Supplemental Online Content

Afarideh M, Sartori-Valinotti JC, Tollefson MM. Association of sun-protective behaviors with bone mineral density and osteoporotic bone fractures in US adults. *JAMA Dermatol*. Published online October 27, 2021. doi:10.1001/jamadermatol.2021.4143

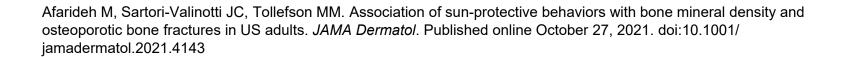**eTable.** Association of sun-protective behaviors with BMD z-scores in NHANES 2017-2018.

This supplemental material has been provided by the authors to give readers additional information about their work.

Baseline and multivariate design-based survey linear regression models demonstrating the association of different sun-protective techniques and BMD z-scores at minor anatomic sites are shown in the **eTable.** While each individual sun-protective modality was associated with significant decreases in several site-specific and total BMD z-scores in baseline models, these associations largely faded following the multivariate adjustments for potential confounders. Weak association of *moderate* shade stay with increased total femur BMD (0.144 [−0.038 to 0.327], *p*=**0.050**) remained significant in the multivariate linear regression.

eTable. Association of sun-protective behaviors with BMD z-scores in NHANES 2017-2018.

	Sun protective behaviors					
	Staying in the shade		**Wearing long sleeves**		**Using sunscreen**	
	Estimate (95% CI)	***P***	**Estimate (95% CI)**	***P***	**Estimate (95% CI)**	***P***
Upper body BMD z-scores						
Head						
Unadjusted Models		0.411		0.137		0.293
Rare	Reference		Reference		Reference	
Moderate	−0.55 (−0.151 to 0.041)		−0.132 (−0.260 to −0.003)		−0.066 (−0.166 to 0.034)	
Frequent	0.16 (−0.104 to 0.135)		−0.094 (−0.255 to 0.068)		0.30 (−0.074 to 0.135)	
*Multivariate Adjusted Model**		0.180		0.540		0.145
Rare	Reference		Reference		Reference	
Moderate	−0.064 (−0.226 to 0.099)		−0.087 (−0.247 to 0.073)		−0.240 (−0.498 to 0.018)	
Frequent	−0.173 (−0.354 to 0.009)		−0.010 (−0.239 to 0.218)		−0.120 (−0.270 to 0.030)	
Left ribs						

Unadjusted Models		**0.012**		0.111		**0.002**
Rare	Reference		Reference		Reference	
Moderate	−0.119 (−0.325 to 0.086)		−0.076 (−0.173 to 0.022)		−0.218 (−0.350 to −0.085)	
Frequent	−0.252 (−0.445 to −0.060)		−0.162 (−0.317 to −0.008)		−0.269 (−0.401 to −0.138)	
*Multivariate Adjusted Model**		0.619		0.510		0.360
Rare	Reference		Reference		Reference	
Moderate	−0.064 (−0.294 to 0.166)		0.033 (−0.196 to 0.263)		−0.160 (−0.414 to 0.094)	
Frequent	−0.138 (−0.424 to 0.148)		−0.097 (−0.336 to 0.142)		0.005 (−0.297 to 0.307)	
Right ribs						
Unadjusted Models		0.073		0.184		**0.001**
Rare	Reference		Reference		Reference	
Moderate	−0.119 (−0.309 to 0.071)		−0.054 (−0.155 to 0.046)		−0.195 (−0.329 to −0.061)	
Frequent	−0.221 (−0.423 to −0.019)		−0.158 (−0.345 to 0.029)		−0.298 (−0.425 to −0.171)	
*Multivariate Adjusted Model**		0.424		0.668		0.345
Rare	Reference		Reference		Reference	
Moderate	−0.100 (−0.269 to 0.069)		0.049 (−0.174 to 0.272)		−0.169 (−0.422 to 0.085)	
Frequent	−0.170 (−0.440 to 0.100)		−0.086 (−0.370 to 0.197)		−0.160 (−0.469 to 0.149)	
Unadjusted Models						
Trunk		**0.008**		0.172		**0.002**
Rare	Reference		Reference		Reference	
Moderate	−0.137 (−0.311 to 0.038)		−0.077 (−0.189 to 0.035)		−0.126 (−0.228 to −0.023)	
Frequent	−0.261 (−0.443 to −0.079)		−0.136 (−0.276 to 0.005)		−0.114 (−0.192 to −0.035)	
*Multivariate Adjusted Model**		0.389		0.994		0.169

Rare	Reference		Reference		Reference	
Moderate	−0.072 (−0.246 to 0.102)		−0.006 (−0.226 to 0.214)		−0.059 (−0.311 to 0.193)	
Frequent	−0.158 (−0.387 to 0.071)		0.009 (−0.261 to 0.278)		−0.220 (−0.448 to 0.008)	
Lower body BMD z-scores						
Pelvis						
Unadjusted Models		0.061		0.301		**0.032**
Rare	Reference		Reference		Reference	
Moderate	−0.132 (−0.298 to 0.034)		−0.052 (−0.196 to 0.092)		−0.072 (−0.179 to 0.035)	
Frequent	−0.193 (−0.363 to −0.022)		−0.127 (−0.304 to 0.050)		−0.085 (−0.151 to −0.018)	
*Multivariate Adjusted Model**		0.782		0.738		0.347
Rare	Reference		Reference		Reference	
Moderate	−0.033 (−0.236 to 0.170)		0.043 (−0.181 to 0.266)		−0.153 (−0.361 to 0.056)	
Frequent	−0.069 (−0.275 to 0.136)		0.100 (−0.167 to 0.368)		−0.085 (−0.293 to 0.123)	
Trochanter						
Unadjusted Models		0.492		0.332		0.523
Rare	Reference		Reference		Reference	
Moderate	−0.070 (−0.275 to 0.135)		−0.232 (−0.559 to 0.095)		−0.073 (−0.353 to 0.206)	
Frequent	−0.164 (−0.441 to 0.113)		−0.094 (−0.441 to 0.253)		−0.119 (−0.336 to 0.098)	
*Multivariate Adjusted Model**		0.103		0.996		0.905
Rare	Reference		Reference		Reference	
Moderate	0.063 (−0.145 to 0.270)		0.018 (−0.393 to 0.429)		0.047 (−0.208 to 0.301)	
Frequent	−0.226 (−0.618 to 0.166)		0.008 (−0.357 to 0.373)		−0.047 (−0.444 to 0.350)	
Total femur						

Unadjusted Models		0.433		0.586		0.309
Rare	Reference		Reference		Reference	
Moderate	−0.013 (−0.268 to 0.241)		−0.155 (−0.463 to 0.154)		−0.109 (−0.464 to 0.246)	
Frequent	−0.171 (−0.467 to 0.126)		−0.068 (−0.485 to 0.350)		−0.150 (−0.344 to 0.045)	
*Multivariate Adjusted Model**		**0.050**		0.769		0.985
Rare	Reference		Reference		Reference	
Moderate	0.144 (−0.038 to 0.327)		0.143 (−0.259 to 0.545)		−0.020 (−0.365 to 0.324)	
Frequent	−0.109 (−0.477 to 0.258)		0.062 (−0.275 to 0.399)		0.021 (−0.434 to 0.475)	

CI Confidence Interval, **BMD** Bone Mineral Density.

* adjusted for gender, age, race/ethnicity, education level, country of birth, annual household income, milk consumption, current smoker status, body mass index, total serum calcium, serum alkaline phosphatase, and MET-minutes physical activity scores.