

Use of the QIAamp[®] DNA Investigator kit in forensic post-mortem samples

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Background: forensic mortuaries



South Africa



Western Cape



Salt River Mortuary

Facilities are graded according to the number of post-mortems per year:

M1: 0-249

M2: 250-499

M3: 500-999

M4: 1000-1499

M5: 1500 - 1999

M6: >2000

Salt River Mortuary

- Approximately 4000 cases per year
- High rates of homicide, suicide, accidents
- Drug-related fatalities



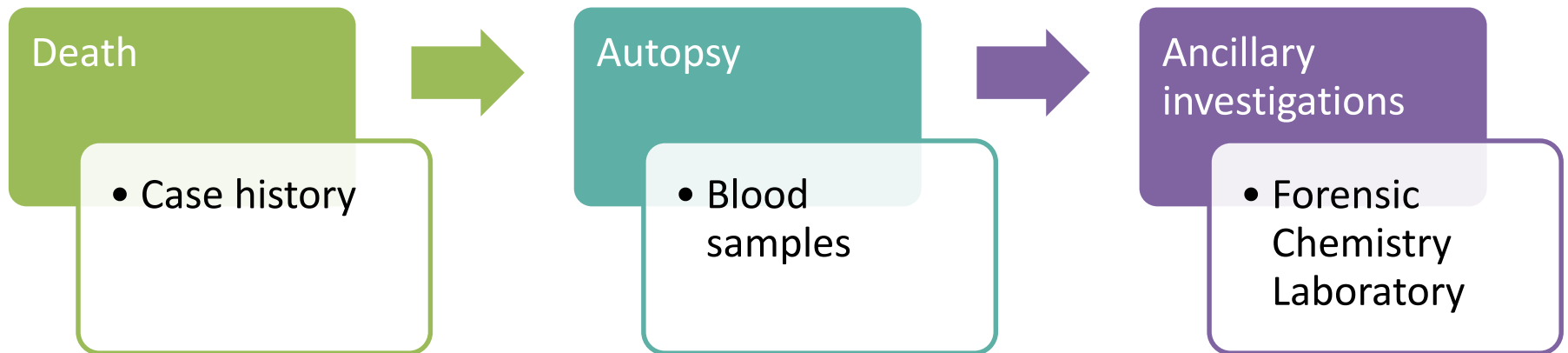
Drug-related fatalities

- Drug abuse is a major social crisis in the Western Cape (Odejide, 2006)
- Can have a fatal outcome:
 - Intentionally: suicide
 - Unintentionally: accidental overdose
- Cases admitted to Forensic Pathology Services



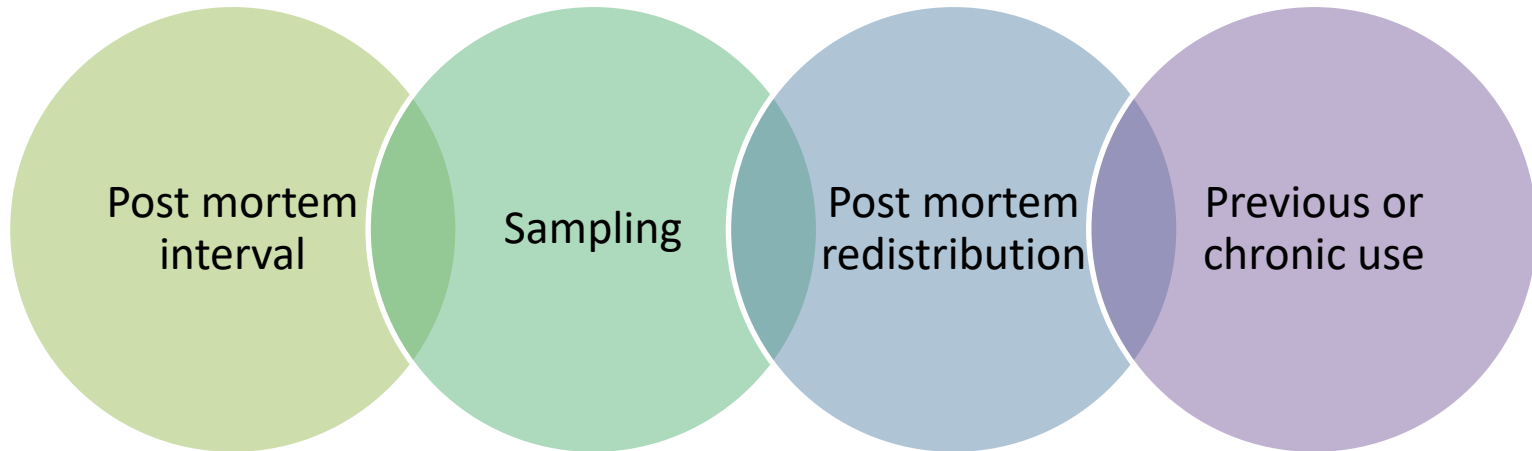
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Workflow of investigation



Post mortem toxicology

- Post mortem toxicology results are complex to interpret



- Concentration of parent drugs : metabolites ratio not ‘normal’
 - Cause and/or manner of death can be ambiguous

Role of genetics

Most drugs metabolised by a family of enzymes: cytochrome P450 (CYP)

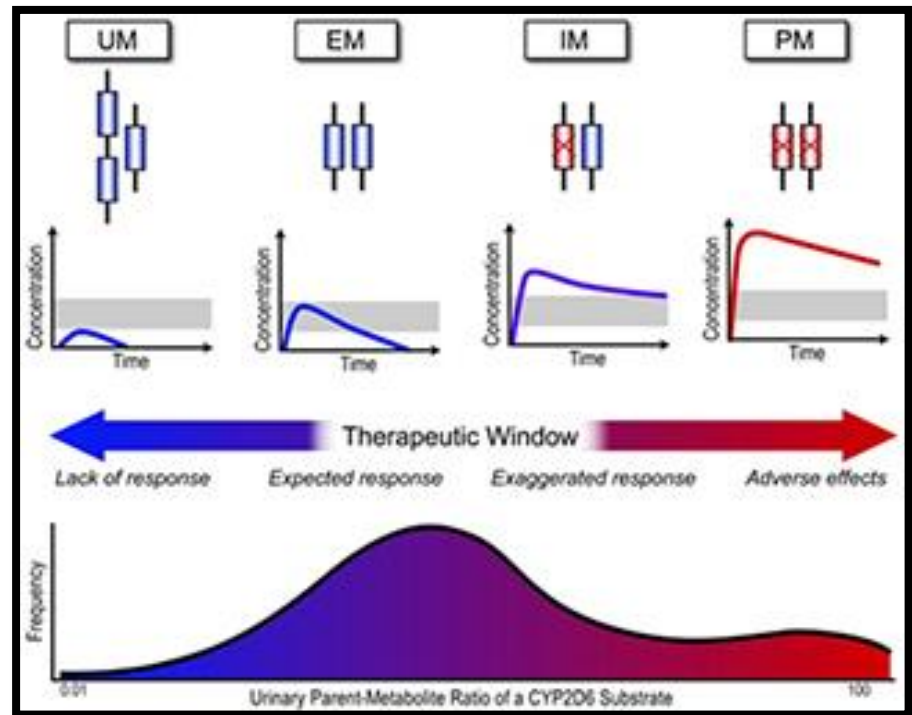
Metabolism phenotype:

UM: ultra rapid

EM: extensive

IM: intermediate

PM: poor



Rationale

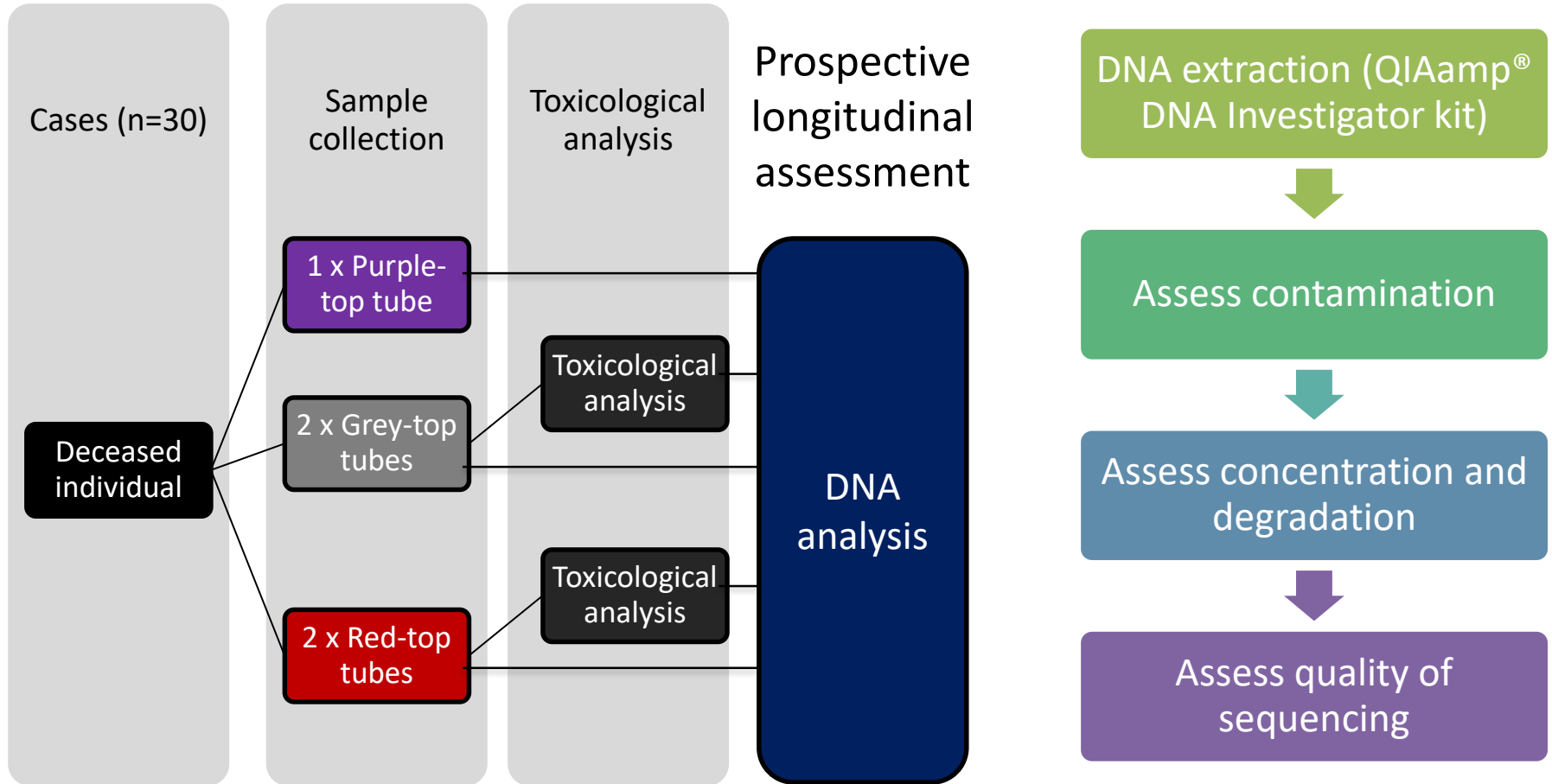
- After full medico-legal investigation → ambiguous
 - May be beneficial to perform a genetic analysis
 - **It is not possible to get another sample for DNA analysis**
-
- Toxicological samples:
 - Preserve chemical compounds
 - Handled in a different laboratory



Aim

To investigate the suitability of blood samples collected and stored in tubes intended for toxicological analysis, for subsequent use in a genetic analysis, following handling involved in the process of toxicological investigation.

Methods



Key results

- All of the samples were from a single source
- DNA concentration was significantly lower from red-top tubes compared to purple- and grey-top tubes
- DNA was not degraded in most samples
- After one year, sequencing results were of better quality from DNA from grey-top tubes

Discussion

- Low concentrations from the red top tubes posed challenges in molecular analysis
- DNA extracted from grey top tubes passed quality assessment and holds potential
- The QIAamp® DNA Investigator kit can be applied to other settings in forensic science
- Concept can be applied to other scenarios where the ideal sample may not be available

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