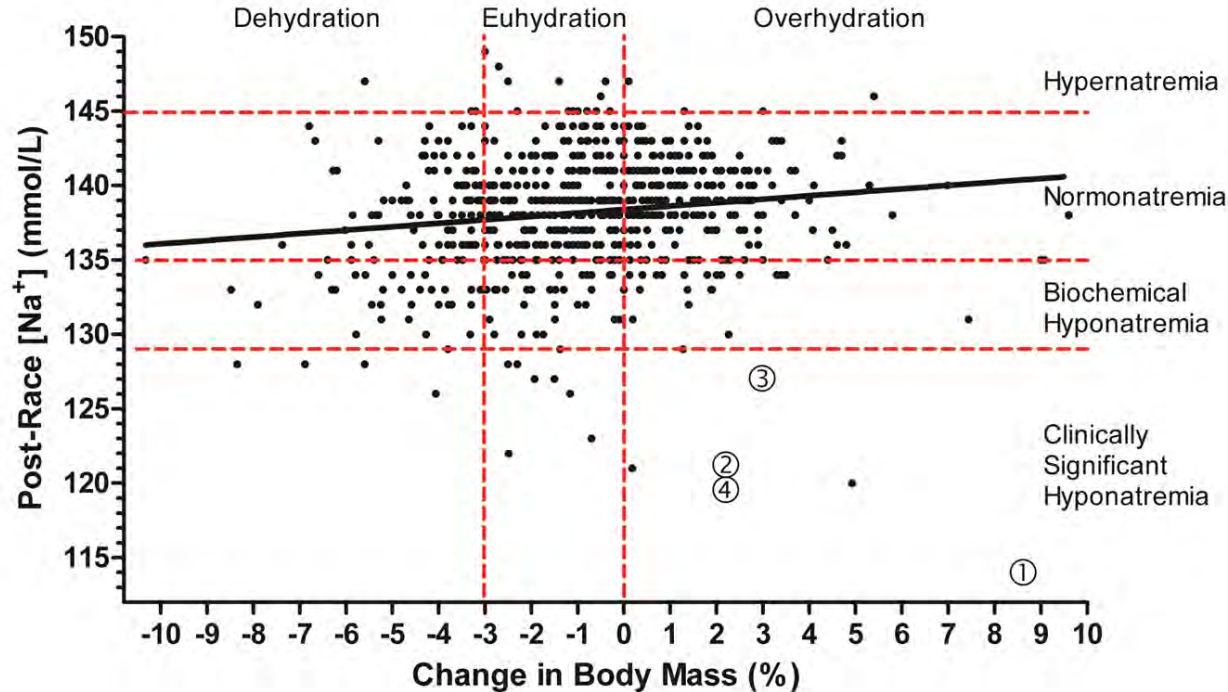
Professor of PM&R, University of California Davis
Chief of PM&R, VA Northern California Health Care System
Director of Research, Western States Endurance Run
Chief Medical Officer, Ultra Medical Team

Disclosure: The contents presented herewith do not represent the views of the
Department of Veterans Affairs or the United States Government.





Noakes et al. PNAS. 2005



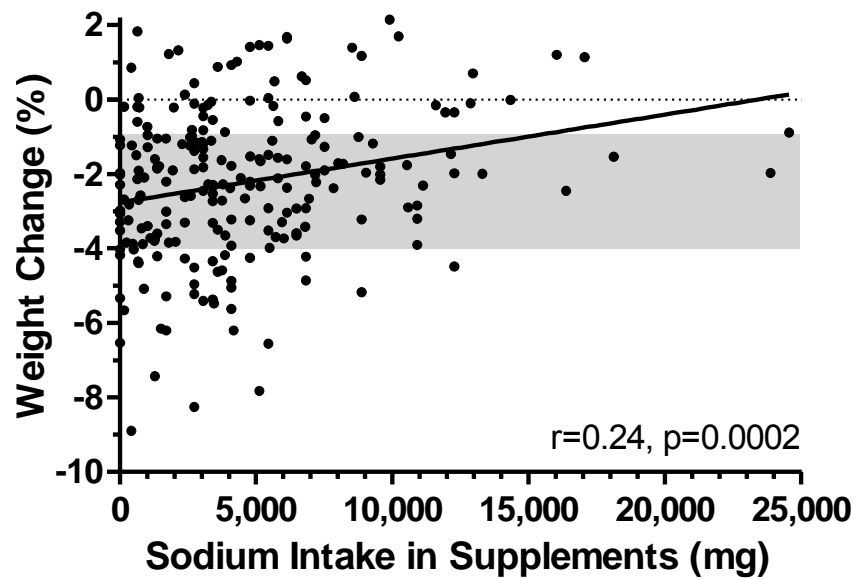
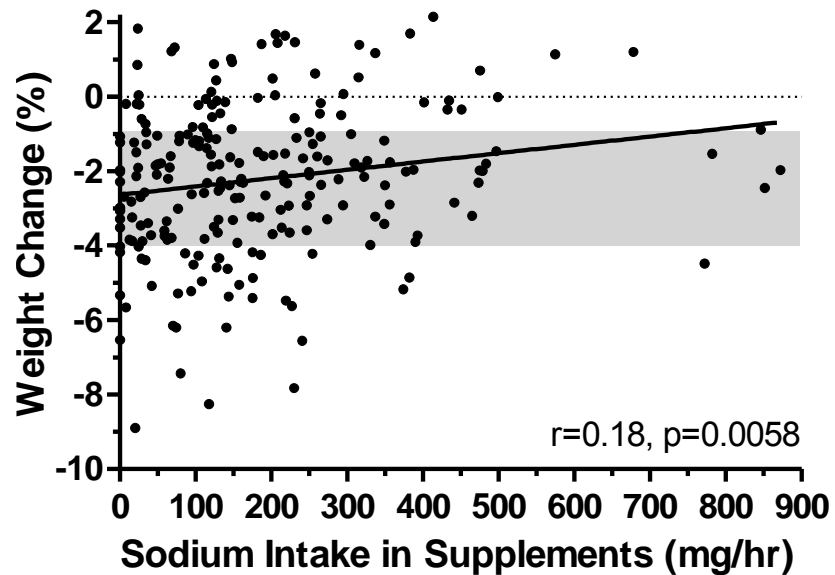
Hoffman et al. Med Sci Sports Exerc. 2013
 Hoffman et al. Clin Nephrol. 2014



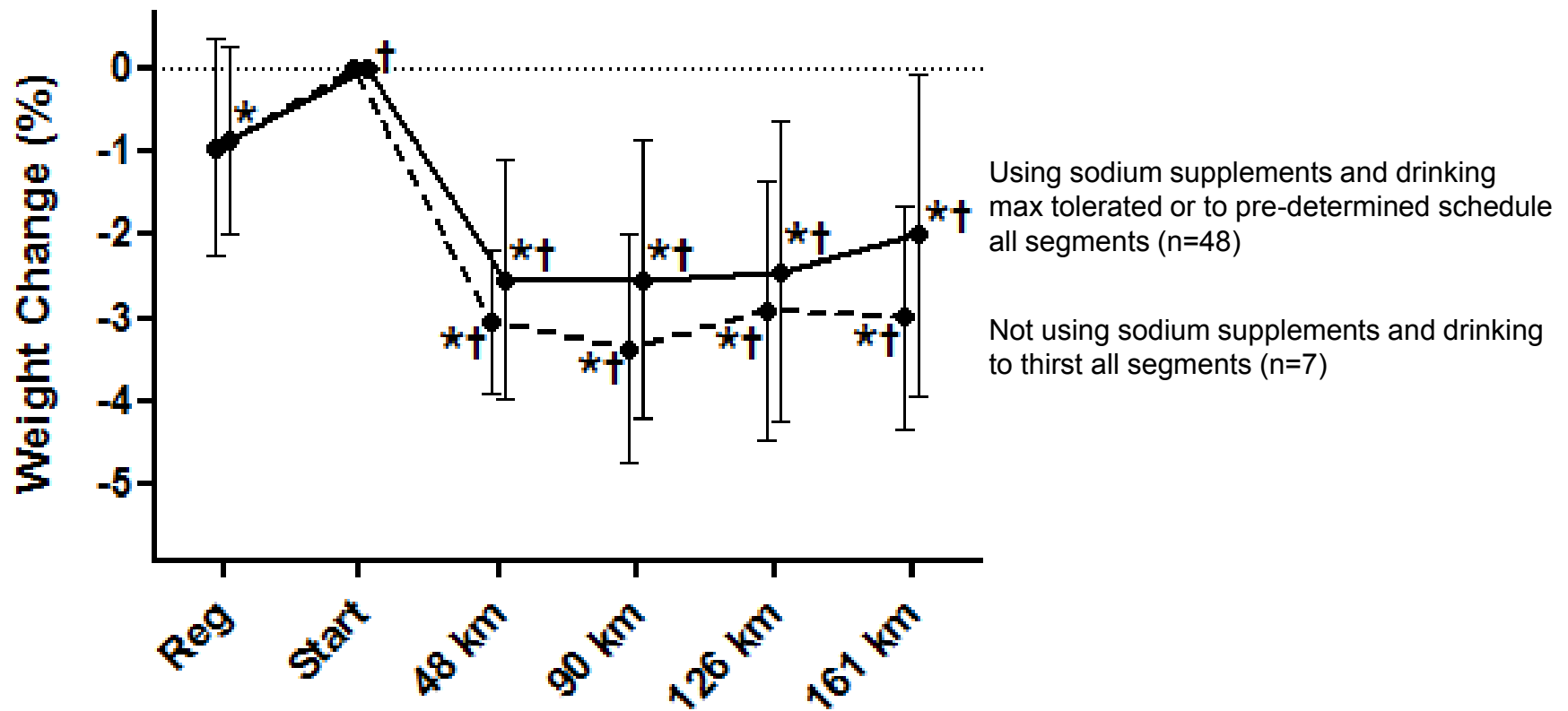
As advertised.....

- Alleviation of cramping
- Buffers to help stabilize the stomach
- Protection against potentially fatal hyponatremia

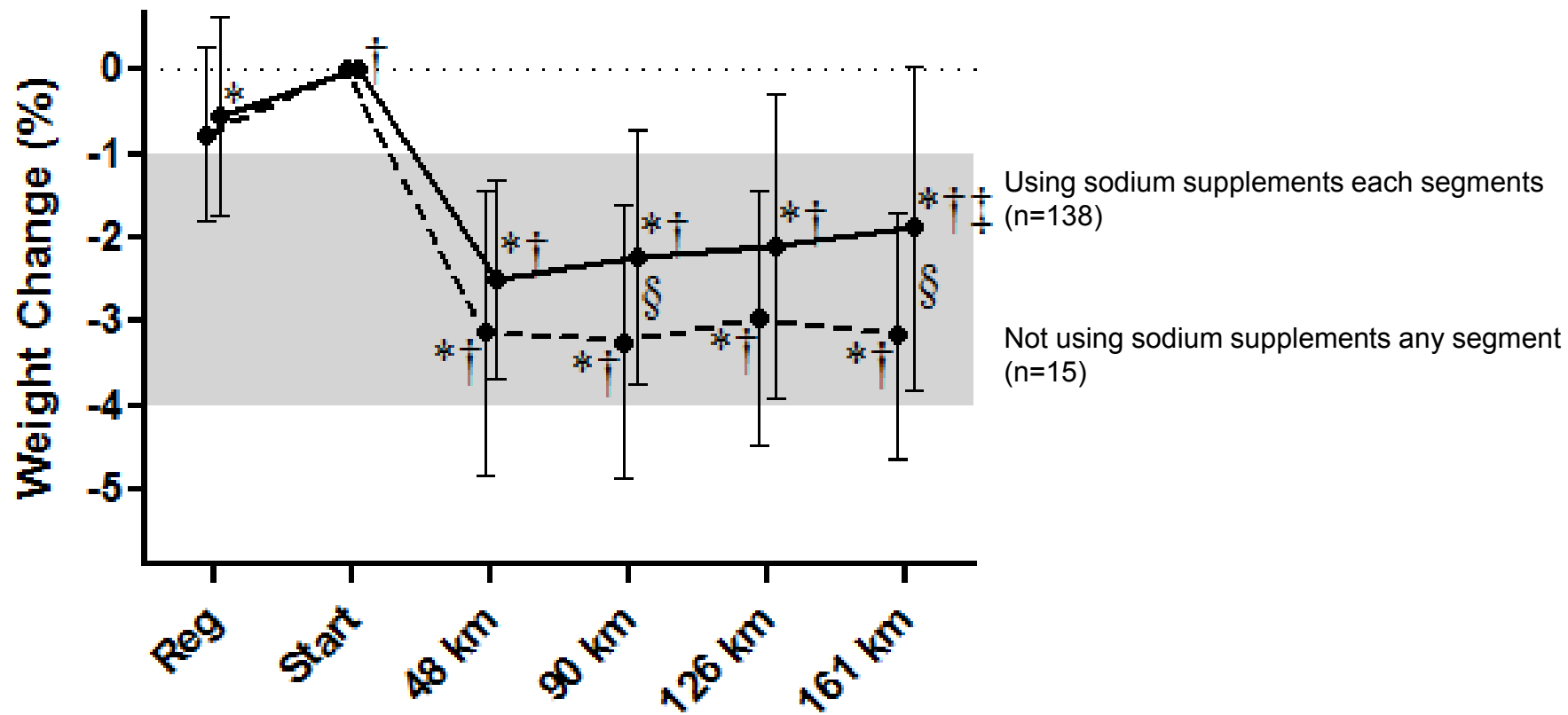
2014 WSER



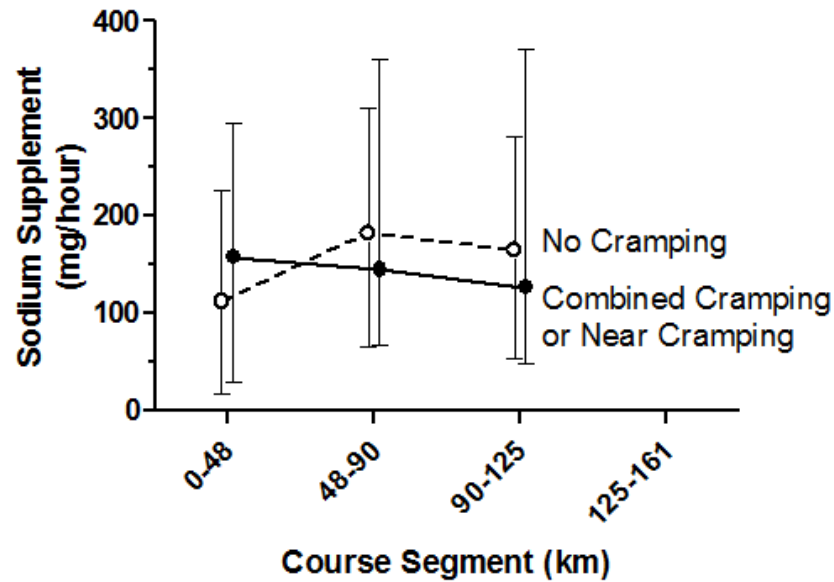
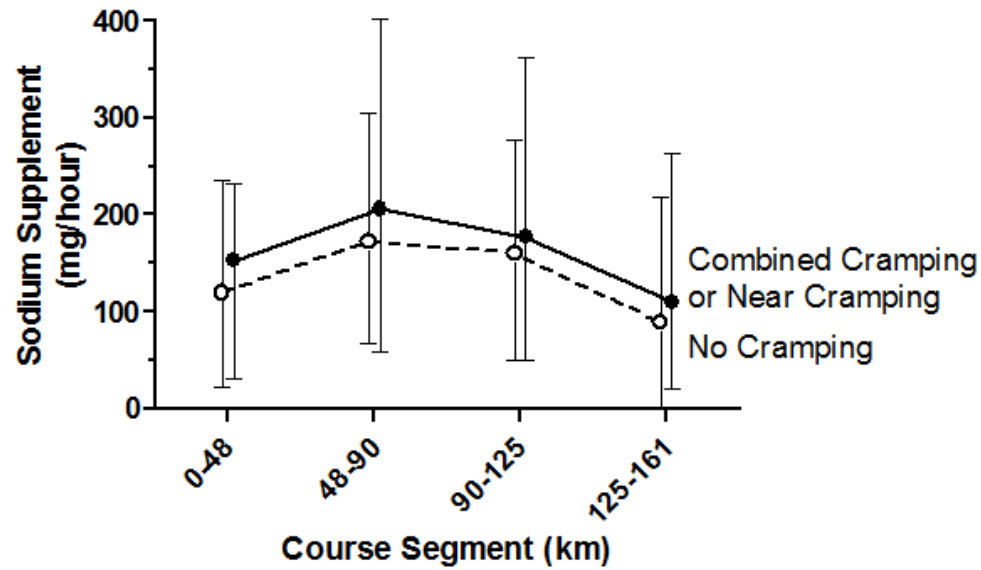
2013 WSER



2014 WSER

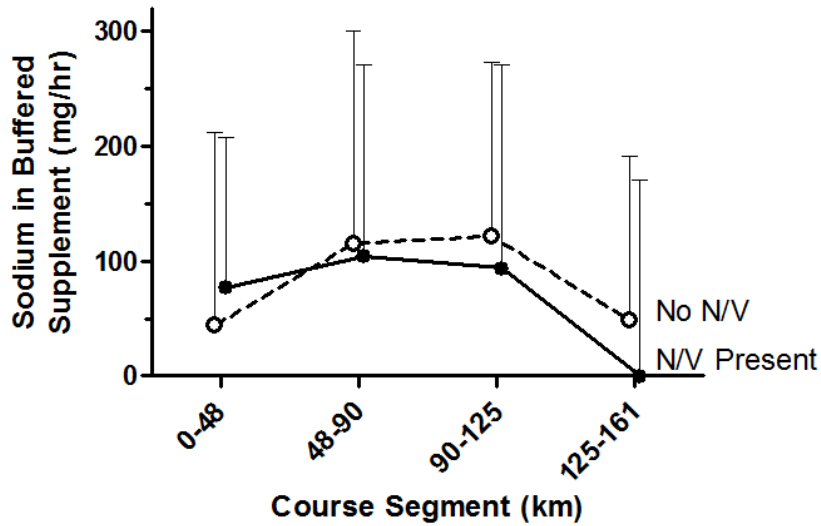


2014 WSER

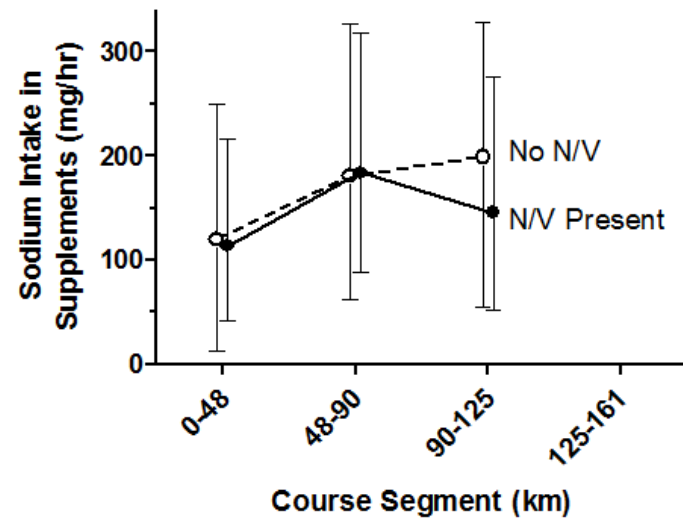
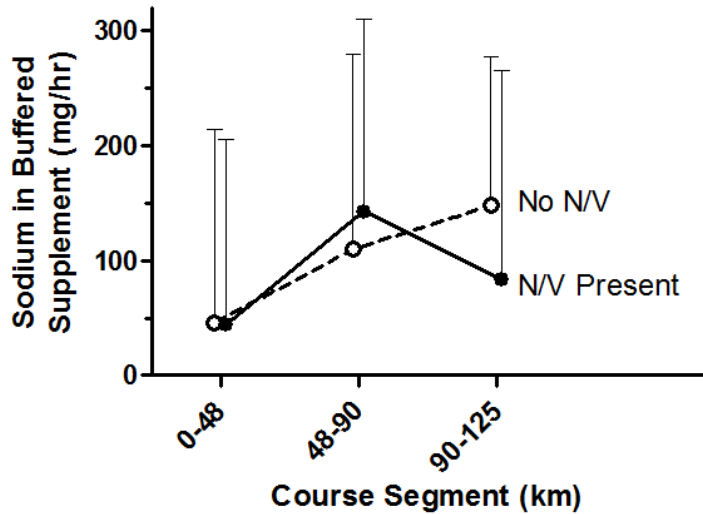
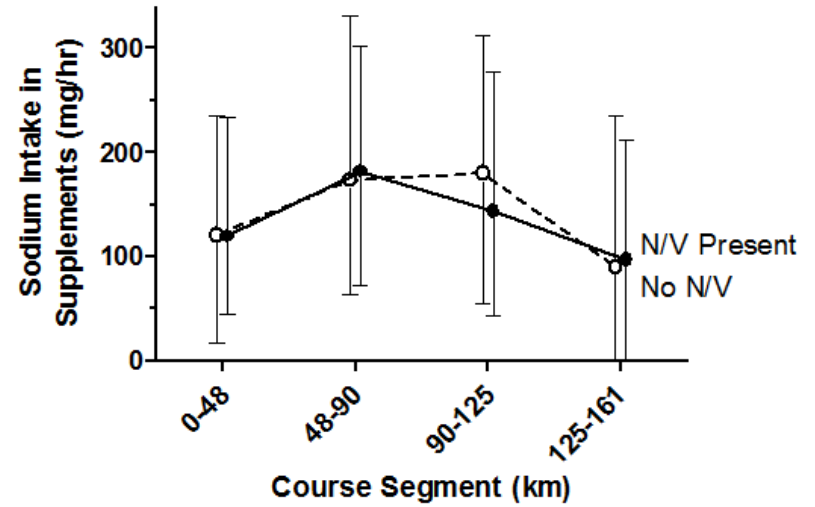


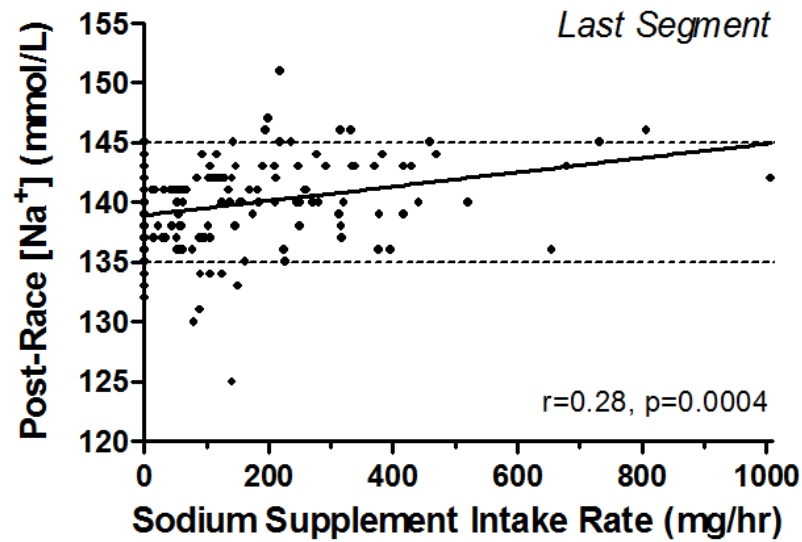
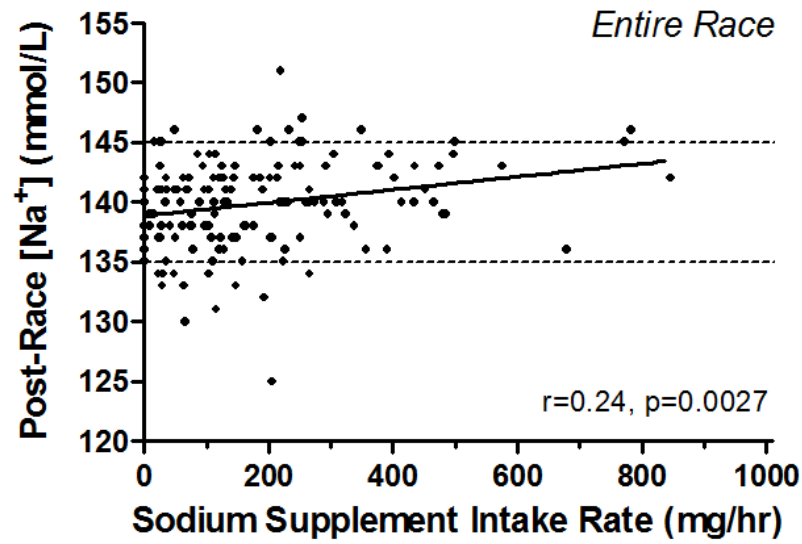
2014 WSER

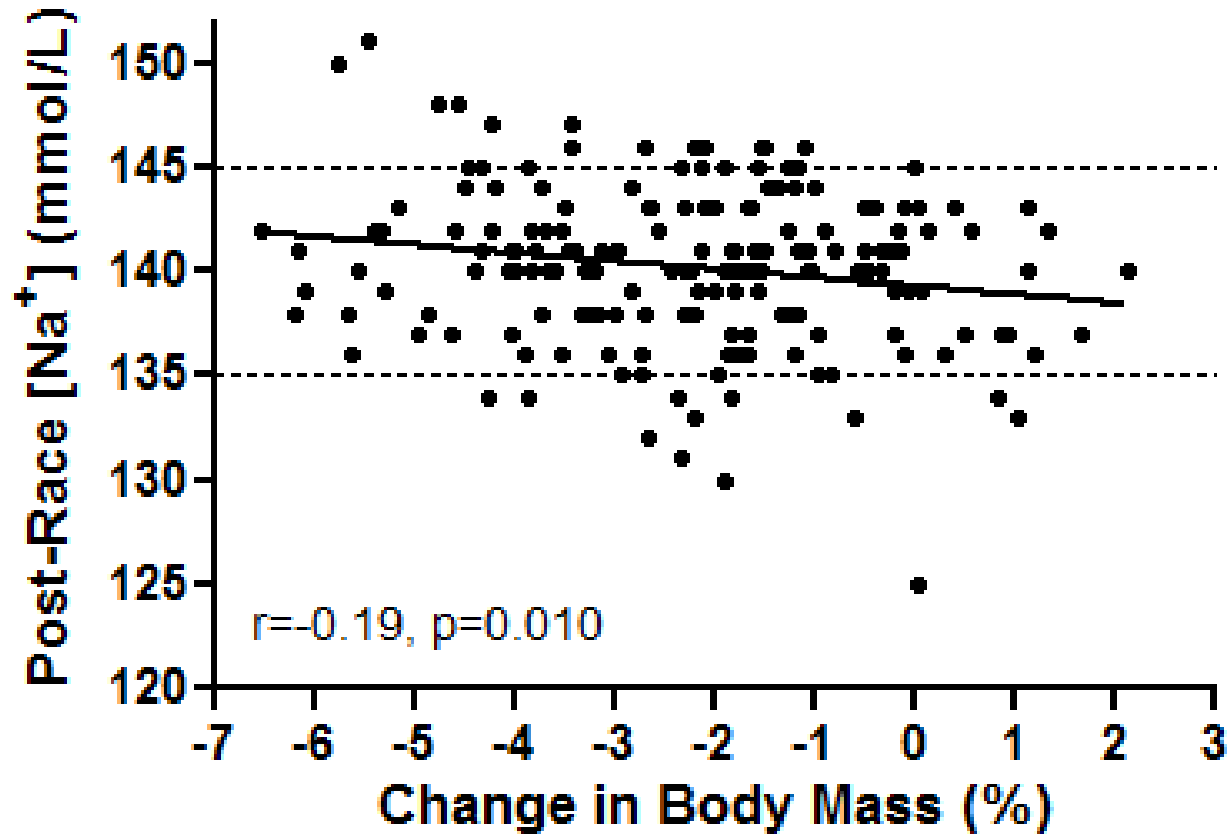
Sodium in Buffered Supplements



Sodium in All Supplements







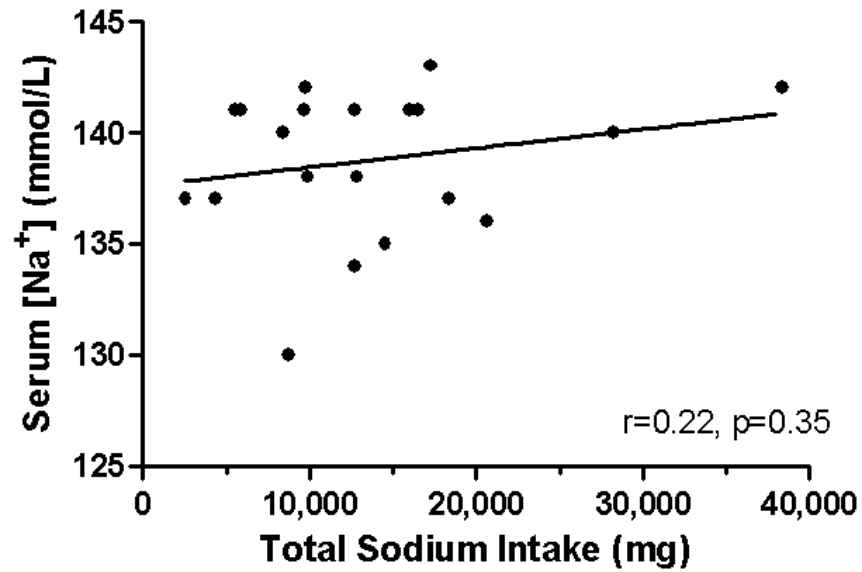
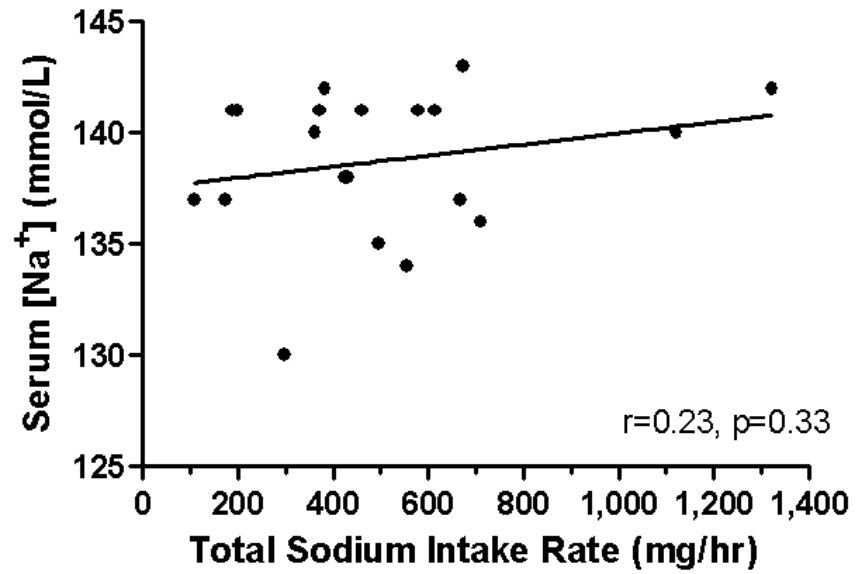
Sodium Supplementation in Ultramarathon Running

- Not a cause for EAH
- Enhance body weight maintenance
....but beyond what is appropriate
- Not related to muscle cramping
- Not related to nausea or vomiting

What about total sodium intake?

- 2014 WSER
- 30 runners provided full dietary data - 20 finished
- Total sodium intake = $13,651 \pm 8,444$ mg (range 2,541-38,338 mg)
- Sodium in food and drink accounted for 66.3% of total sodium (range 34.2-100%)

2014 WSER



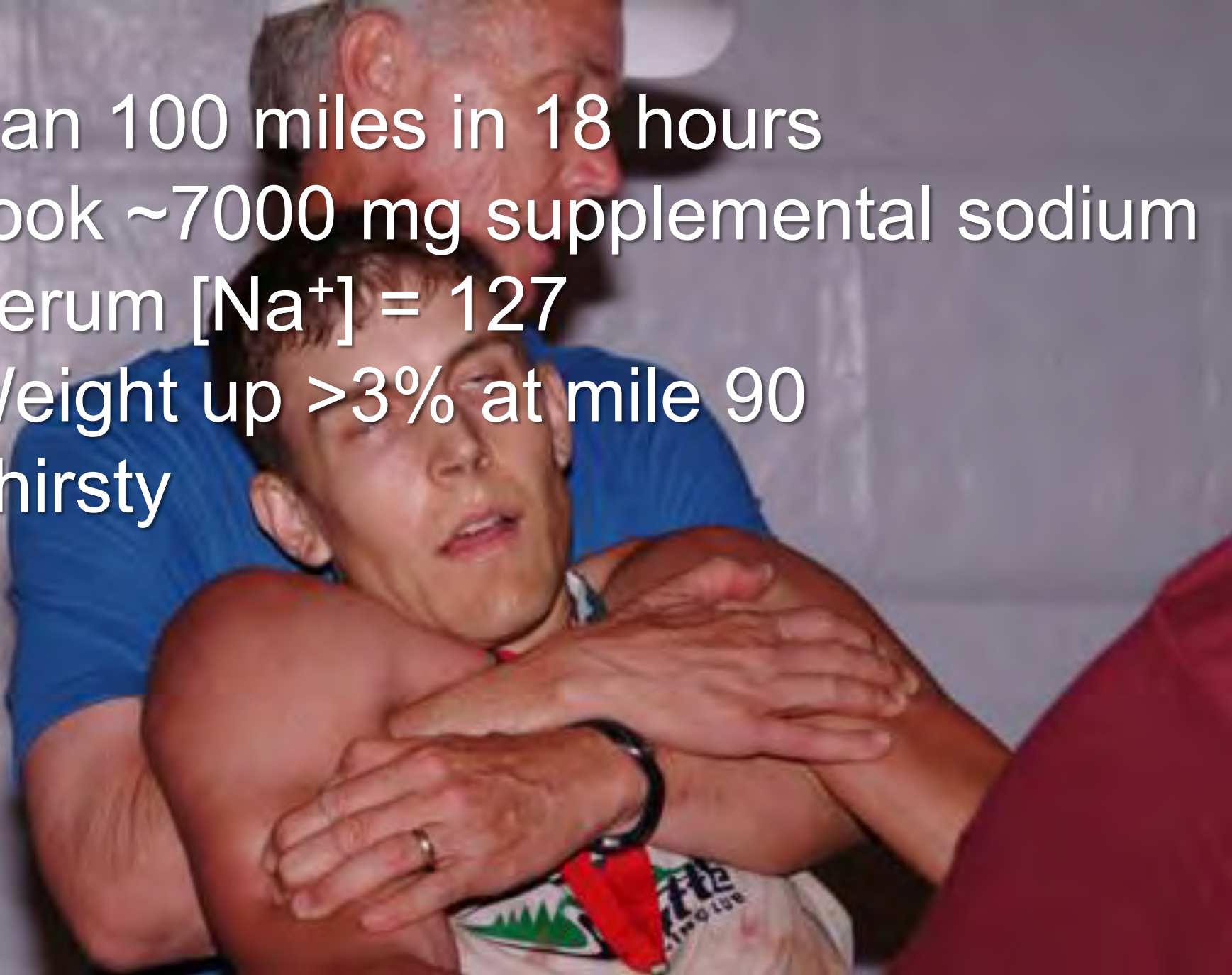
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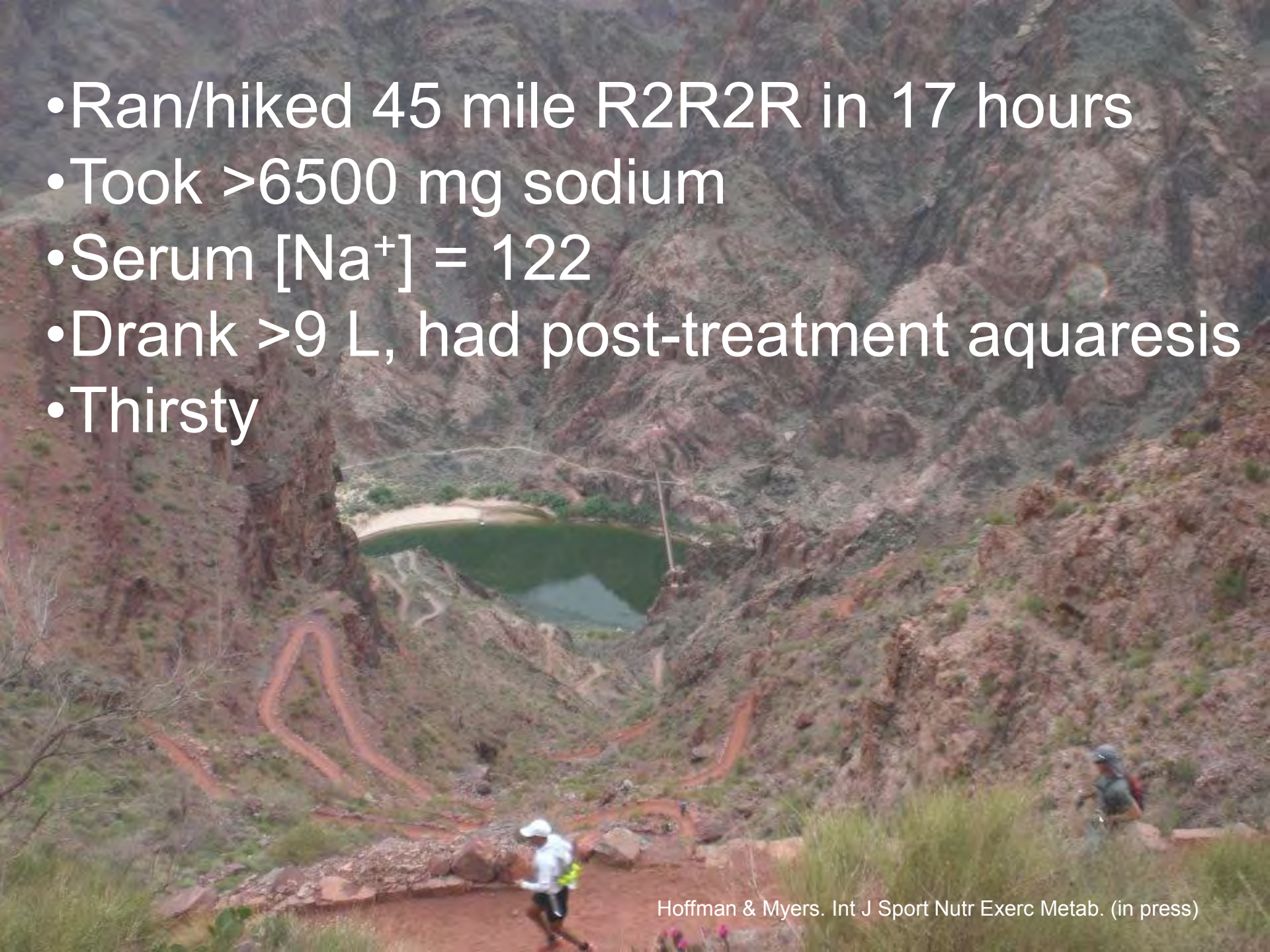


**Can too much sodium be a
problem?**

- Ran 100 miles in 18 hours
- Took ~7000 mg supplemental sodium
- Serum $[Na^+] = 127$
- Weight up $>3\%$ at mile 90
- Thirsty



- Ran/hiked 45 mile R2R2R in 17 hours
- Took >6500 mg sodium
- Serum $[Na^+] = 122$
- Drank >9 L, had post-treatment aquaresis
- Thirsty





- Dropped at 90 miles after 27.6 hours
- Took >8500 mg supplemental sodium
- Serum $[Na^+] = 122$
- Weight up >2% at mile 90
- Thirsty

Clinical Nephrology, DOI 10.5414/CN108233



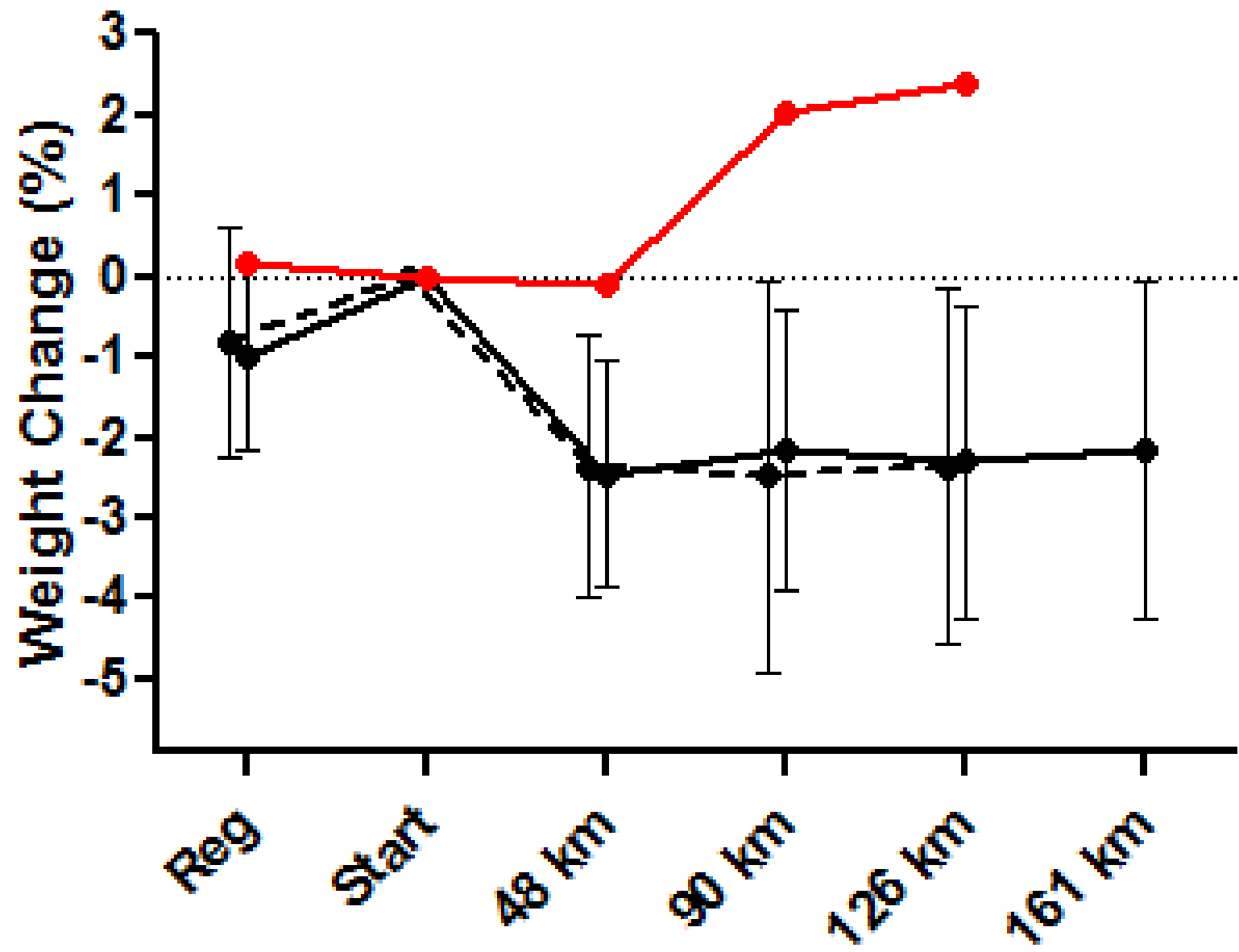
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Exercise-associated hyponatremia with exertional rhabdomyolysis: importance of proper treatment

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Prevention Recommendations

(Bennett et al. Wilderness Environ Med. 2014)

- **Avoid overhydration -
Drink to thirst!**
- **Avoid excessive sodium
supplementation**



Thank You!

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