



# “Point of Care” testing and Forensic Medicine

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# Presentation Outline

- What is 'Point of Care' testing?
  - Definitions
  - What can be tested?
- The advantages for the Medical Investigator and Coroner
- Why don't we do "Point of Care" testing at VIFM
- The negatives or dangers of "Point of Care" testing
- What are the important principles involved in setting up "Point of Care" testing



# What is “Point of Care” testing (POCT)?

- **Definitions**

- Point-of-care testing can be defined as pathology testing performed on-site during the patient consultation. It allows a rapid test result to be generated and used to make an immediate, informed clinical decision. (Mark Shephard)
- A Quality Assured Pathology Service Using Devices Located near the Patient. (NSW)
- Pathology investigation by or on behalf of the treating medical practitioner on-site, at the time of and for use during the consultation. The results of POCT must be equivalent in quality to those from a pathology laboratory. (RCPA)



# What is “Point of Care” testing (POCT)?

- **Examples**

- Breathalysers
- Dip sticks (pregnancy test sticks)
- Road side saliva drug screens
- Glucose-meters (Most stolen device in a hospital)



# What can be done by POCT

## **Carbohydrate metabolism**

Glucose, Glycated haemoglobin

## **Lipids**

Triglyceride

Total cholesterol

High-density lipoprotein cholesterol

Low-density lipoprotein cholesterol (calculated)

## **Renal function**

Urea

Creatinine (estimated glomerular filtration rate)

Urine albumin

Urine albumin–creatinine ratio





# What can be done by POCT

## **Haematological/coagulation**

Haemoglobin, INR

## **Liver function**

Total protein

Albumin

Alanine aminotransferase

Aspartate aminotransferase

Gamma-glutamyltranspeptidase

Alkaline phosphatase

Bilirubin

Urine albumin–creatinine ratio



## **Electrolytes**

Sodium

Potassium

Chloride

Total CO<sub>2</sub>

Anion gap

# What can be done by POCT

## **Arterial blood gases**

pH

Partial pressure CO<sub>2</sub>

Partial pressure O<sub>2</sub>

Saturated O<sub>2</sub>

Base excess

## **Cardiac function**

Troponin 1 & T

Creatine Kinase (Myocardial band)

Myoglobin

N-terminal pro b-type Natriuretic peptide

Brain natriuretic peptide



# What can be done by POCT

## Toxicology - Drugs

Lateral flow immunoassays (Clean Specimens)

Biochips (decomposed specimens)

Opioids

Cannabinoids

Cocaine

Methamphetamine

Oxycodone

MDMA

## Microbiology

HIV

Group A Strep.

Malaria

Legionella etc.



Clozapine

## MISC.

C-reactive protein



- **Advantages of POCT:**

- 'Triage' decision making
- Qualitative screening
- Small physical environment
- Lesser degree of training (doctors can do it!)
- Rapid test results
- Rapid implementation of test results
- Shorter bed stay
- Lowered morbidity Faster effective care provision
- Economic in clinic settings
- Long term chronic disease management by patient

- **How can this help the Medical Investigator and Coroner**

- Mortuary testing on body admission as part of investigation modality choice
- No need to send specimens out (remote mortuaries)
- No need to pay lab fees
- BUT .....



# Why don't we do "Point of Care" testing at VIFM

- Death is reported to Coroner by ringing CAE
- The CAE
  - Collect demographic information
  - Collect medical information
  - Collect medical records, ante-mortem medical specimens etc.
  - Request Police to attend: (if not already present)
    - Complete police information form
    - Control the scene/body
  - Identify and Communicate with Next-of-Kin (**Initial Family Contact**)
    - Obtain information regarding
      - relevant lifestyle factors, medical history, GP, Dentist, other family members, executor of deceased's estate,
      - The name of the family's funeral service provider
      - Family views regarding autopsy
    - Provide information about the Coronial process
    - Provide initial bereavement support
    - If required – arrange appointment for formal visual identification
  - Arrange for the body to be transported to VIFM mortuary



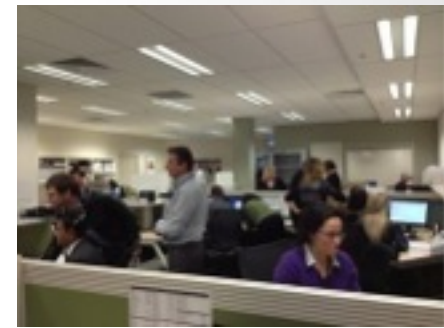
# What next?

- On Arrival (Presentation of the body to the Institute)
- Power to undertake a Preliminary examination (Coroners Act 2008)
  - *a visual examination of the body (including a dental examination);*
  - *the collection and review of information, including personal and health information relating to the deceased person or the death of the person;*
  - ***the taking of samples of bodily fluid including blood, urine, saliva and mucus samples from the body (which may require an incision to be made) and the testing of those samples;***
  - *the imaging of the body including the use of computed tomography (CT scan), magnetic resonance imaging (MRI scan), x-rays, ultrasound and photography;*
  - *the taking of samples from the surface of the body including swabs from wounds and inner cheek, hair samples and samples from under fingernails and from the skin and the testing of those samples;*
  - *the fingerprinting of the body;*
  - *any other procedure that is not a dissection, the removal of tissue or prescribed to be an autopsy;*
- Clothing / possessions examined collected
- Body weighed, measured, photographed and inspected
- Whole body CT scan and high res. CT head
- Blood and urine collected for toxicology



# What next?

- Duty Pathologist
  - Reviews police documents, medical records
  - Reviews CT scans
  - Reviews Toxicology results (24 hour turn around)
  - Carries out external examination of the body
  - Completes a preliminary examination report
    - Summarises the available circumstantial and medical information
    - Notes the family's wishes regarding an autopsy
    - Notes the police and treating medical staff's wishes regarding an autopsy
    - States whether a reasonable Cause of death is available on the current information
    - States whether an autopsy is medically advisable on the circumstances known
  - Case Triage Meeting (Duty Pathologist, Duty Coroner, CAE Staff)
    - Review of overnight toxicology findings, CT scan, documentary evidence.....
    - Coroner hears and considers:
      - Family issues/requests
      - Police issues/requests
      - Medical issues/requests
      - Legal issues (Criminal and /or Civil) – legal representatives issues/requests
  - Coroner Determines
    - Whether they are satisfied as to the identity of the deceased
    - Whether they will order an autopsy and/or other tests
    - When the body can be released to the family
    - The process for completing the investigation

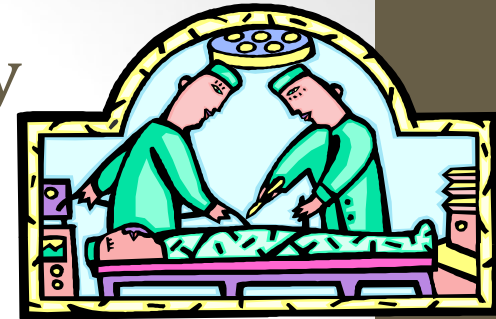


# So !

- Our Toxicology lab is on-site
  - No transport of specimens
  - Electronic communication of results
  - Face-to-face Coroner/pathologist/toxicologist consultation
- Our lab has better toxicology equipment (LC-MS)
- We can get quantitative results of most drugs in 24 hours
  - CO in 20 minutes
- Equipment operated and subject to detailed quality management by toxicology experts
  - (they may be asked to give expert evidence)
- Detailed accredited equipment maintenance
- Same equipment can be used for new analytical methods – new emerging drugs (R&D)
- Financial management
  - inc. equipment replacement, upgrades.



# The negatives or dangers of mortuary “Point of Care Testing”



- Increased mortuary staff workload
  - Staff trained differently to lab staff – lack of analytical expertise
  - Lack of laboratory type quality control
- Mortuary staff may not be seen as toxicology “experts” if they need to give evidence
- POCT method may not be comparable with subsequent Laboratory methods – inconsistency of result quantification
- Test results may only be qualitative
- More machines needed to cover relevant drug classes  
→HIGHER COST
- Result recording and storage more difficult
- Mortuary a more hazardous area than a laboratory





# Your results may depend on how you test



**POCT**

**Laboratory tests**

# The Key principles involved in setting up Mortuary “Point of Care Testing” *RCPA policy based*



- The facility/mortuary undertaking POCT must be accredited in accordance with the standards set by a suitably qualified body and tailored to Point of Care practice/s. In Australia this would be the National Pathology Accreditation Advisory Council (NPAAC) standards and audited by NATA.
- The facility/mortuary undertaking POCT must participate in both internal and external quality assurance programs and reach a standard comparable to the equivalent pathology laboratory.
- POCT must only be conducted by appropriately trained staff in the facility who have evidence of ongoing competency with the relevant POCT instrumentation and are supervised by a pathologist or clinical scientist as per NPAAC supervision requirements.
- POCT is designed to provide rapid results to facilitate immediate decision making, it should not be used to replace routine non-urgent tests when access to a normal pathology laboratory is readily available.
- POCT adverse incidents and corrective action/s taken must be documented transparently (inc. for court review) and audited.

**To be confident about scientific evidence, it is vital to be able to validate what you are provided with!**



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