G138 Toward Validating a Universal Equation for Estimating Postmortem Interval

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After attending this presentation, attendees will understand that it is possible to provide an accurate presumptive estimate of Postmortem Interval (PMI) within a few hours of attending a death scene.

This presentation will impact the forensic science community by demonstrating the use of a new method for medicolegal death investigators to gather information useful for making timely decisions on the scope of the investigation and the use of resources.

Estimating PMI is a critical step in every death investigation. During the initial interview process, a first responder/investigator will attempt to determine the time at which the deceased was last known to be alive. This information is not always helpful to establish a firm PMI. The information for a more reliable PMI can be critical to evaluate alibis, identify the deceased, establish a working hypothesis on the manner of death, lend weight to other information through corroboration, and corroborate the cause of death. Several methods have been developed to estimate PMI since the mid 19th-century, but the development of a universal method remains elusive. Two universal equations were recently proposed in the forensic science literature.[1] One of these equations was developed for above-ground death scenes and presents PMI as a function of soft tissue mass loss, temperature, and relative humidity. In response to the need for validating this equation in other climates, we have begun the process of validating this equation in southeastern Nebraska, USA. This region is located in a cold climate characterized by hot summers and the lack of a dry season (climate code: Dfa).

Presented are the findings from three death investigations where the estimate generated by the above-ground PMI equation was used and compared to a known PMI. Temperature and relative humidity were measured at intervals of one minute with a datalogger placed as close as possible to the corpse. These measurements were collected for 90 to 150 minutes.

It is shown that this method has real time application for corroborating other information and thus making a more robust initial estimation of PMI. It is often the case that first responders and crime scene investigators need just one additional component of information to make a confident decision on the parameters of the investigation to confidently proceed with further investigative tasks such as interviewing witnesses. On the other hand, other information may not be available, or is unreliable, so that the method herein provides the primary information for estimating PMI. The current method is such that it can be taught easily to first responders and crime scene investigators. Supervisors and others who have an interest can easily check the data points by looking at digital images, collecting official weather data, and conducting the calculations of the method. This is a real-time viable tool that only awaits additional research and application.

The current results complement the universal equation for above-ground death scenes proposed in the recent literature. Results indicate that overall, the proposed equation was accurate in helping to narrow the time frame for an estimated PMI. Since the percentage of soft tissue loss is subjective, it is recommended that more than one individual observe the physical characteristics of the corpse to determine an average tissue loss. This procedure will allow for a more accurate range for tissue loss and minimize the error associated with estimating PMI.

Reference:

1. Vass AA. The elusive universal postmortem interval formula. Forensic Sci Int 2011;204:34-40.

Medicolegal, Taphonomy, Death

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