

## B203 False Inferences From True False and False True Positives and Negatives

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**Learning Overview:** After attending this presentation, attendees will be aware that sometimes a positive analysis is positive but not for the reasons suspected and vice versa. For example, drugs present in analysis but not deliberately taken, drugs absent but taken or carboxyhemoglobin present but person not alive and breathing during fire.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by highlighting instances when the analysis tests positive for the wrong reason and when the analysis tests negative for the wrong reasons.

Forensic Investigations that use scientific analysis rely on an analytical test producing a positive or a negative result where appropriate. This presentation will present examples from recent research when the analysis of evidence points one way that would lead to the wrong inference. The sampling is CORRECT. The sample preparation and analysis are CORRECT. The positive or negative results from the analysis are CORRECT the material is present or absent BUT the inference that would be taken is WRONG.

Examples are presented where:

- (1) drugs are detected in humans when they hadn't taken drugs either because of postmortem formation or due to exposure by living in a contaminated house (false positive).<sup>1-2</sup>

Post-mortem formation: Under normal circumstances there should not be any sugar or yeast present in urine. However, there are some medical conditions, including pregnancy, diabetes (hypoglycaemic incident) and Renal Glucosuria, where sugar can be in urine. If this is coupled with yeast infection and appropriate temperature postmortem formation of ethanol could result.<sup>1</sup>

Innocent Exposure: In a case study, five members of a family living in a house that had previously been used as a clan laboratory were found to have different amounts of amphetamine and methamphetamine on their hair and in their hair depending on their age, exposure, and their activities in the house.<sup>2,3</sup>

- (2) when drugs are not found when they had been taken because of postmortem microbial degradation (false negative).<sup>1,4,5</sup>

In this case a patient that was known to be prescribed specific drugs (Risperidone and Paliperidone) tested negative to both drugs after death, but investigation of bacterial degradation of these drugs and discovery of the metabolites revealed the complete degradation of these drugs in this body. Other cases had a mixture of parent drug and metabolite indicating that the amount of drug detected was not a true representation of the amount of drug taken pre-mortem.

- (3) carboxyhemoglobin levels would be interpreted to indicate a victim was alive at the time of the fire because of postmortem infusion of carbon monoxide through skin or breaches, but the victim was not alive.<sup>6,7</sup>
- (4) when the food or drink you buy isn't what it says it is on the label due to contamination with pesticides, adulterants, or due to fraudulent labelling or deliberate mis-identification of origin.<sup>8</sup>

These examples could lead to an incorrect guilty or innocent verdict. With food fraud, mothers believe they are giving sufficient nutrients, but are 'short changing' their children potentially leading to illness and even death.

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### False Conclusions, Fire Deaths, Drugs

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