



High School Sports: A Longitudinal Follow-up Study on Physical Activity and Lifespan



Zach Watson, Robin Bleicher & Dr. Susan Trumbetta

Introduction

- While the research examining sports participation specifically in adolescence is limited, there is a well-established association between physical activity, including sports participation, and longevity (Loprinzi, 2015; Antero et al, 2021)
- However, there is also evidence that football participation may be negatively associated with lifespan
 - Frequent mild traumatic brain injury (MTBI) may confer risk for neurodegenerative disease later in life (Nguyen et al, 2019)
 - Evidence is mixed regarding the effect of concussions and MTBIs on adverse outcomes later in life (Noble & Hesdorffer, 2013)
 - Weight gain and other physical injuries physical injuries may reduce cardiovascular health (Nguyen et al, 2019)
 - Previous work of this lab in 2015 found that student athletes had higher risk of mortality by age 70 than general population, and that effect was entirely due to football (Acosta & Trumbetta, 2015)
 - This pilot study was based in was based in a single high school. The present study tests the relationship between sports participation and lifespan again with a larger sample

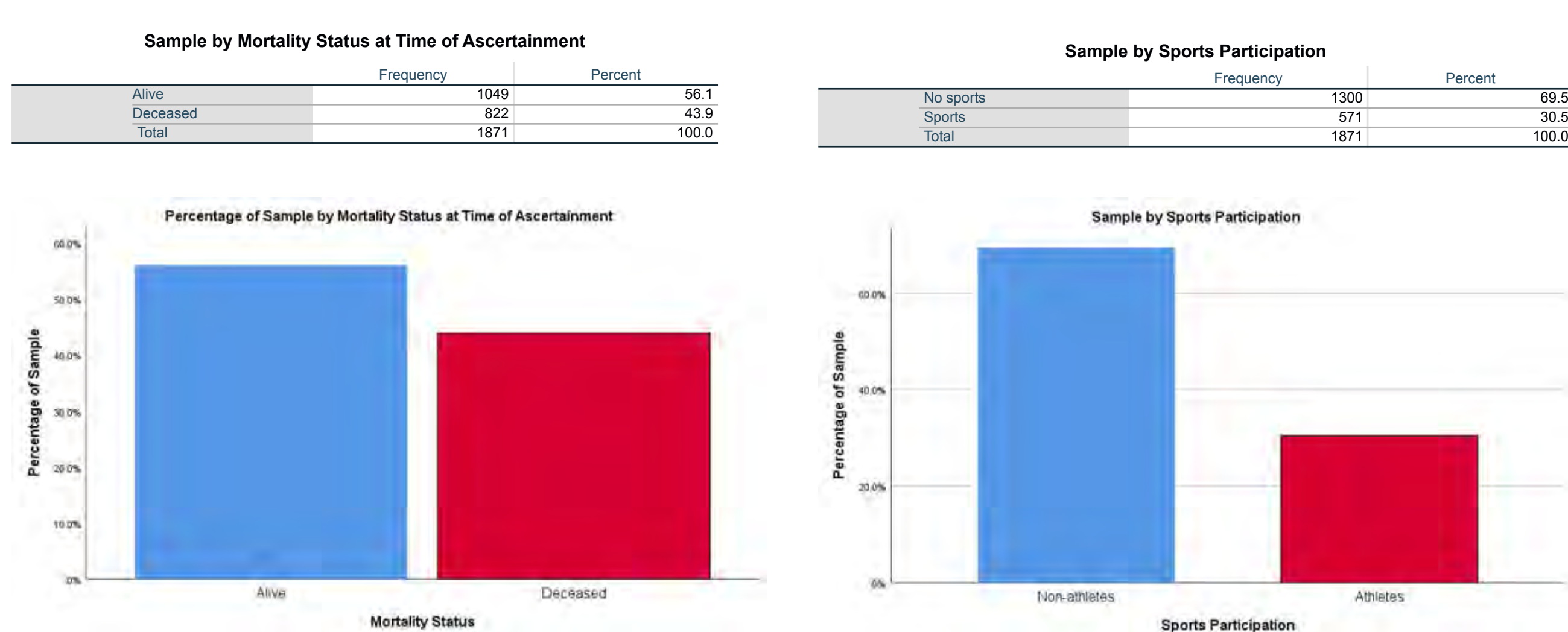
Hypotheses

- Adolescents who played a sport in high school will have a higher life expectancy compared to those who did not
- Adolescents who played football will have a lower life expectancy compared to those who played other sports

Methods

- Our sample was gathered in 1954 by Starke R. Hathaway and Elio Monachesi as part of an effort to adapt the Minnesota Multiphasic Personality Inventory (MMPI) for use with adolescents
 - Consists of adolescents from Minnesota approximately 15 years old (n = 11,329) who took the MMPI
- Using the Ancestry Library edition database, we searched for any death records of our participants in order to ascertain their mortality status
 - The sample used for the present study includes only the men from the original sample - due to lack of sports participation prior to Title IX and surname changes that impede easy follow-up in death records, women were excluded from the present study
 - The present study is a subset of the men in the original study (n=1,871) for which we had high school yearbooks
- Hathaway's archive contained 19 high school yearbooks with varying degrees of information regarding sports participation
- Students coded yearbooks for participation in each sport offered

Descriptive Statistics

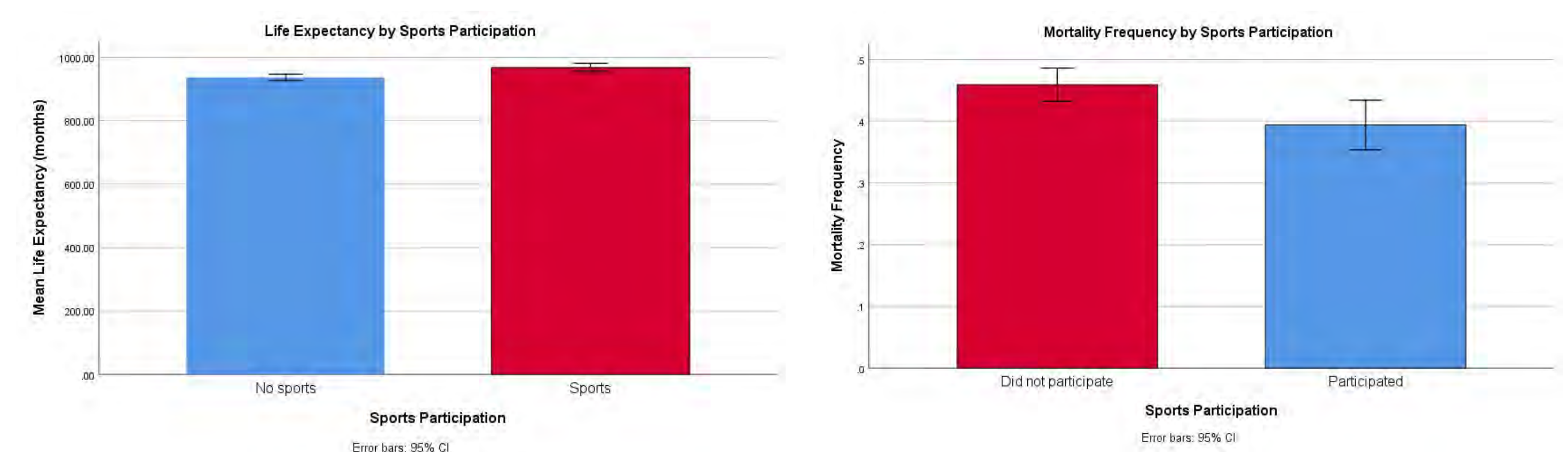


Results

Hypothesis 1: Varsity Sports Participation

An independent samples t-test indicates that student athletes live approximately 31 months longer than those who did not play sports (95% CI [14.44, 47.8], p=.000).

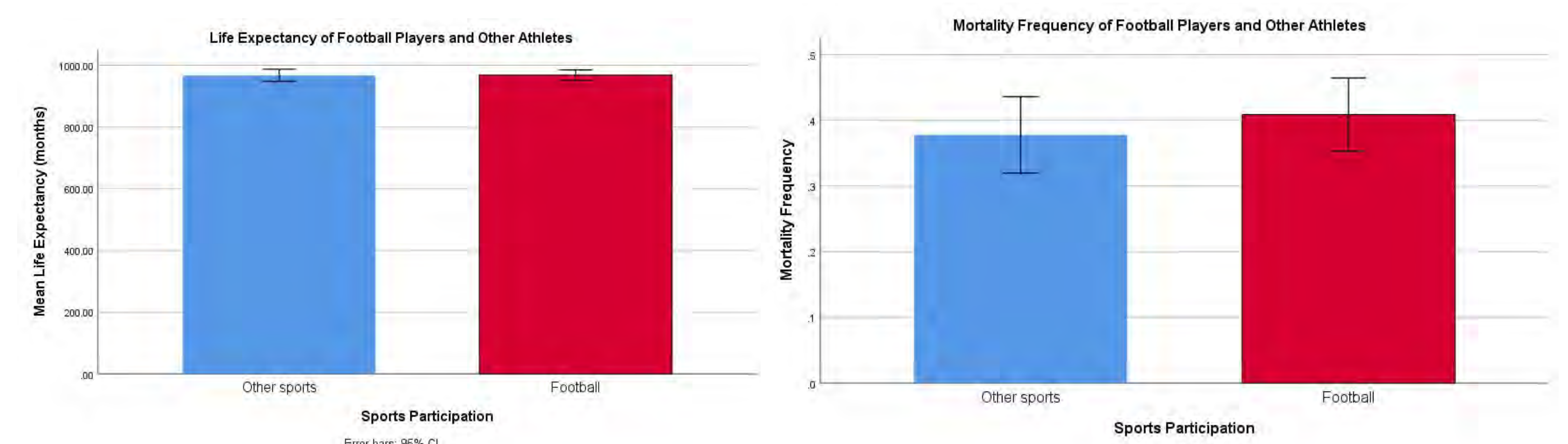
Student athletes also have a lower frequency of mortality by age 81 than non-athletes (95% CI [-.114, -.017], p=.009).



Hypothesis 2: Football Participation vs Other Sports

A t-test comparing football players to student athletes who played other sports indicates no significant difference in life expectancy (p=.976).

Mortality frequency by age 81 did not differ significantly between football players and other athletes (95% CI [-.050, .111], p=.452).



Conclusions and future directions

- Our results confirm the well-established link between physical activity and longevity, and indicates that this association applies specifically to sports participation in high school
- Our hypothesis that football participation is negatively associated with longevity was not supported - it appears to be as protective as other sports
- Our study is limited by the fact that we were only able to ascertain sports participation for a limited subset of our sample
- Our research is ongoing - in the future, we plan to include personality variables as assessed by the MMPI items
 - We also plan to revisit our results, accounting for socioeconomic status and other known covariates of lifespan

Acknowledgements

I would like to thank my faculty mentor Professor Susan Trumbetta for her support and guidance throughout the process, as well as URSI director Brian Daly and URSI coordinator Susan Painter for making this project possible. I would also like to acknowledge the work of Starke R. Hathaway and Elio Monachesi in the collection of our sample, and thank Dr. Irv Gottesman for making the sample available to us.

References

- Acosta, J. & Trumbetta, S.L. (2011, October 3). Does participation in high school team sports extend the lifespan? Survival of the couch potatoes. Undergraduate Research Summer Institute, Vassar College, Poughkeepsie, NY
- Antero, J., Tanaka, H., De Lencelambert, Q., Pohar-Perme, M., & Toussaint, J.-F. (2021). Female and male US Olympic athletes live 5 years longer than their general population counterparts: A study of 8124 former US Olympians. *British Journal of Sports Medicine*, 55(4), 206-212. <https://doi.org/10.1136/bjsports-2019-101696>
- Loprinzi, P. D. (2015). Dose-response association of moderate-to-vigorous physical activity with cardiovascular biomarkers and all-cause mortality: Considerations by individual sports, exercise and recreational physical activities. *Preventive Medicine*, 81, 73-77. <https://doi.org/10.1016/j.ypmed.2015.08.014>
- Nguyen, V. T., Zafonte, R. D., Chen, J. T., Kponse-Shovein, K. Z., Paganoni, S., Pascual-Leone, A., Speizer, F. E., Baggish, A. L., Taylor, H. A., Nadler, L. M., Courtney, T. K., Connor, A., & Weisskopf, M. G. (2019). Mortality Among Professional American-Style Football Players and Professional American Baseball Players. *JAMA Network Open*, 2(5), e194223. <https://doi.org/10.1001/jamanetworkopen.2019.4223>
- Noble, J. M., & Hesdorffer, D. C. (2013). Sport-Related Concussions: A Review of Epidemiology, Challenges in Diagnosis, and Potential Risk Factors. *Neuropsychology Review*, 23(4), 273-284. <https://doi.org/10.1007/s11065-013-9239-0>

