

NSW Public Defenders Criminal Law Conference
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A photograph of a crime scene. In the foreground, a spiderweb is stretched across a paved surface. A bullet casing is visible in the lower-left quadrant. Blood splatters are scattered across the web and the pavement. In the background, a yellow 'X' marker is visible on the ground.

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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