



### A130 Assessing the Utility of Total Body Score (TBS) and Accumulated Degree Days (ADD) for Estimating Postmortem Interval (PMI) in Clothed Vulture-Scavenged Human Remains

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After attending this presentation, attendees will have a better understanding of how clothing and vulture scavenging can affect the estimation of PMI.

This presentation will impact the forensic science community by demonstrating the accuracy of employing TBS and ADD to estimate PMI for clothed vulture-scavenged remains.

As taphonomic agents, animal scavengers have the potential to affect the discovery, recovery rate, and estimations of PMI in medicolegal death investigations; however, very little is known about the effects of vulture scavenging on the estimation of PMI when using the TBS to calculate the ADD.<sup>2</sup> The performed study observed clothed human bodies that were exposed to vulture scavenging to examine the effects of vulture scavenging on the estimation of the PMI. It is hypothesized that vulture scavenging of clothed human remains would cause a significant overestimate of the PMI when using TBS.

Five clothed individuals were dressed in white cotton T-shirts, blue denim jeans, white socks, and black tennis shoes. These clothing items are representative of “common” clothing found on deceased individuals from medicolegal investigations, including border crossers.<sup>1</sup> The bodies were placed in an open field for a period of approximately six weeks. Vulture scavenging was verified using motion detector cameras. After completion of the study, data related to estimating the PMI was collected by calculating ADD and determining TBS using the Megyesi et al. method.<sup>2</sup> Local temperature data was gathered from Weather Underground to calculate known ADD from the day of placement to the end of the study period. TBS scores of the head, torso, and limbs were subsequently assessed through photographs. The legs were scored by removing the jeans, if still on the body. The TBS was used to calculate estimated ADD using the Megyesi et al. formula.<sup>2</sup> Both bias and inaccuracy were examined. Bias provided information regarding whether the Megyesi et al. equation systematically under- or over-estimated the ADD/PMI for each individual.<sup>2</sup> The examination of inaccuracy provided information regarding how accurately the Megyesi et al. equation estimates the actual PMI that has elapsed for clothed and vulture-scavenged individuals.<sup>2</sup> A Pearson correlation test and Spearman’s rank correlation test were used to evaluate the relationship between estimated and known ADD/PMI.

Results of the Pearson correlation test yielded a correlation coefficient of -0.47, and results of the Spearman’s rank correlation test yielded a correlation coefficient of 0.50. Bias was determined to be -1,318.8, while inaccuracy was determined to be 1,318.8. These results suggest that the Megyesi et al. method greatly overestimates ADD, and therefore is not a reliable method for assessing PMI in clothed vulture-scavenged individuals.<sup>2</sup> There was also a low correlation between the estimated and known ADD for these five individuals. Future studies should look at developing a correction in order to properly estimate PMI in clothed, vulture-scavenged remains.

#### Reference(s):

1. Beck J., Ostericher I., Sollish G., and De León J. 2015. Animal scavenging and scattering and the implications for documenting the deaths of undocumented border crossers in the Sonoran Desert. *Journal of Forensic Sciences*. 60(S1):S11-S19.
2. Megyesi M.S., Nawrocki S.P., and Haskell N.H. 2005. Using accumulated-degree days to estimate the postmortem interval from decomposed human remains. *Journal of Forensic Sciences*. 50(3):1-9.

**Forensic Sciences, Forensic Anthropology, Taphonomy**