

NSW Public Defenders Criminal Law Conference
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A photograph of a crime scene. In the foreground, a spiderweb is stretched across the frame, with several blood splatters of varying sizes and colors (red and dark red) scattered across it. A yellow evidence marker is visible in the background, partially obscured by the spiderweb. The ground is paved with grey gravel. The text "Expert Evidence" is written in red, and "INSIGHTS INTO CRIME SCENE EVIDENCE" is written in large, bold, red capital letters across the bottom of the image.

Expert Evidence
INSIGHTS INTO CRIME SCENE EVIDENCE

WHAT TO EXPECT TODAY

- GOOD SCIENCE requires high skill levels especially when multiple forensic disciplines are involved **(as in my opening slide)**
- An example showing that before forensic investigators even start using “good science” cognitive influences **(often unrecognised)** can affect their decision making
- An example of the consequences of forensic investigators being unfamiliar with good science **(“That’s how we have always done it”)**

GUIDING PRINCIPLES IN OPPOSITION

- Develop Suspect: **PROVE** elements of the offence
- Develop Scientific Hypothesis: **DISPROVE** the hypothesis (Karl Popper's Theory of Falsification)

TO BEGIN – before we even look at the science

- Thinking Type – Are you a I or a II? (a quick vs considered approach)
- Reason Model – Deductive, Inductive, Abductive and Blends
- Biasing Influences
- Law Enforcement Error, Training, Research Culture

TO BEGIN – before we even look at the science

CASE EXAMPLE 1

BIASING INFLUENCES + POOR ABDUCTIVE REASONING

OBVIOUSLY..... IT'S A SUICIDE

- Man arrested for drink driving (occupation Truck Driver)
- Ex attends address finds him drunk / holding firearm
- Financial, mental health and occupational problems
- Ex attends Police Station expresses welfare concerns
- Welfare check task gets “lost” in system
- Police attend 2 days later with man found deceased
- Patrol officers speak with CSI
- CSI speaks with Ballistics Officer
- Entrance wound to chin = SUICIDE (at scene 45 mins)





OBVIOUSLY..... IT'S A SUICIDE

- PM 3 days later (no priority as body came in as a Suicide)
- Pathologist recognised equivocal nature of chin wound
- CT / X Rays
- Bone fragments travelling from BACK to FRONT of head
- Chin wound is an EXIT
- Police send to Coroner as a SUICIDE (Anchoring concept)
- Coroner sends it to me
- Its now back with Homicide
- Initial assessment can be as simple as applying OCKHAM's Razor

NEXT.....

BRING ON GOOD SCIENCE

BRING ON GOOD SCIENCE

- Reconstructive efforts are “Experiments”
- Where possible any experiment should be as close as possible to the known circumstances of the event
- Experiments are performed subject to scientific rules
- Experiments can be Quantitative or Qualitative
- Experimentally derived results can be very powerful

BRING ON GOOD SCIENCE

- Quantitative

Muzzle to target distance determination (range of fire)

- Qualitative

Blood pattern analysis [BPA] reconstruction / Shooting trajectory determination

BRING ON GOOD SCIENCE

CASE EXAMPLE 2

“SHE SHOT HERSELF”

EVALUATING COMPETING HYPOTHESES – SUICIDE OR VICTIM?

- Female deceased
- Shotgun wound to face – scalloping / pellet separation
- Partner present – “she shot herself”
- Scene exam raised doubts as to partner’s version
- Partner chose to remain silent after initial comment
- Forensic assistance required for Homicide investigation
- Muzzle to target range determination a priority

EXPERIMENTAL PLANNING

- Briefing by Ballistics Officer to complete range of fire determination
- 3 shots at each distance
- Q: Where did 3 come from?
- A: That's what we have always done!
- Environmental survey (Literature / other jurisdictions)
- What scientific confidence level does 3 replicates at each range provide?

EXPERIMENTAL PLANNING

- Executive decision by me to provide case supervision
- Engage a statistician from Curtin University
- Reverse calculation to establish number of replicates (**shots**) required at each range to provide 95% confidence limit (**Industry Standard**)
- Draft experimental plan for review ?
- Number of shots at each range calculated

WE HAVE DONE IT THIS WAY FOREVER, BUT NO MORE!

- The phenomenon of pellets beginning to spread was not always seen in the first 3 shots **(sometimes it was seen at shot 8 or shot 12)**
- When the experimental boundary is approached, at what shot the phenomenon appears in the data set **(number of shots at each range)** is random
- Data set(s) must be sufficiently large so that phenomenon will be observed if it is still occurring **(depending on the confidence limit you have chosen)**
- With an appropriately sized data set, if the phenomenon no longer occurs then the experimental boundary has been reached and a range determination has been established

RANGE OF FIRE ESTABLISHED

- Not less than 700mm from end of barrel (don't forget +/- error value) **(every measurement process has associated error EVEN measuring the speed of light in a vacuum)**
- Bio-mechanically impossible as a suicide **(case specific)**
- Partner arrested
- “The gun went off by accident”
- Functionality test of the firearm showed that it was in good operational order

TAKE HOME MESSAGES

- Good science can be simple or very complex
- Law enforcement culture does not support the use of good science
- Even in apparently simple matters, the best person to evaluate science is a scientist with the relevant skills and experience
- I provide case reviews (complex or simple) and deliver “fit for purpose” training

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