

Concussion History of Campers and Staff at Philmont Scout Ranch

Jeff Radel PhD¹, Will Retz², Tanya Filardi MD³, David Naylor, MD⁴

¹OT Education, ²Medical School, ³Neurosurgery, ⁴General & Geriatric Medicine Univ. Kansas Medical Center

QUESTION

Are Acute Mountain Sickness (AMS) and a history of prior concussion symptoms related?

BACKGROUND

Philmont Scout Ranch challenges 22,000 adventurers annually with outdoor experiences in the rugged mountain wilderness of northern New Mexico. This High Adventure setting attracts international participants of all ages, and offers a unique environment for study of concussion history in a novel population.



This study aims to document the concussion history and symptom profiles of Philmont participants, and assess potential for curtailed activities related to past brain injuries.

METHODS



Philmont Scout Ranch participants surveyed in May-August 2017 provided information about their concussion history, to evaluate current knowledge, opportunities for education, and predictors of

performance concerns among this diverse population of adventure seekers. A survey was distributed as part of a preparatory information package to all campers, scout leaders, and seasonal staff and collected upon arrival at Philmont. A second survey was administered in the Health Lodge Clinic to any patient seen with symptoms of Acute Mountain Sickness. Data was de-identified and entered into REDCap for later analysis. Demographic data were compared with those published from other concussion populations using simple statistics (*t*-test, Chi-Square) and multi-factor analyses (Pearson's correlation). This study was approved by the KU Medical Center's IRB, and endorsed by both Philmont Scout Ranch and the Boy Scouts of America.



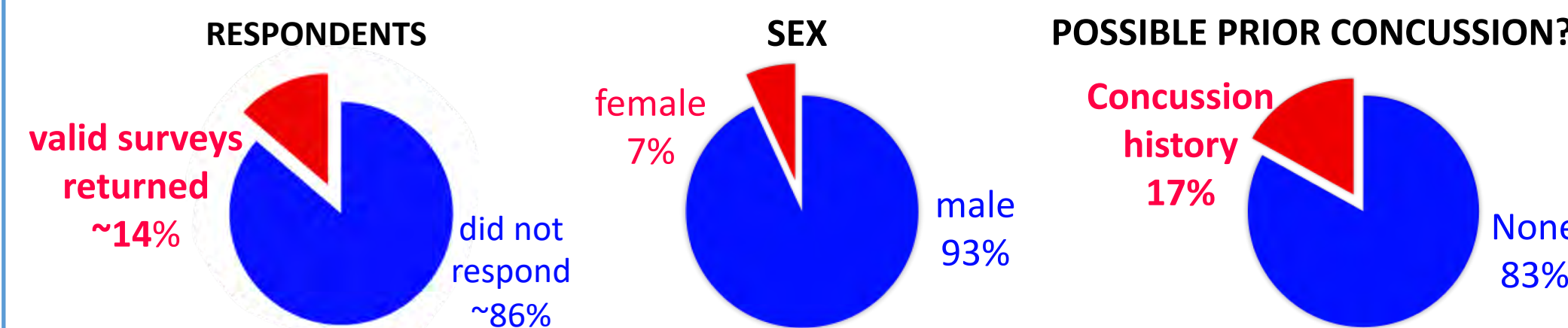
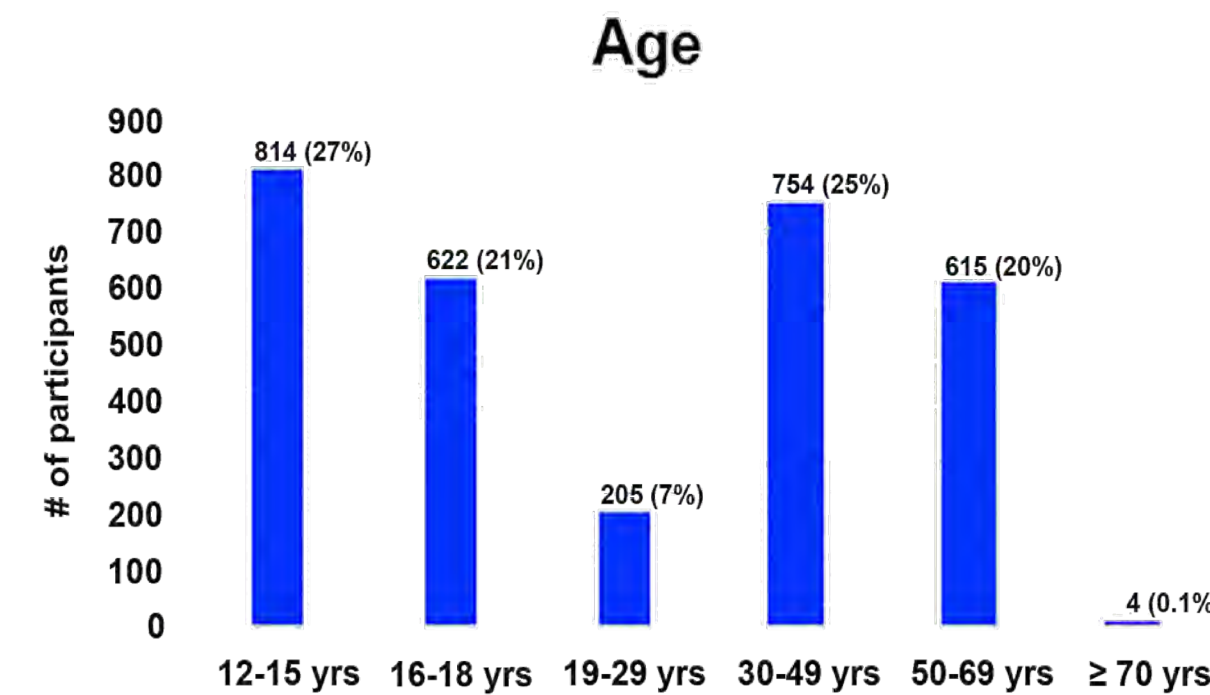
Acknowledgments

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RESULTS

A majority of the 3016 respondents (14% of all adventurers in 2017) were **male** (93%) and **teenaged** (12-18 years; 47%), with middle-aged (30-49 years; 25%) and older (50-69 years; 20%) adults also participating.



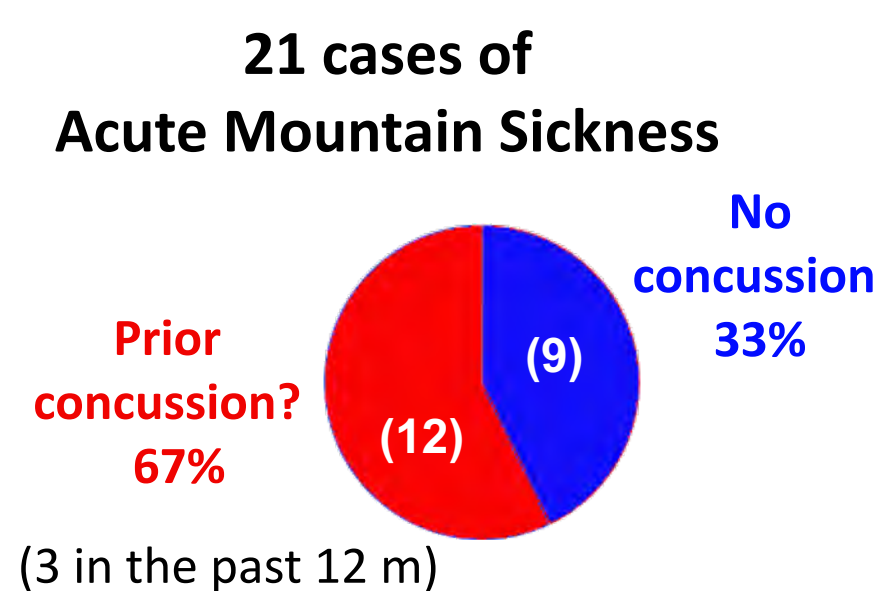
• 503 (17%) of respondents reported they had experienced a possible prior concussion

Of the 1292 adolescent respondents (aged 12-18 years):

- 13% reported a possible prior concussion
- 59% reported they did not play sports
- 20% had at least one prior baseline concussion test
- 47% had taken part in a concussion awareness program
- 56% had taken a first aid or wilderness medicine course.

Acute Mountain Sickness

- 14% of all pre-arrival survey respondents reported trouble adjusting to higher altitudes
- 21 Health Lodge patients were seen for AMS
- 20 of 21 reported symptoms arising only after arriving at Philmont.
- 12 of 21 also reported a possible concussion history
- 3 of 21 had a documented concussion in the prior year.



Patients reporting Acute Mountain Sickness

Similar symptom prevalence

	Never a Concussion (9)	Possible prior Concussion (12)	Diagnosed prior Concussion (7)
Fatigue or low energy	56%	58%	57%
Dizziness	67%	50%	57%
Headache	56%	75%	71%
'Don't feel right'	56%	67%	57%
Rapid heartbeat	33%	25%	29%

Differential symptom prevalence

	Never a Concussion (9)	Possible prior Concussion (12)	Diagnosed prior Concussion (7)
Nausea or vomiting	100%	25%	0%
'Pressure in head'	11%	50%	43%
Difficulty remembering	0%	25%	29%
Confusion	0%	25%	29%
Sensitivity to light	0%	17%	14%
Sensitive to noise	0%	17%	14%
Feeling 'like in a fog'	0%	33%	29%

CONCLUSIONS

The Philmont Ranch is a unique environment for study of concussion history, in a group of active individuals where many do not participate in organized sports. Preliminary analyses suggest their patterns of concussion experiences are similar to those of the general U.S. population, with concussions occurring across the age span, with single concussions outnumbering multiple concussions, and symptom resolution occurring in most people within 1 month of the injury. Four common concussion symptoms also are typical in Acute Mountain Sickness (*headache*, *'not feeling right'*, *dizziness*, *confusion*). *Sensitivity to light and noise* are common concussion symptoms and atypical in AMS, while *nausea*, *shortness of breath*, *feeling fatigued* and having a *reduced appetite* are common AMS symptoms and atypical after concussion.

The relatively common experience of concussion among this active, high adventure population is a factor limiting successful engagement with activities at higher altitudes. Including a concussion awareness component in first aid programs, and screening for recent concussions prior to arrival at Philmont may contribute to a more satisfactory experience for these individuals.



The Ute Park wildfire led to evacuation and closure of Philmont in the summer of 2018. We plan to continue our study in 2019...