Forensic Autopsy and the Role of the Forensic Pathologist
The Victorian Institute of Forensic Medicine

- Provides independent, expert forensic medical and scientific services to the justice system.

- Investigates deaths reported to the Coroner, examines alleged offenders and assesses, treats and supports victims of crime.
Role of the Forensic Pathologist

- The role of Forensic Pathologists is to assist coroners, police and courts to resolve critical medical issues, including causes of death, the circumstances in which deaths occurred, how injuries might have been caused and the identity of the deceased.

- The Forensic Pathologist is assisted in this role by forensic technicians, medical specialists and forensic scientists at VIFM and Victoria Police.
Forensic Medical Specialists

- Forensic odontologists.
- Forensic anthropologists.
- Forensic radiologists.
- Pathology registrars (histopathology).
Forensic Science Services

- Forensic toxicology
- Molecular biology
  - DNA Analysis.
  - Serology.
- Microbiology
- Other forensic services provided by Victoria Police.
FORENSIC AUTOPSY
Overview of Forensic Autopsy

1. Preliminary Examination
2. External Examination
3. Internal Examination
4. Drafting autopsy report
Section 23 of Coroners Act 2008 (Vic) –

**Preliminary examinations**

1. The purpose of a preliminary examination is to assist the coroner in the performance of his or her functions in respect of a death.

2. A coroner may provide a body to a medical investigator to enable a preliminary examination to be performed on the body.

3. The provision of the body authorises the conduct of the preliminary examination.
Preliminary Examination

Defined in Coroners Act 2008 (Vic) as:

a) A visual examination of the **body** (including a dental examination);

b) The collection and review of information, including personal and health information relating to the deceased person or the **death** of the person;

c) 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;

d) The imaging of the **body** including the use of computed tomography (CT scan), magnetic resonance imaging (MRI scan), x-rays, ultrasound and photography;

e) 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;

f) The fingerprinting of the **body**;

g) Any other procedure that is not a dissection, the removal of **tissue** or **prescribed** to be an **autopsy**;
The Forensic Pathologist does not examine blindly.

Section 29A of the Coroners Act 2008 (Vic) requires that VIFM be provided with a copy of the initial police report on the death and details of next of kin.

Relevant medical records for the deceased are obtained to assist in examination.
Forensic Radiology

- Every body brought into the mortuary at VIFM is given a whole body CT scan and a high resolution CT scan of the head.

- X-rays and MRI scans may also be requested.

- The pathologist will review scans, if there is a particular issue they will also consult with a forensic radiologist.
Forensic Radiology
Evidence Collection

- Victim’s clothing
- Fingernail scrapings
- Head and pubic hairs
- Blood (for DNA typing)
- Vaginal, anal, and oral swaps (sex-crimes)
- Recovered bullets/knives from body
- Hand/wound swabs from shooting victims (for GSR analysis)
External Examination

- Whole body checked and all distinctive features are noted.
- If there is a question of identity, distinguishing marks such as tattoos, piercings, birth marks etc are noted.
- Wound analysis and evidence of particular medical disorders and abnormalities are also noted.
Time of Death

- Not an exact science.

- **Pallor mortis**: paleness (15 minutes to 2 hours after death).

- **Livor mortis**: blood settles with gravity (20 minutes to 4-5 hours after death).

- **Algor mortis**: body temperature is significantly lowered (occurs at steady rate and is used to estimate time of death).

- **Rigor mortis**: the limbs of the corpse become stiff and difficult to move (variable).

- **Putrefication/Decomposition**: the reduction into simpler forms of matter, accompanied by a strong, unpleasant odor (2+ days after death).
Wound Analysis

Blunt force trauma (car):

Blunt force trauma causing contusion:
Wound Analysis

Sharp force trauma (knife):

Entry/exit wound of stab wound:
Wound Analysis

Gun shot wound (close range)  Shotgun wound
Evidence of Cause of Death

Orbital petechia indicative of strangulation
Limitations of External Examination
Full Autopsy Necessary?

- There may be sufficient information from radiology, external examination, medical history, police report and non-invasive tests.

- Taking this information into account, along with legal aspects of the investigation process and often the expressed wishes of families, the coroner then makes a decision as to whether to direct an autopsy or not.

- Family may ask for a reconsideration.
Section 25 of Coroners Act 2008 (Vic) –

Autopsies

1. The purpose of an autopsy is to assist a coroner to perform his or her functions in respect of a death.

2. A coroner must direct a medical investigator to perform an autopsy on a body under the control of the coroner if the coroner believes that—
   a) the autopsy is necessary for the investigation of the death; and
   b) it is appropriate to give the direction.
Conditions on Autopsy

Section 25 of Coroners Act 2008 (Vic) –

3. After consulting with, and seeking advice from, the Institute or a pathologist, a coroner may—

a) impose conditions on the manner in which an autopsy on a body is to be performed; and

   Conditions under subsection (3) could include the number of cavities to be explored or the organs to be removed.

b) direct the medical investigator to perform certain tests on a body or on tissue or other material removed from the body.
Internal Examination

I. Incision made (most common being ‘Y incision’).

II. Internal organs removed (only if necessary!) for external examination.

III. Selected organs are dissected and examined.

IV. Portions of organs are taken to be placed in formalin and sent for histopathology testing.

V. Body is ‘reconstituted’.
Macroscopic Examination
Macroscopic Examination
Macroscopic Examination
Histopathology

- The microscopic study of diseased tissue, is an important tool in anatomical pathology, since accurate diagnosis of cancer and other diseases usually requires histopathological examination of samples.
Histopathology
Autopsy Report

- Historical Summary
- Examination Type, Date, Time, Place, Assistants, Attendees
- Presentation, Clothing, Personal Effects, Associated Items
- Evidence of Medical Intervention
- Postmortem Changes
- Postmortem Imaging Studies
- Identification
Autopsy Report (cont..)

- Evidence of Injury
- External Examination
- Internal Examination
- Histology Cassette Listing
- Microscopic Descriptions
- Toxicology Results, Laboratory Results, Ancillary Procedure Results
- Pathologic Diagnoses
- Summary and Comments
- Cause of Death Statement
‘Inconclusive’

- Either means a failure to diagnose a cause of death or that there are multiple potential causes of death.

- International definition of ‘cause of death’:

  “All those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries”
Identifying Deceased

Section 24 Coroners Act 2008 (Vic): -

A coroner may direct a medical investigator to perform any procedure on a body (including the removal of tissue but not including a preliminary examination) for the purposes of identifying the deceased person.
Identifying Deceased

Methods:
- External Examination (distinguishing features).
- Forensic dentistry.
- Forensic biology – DNA analysis.
- Post-mortem fingerprinting.
- Forensic anthropology.
Limitations

Remains of Carnegie Mellon grad, 9/11 victim at World Trade Center, are identified

By Mark Roth, Pittsburgh Post-Gazette (TNS)  Friday March 20, 2015 08:02 PM

PITTSBURGH — A Carnegie Mellon University graduate is the latest victim whose remains have been identified in the 2001 World Trade Center attacks, moving the New York medical examiner’s office one step closer to its ultimate goal of putting a name to all of the tissue samples it has kept for years.

Matthew David Yarnell, a young New Jersey computer analyst who graduated from Carnegie Mellon University in 1997, was positively identified last week, said his mother, Michele Yarnell.

At this point, only about 60 percent of the World Trade Center remains have been identified, and many forensic experts believe it will be impossible to put a name to all of them. Still, new techniques are slowly adding verifications like Yarnell’s.