



# The science: The medicolegal autopsy



UNIVERSITY OF CAPE TOWN  
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University of Cape Town

Division of Forensic Medicine & Toxicology



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The science behind the medicolegal autopsy

# Forensic medicine

Forensic pathology



Clinical forensic medicine



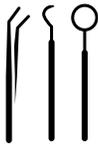
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Medicolegal autopsies are performed by forensic pathologists, coroners and medical examiners. This depends on the country and the legal system in a particular state, country or province. In many African countries, forensic pathologists are tasked with medico-legal investigations of death. These investigations serves the judicial process, and facilitate the administration of justice. The primary objective of a forensic pathologist is to provide a medical assessment of the cause of an individuals death. FP's are generally medical doctors who have specialised in the field of forensic pathology.

Forensic pathology exists in the realm of forensic medicine. Clinical forensic medicine is a subfield of forensic medicine that provides clinical medico-legal investigative service. This usually concerns living persons. This is practices by medical practitioners or forensic nurses, and most commonly involves medical examination of living victims of violent crime. This may also include medical examination of people accused of crimes. Clinical forensic medicine experts are trained to collect evidence and provide the necessary care that a survivor of a violent crime requires.

# The autopsy

- Post-mortem examination.
- Cause of death (opinion on manner of death).
- Profile of the deceased (helpful for identification).
- Post-mortem interval.



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Forensic pathologists conduct PME of deceased individuals. This may include an autopsy. It may include external examination, or an X-Ray instead. An autopsy involves, cutting open or eviscerating the body, removing organs, and examining them. All deaths identified as unnatural undergo an autopsy but natural deaths or suspected natural deaths, do not need to undergo an autopsy.

The aim of the autopsy is to provide a medical assessment of the cause of death. A pathologist may be asked to provide an opinion on the manner of death, whether it was accidental, suicidal or homicidal. They can facilitate in establishing a profile of the deceased. This is critical for identity, especially in the case of decomposed, burnt, mutilated or an unidentified body. A postmortem interval may be determined by forensic pathologists.

# Types of Autopsy

The medicolegal autopsy  
(Unnatural deaths)

Pathological, hospital or  
clinical autopsy  
(Natural deaths)

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There are two main types of autopsy, an academic and the clinical autopsy. The medicolegal autopsy is in the event of a suspected unnatural death and the clinical autopsy in the event of natural deaths. In South Africa, the medicolegal autopsy is permitted through the inquests act. Clinical autopsies are mandated by the National Health Act and do not require consent.

## The South African legal context

- Inquests Act (No. 58 of 1959, as amended, 1996).
  - Procedures followed in cases of death due to unnatural causes.
  - Authorised by a magistrate.
  - Does not require consent.
- National Health Act (Act 61 of 2003).
  - Medical investigation of natural deaths.
  - Requires consent of deceased or next-of-kin.



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There are two key pieces of legislation governing medico-legal death investigation in South Africa. This is the Inquests Act and the National Health Act. There are other acts that are important such as the Criminal Procedures Act and The Human Tissues Act, however, these will not be dealt with in detail here.

The Inquests act provides the instruction that any death that is suspected to be non-natural must be reported to the South African Police Service. SAPS will then initiate the investigation into the death of that individual, which may then require that a post-mortem examination is performed by an authorised medical practitioner to determine the cause of death. Note that the medical practitioner does not determine the manner of death (suicide, homicide etc), as this will be determined within the criminal or inquest court proceedings.

# Unnatural and natural deaths

## Natural death

- Not due to another persons act of commission or omission, violence, acts of 'God'.

## Unnatural death

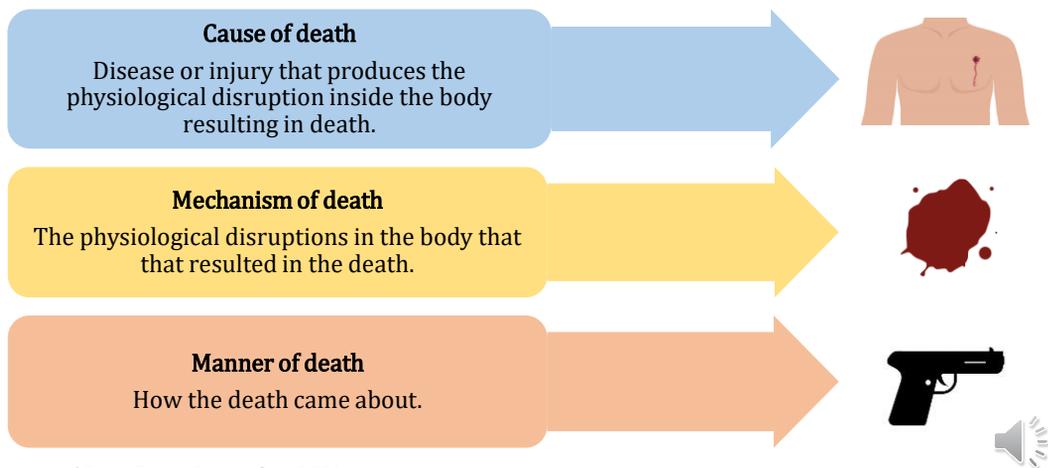
- Application of force, physical, chemical or other factors Acts of omission or commission.
- Procedural related deaths (Section 6 deaths).
- Unexpected or unexplained deaths.



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In general the legislative and procedural death may differ based on whether the death is natural or unnatural. Natural deaths are deaths that are not due to another persons act of commission or omission, violence, acts of 'God'. Application of force, physical, chemical or other factors Acts of omission or commission. This may also include procedural related deaths (Section 6 deaths) or unexpected unexplained deaths.

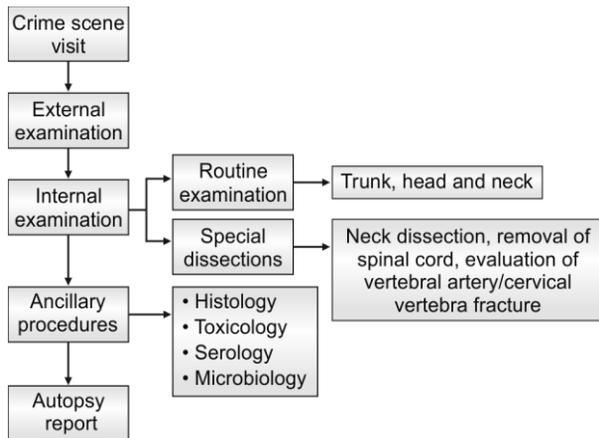
## Cause vs manner of death



The forensic pathologist must weigh the scene, autopsy, and ancillary test findings against their knowledge of the human body to determine the most significant factors that caused the individual's death. The cause of death as this is called refers to the disease or injury that produces the physiological disruption inside the body resulting in death, for example, a gunshot wound to the chest. This differs from the mechanism of death that refers the physiological disruptions in the body that that resulted in the death. An example of a mechanism of death due to the gunshot wound may be is exsanguination (extreme blood loss). The cause of death is different from describing the mechanism of death, and even though the mechanism of death does not go on the death certificate it is still something that should be examined as part of the overall determination of what could have led to the decedent's death.

The manner of death refers to how the death came about and can be classified as 1) Natural, 2) Accidental, 3) Suicide, 4) Homicide or 5) Undetermined. The role of the inquest magistrate is to determine that manner of death based on the evidence. So in this example, the cause of death would be a gunshot wound to the chest, the mechanism of death would be exsanguination (extreme blood loss). The manner of death would be homicide.

# The medicolegal autopsy



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(Gautam, 2015)

The legal autopsy requires meticulous detailed descriptions, measurements, and documentation. The forensic pathologist goes beyond the mere cause of death; he must establish all the facts, both lethal and nonlethal, with any potential bearing whatsoever on the criminal or civil litigation. The process is multi-staged and includes examination of the scene of death, external and internal examinations of the body, special investigations and tests and generation of a report.

Perhaps one of the most overlooked aspects of the medicolegal autopsy is examination of the crime scene. Many Forensic pathologists either go to visit the scene of the death, or the scene where the body is found, or forensic officers go as representatives of forensic pathologists. Investigation of the scene of a death in medicolegal cases is important, for the evaluation of circumstances of death may be critical in establishing the mode of death—e.g., suicide. The autopsy may not be able, of itself, to determine intent, the scene and the circumstances may provide more clarity on the circumstances surrounding the intent of an individual deaths.

## Scene examination

- Identify and document evidence on and around the body
- Identify primary and secondary scenes
- Document conditions at the scene



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The autopsy is conducted at a designated medical facilities. Despite this however, examination of the scene and body at the scene provides valuable information in the medico-legal investigation. Investigators visiting the scene will identify and document evidence on and around the body.

Their role is to look for evidence pertaining to medical aspects surrounding the death or the body. This may involve looking for evidence of primary and secondary scenes. For example, if an individual was shot in the kitchen and stumbled into the lounge, these would be two separate scenes and may contain evidence of biological material helpful in understanding to the cause of death, or these may contain DNA deposited on various objects at the scene. The investigator at the scene will document the scene conditions thoroughly through note taking, and photography.

## Body examination on scene

- Position of the body
- Identification of blood, vomit and other body fluids
- Postmortem interval
- External disease/trauma
- Collect any relevant evidence



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Once the medical investigator visiting the scene has documented the scene and surroundings, they may then perform a preliminary assessment of the body on scene. This is only preliminary as a more extensive investigation is conducted at the autopsy. This includes examining the body, noting the location, condition and temperature of the body. Sex and stature if possible. The body should be examined from head to toe and preserving any evidence that may be lost in transport. The hands of the deceased may be bagged (brown bags placed over hands) in cases of sexual assault homicides for example. It is important not to remove any clothing or devices on the body, and to assess signs of death and trauma or any other information that would be relevant to assessments at the autopsy. This entire procedure should be documented and the medicolegal investigator should strive to maintain a proper chain of custody for evidence through proper documentation, collection and preservation of evidence.

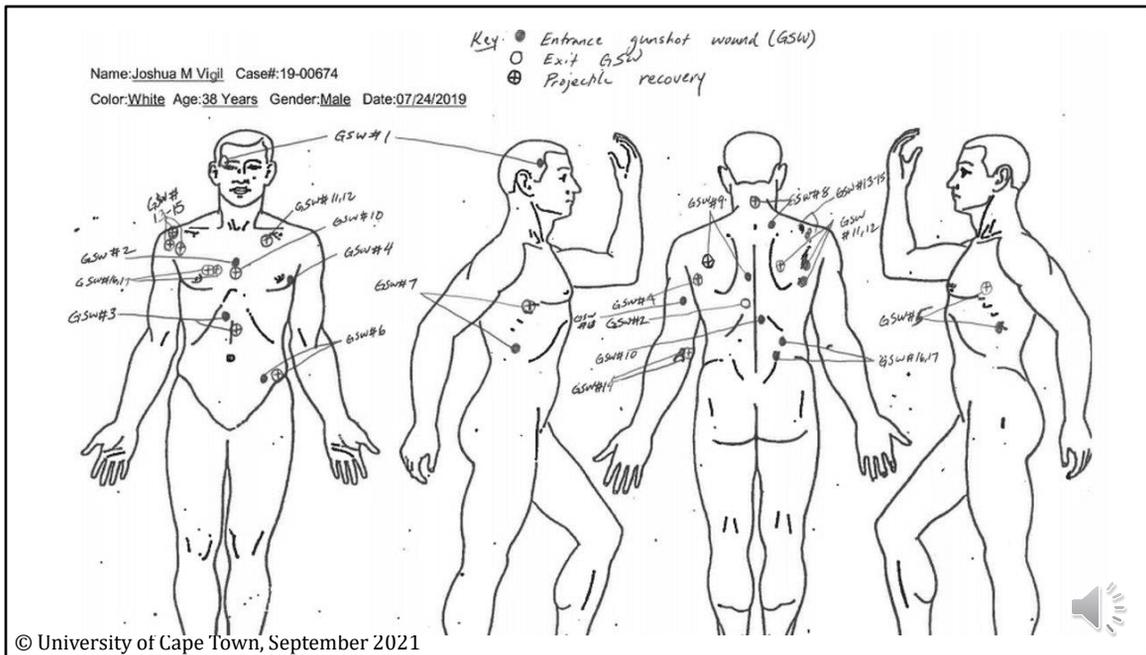
## External examination

- Identifying characteristics (sex, ancestry, tattoos, deformities, mass, height etc.)
- State of preservation
- Postmortem changes
- Medical/surgical interventions.
- Signs of diseases
- Injuries



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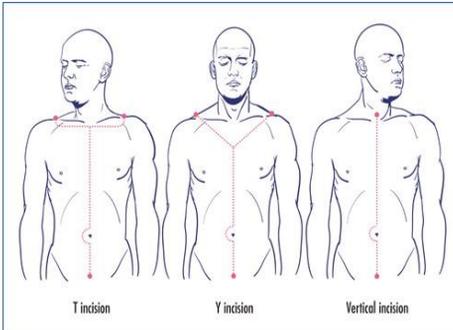
Once the body is removed from the scene and arrives at the mortuary, an external examination is conducted. The examiner or pathologist will be looking to identify individualising characteristics (sex, ancestry, tattoos, deformities, mass, height etc.). They will note the state of preservation, and the presence of any postmortem changes. In addition to this evidence of medical or surgical interventions, diseases and injuries will be assessed through visual examination.



As part of the external examination the pathologist or examiner will attempt to identify any evidence of trauma such as gunshot wounds, stab wounds, bruises and burns. This includes detailed notes about the location, appearance and size of wounds. The use of X-Rays can facilitate the identification of trauma beneath the skin and confirm the presence of projectiles or foreign objects in the body. The notes taken by the pathologist may resemble this image of illustrating the location of exit and entrance GSW, as well as the site of projectile recovery.

# Autopsy

- Organ removal and examination

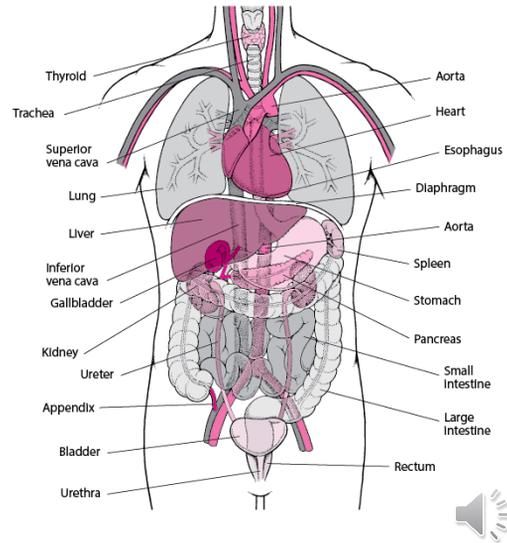


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The autopsy procedure itself has changed very little during the 20th century. The first step is a gross examination of the exterior for any abnormality or trauma and a careful description of the interior of the body and its organs. This is usually followed by further studies, including microscopic examination of cells and tissues. The main incisions in the body remain the same. For the torso, a Y-shaped incision is made. Each upper limb of the “Y” extends from either the armpit or the outer shoulder and is carried beneath the breast to the bottom of the sternum, or breastbone, in the midline. From this point of juncture at the bottom of the sternum the incision is continued down to the lower abdomen where the groins meet in the genital area.

## Examination of organs

- Shape, size, pallor, weight.
- Injury/trauma
- Macroscopic pathology.
- Incisions differ depending on the type of organ.



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There are different schools as to procedure beyond this point. In one method, each organ is removed separately for incision and study. In the so-called en masse methods the chest organs are all removed in a single group and all of the abdominal organs, the pelvic organs and then the brain for a separate examinations. By removing these organs as a collection the pathologist will seek to preserve the context or organ systems that function together. Regardless of how the organs are removed there are several consistent examinations used, these are assessments of shape, size, pallor and weight. The pathologist has knowledge about different illnesses and conditions and how the appearance of organs may reflect these factors. Evidence of injury, trauma may also be seen on the organs. In addition the pathologist may make an incision through the organ to assess internal structures. The pathologist is legally allowed to remove certain structures or specimens for examination and storage. Immediately upon completion of the procedure, organs are returned to the body and incisions carefully sewn. After the body's proper restoration, no unseemly evidence of the autopsy need remain. After all studies—histological, chemical, toxicological, bacteriological, and viral—are completed, any errors of the provisional anatomical diagnoses are corrected and the final anatomical diagnoses and the final cause of death are listed.

# Postmortem Specimens

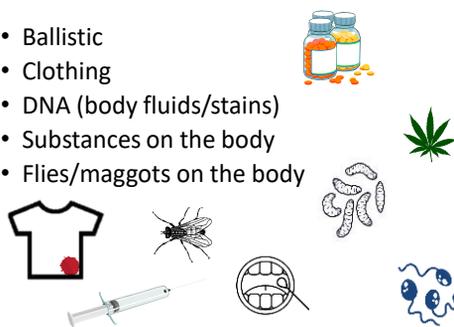
## Diagnostic

- Organ samples
- Blood
- Urine
- Pus
- Cerebrospinal fluid
- Bile
- Hair
- Vitreous humour
- Swabs of stains



## Evidentiary

- Ballistic
- Clothing
- DNA (body fluids/stains)
- Substances on the body
- Flies/maggots on the body



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Postmortem evidence can largely be grouped as diagnostic or evidentiary. Examples are shown here.

# The postmortem report

- In affidavit form
- Details of examination and author of report
- Schedule of observations
- Chief postmortem findings
- Cause of death (opinion on manner of death)
- Record of specimens retained and disposal

**AFFIDAVIT**

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I, the undersigned \_\_\_\_\_, do hereby make oath and state that:

1. The facts herein deposed to fall within my personal knowledge and are both true and correct.
2. I am an adult female forensic analyst, attached to the \_\_\_\_\_ Forensic Science Laboratory situated at the \_\_\_\_\_
3. My address for service is: \_\_\_\_\_, Cape Town.
4. I have been awarded the degrees of B. Sc [Stellenbosch University], BSc Hons. [UCT] & M.Phil. [UCT].
5. I have a total of 15 years' experience in the biological sciences.



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## What is the autopsy report?

After all studies are completed, a detailed report is prepared that describes the autopsy procedure and microscopic findings, gives a list of medical diagnoses, and a summary of the case. The report contains the chief postmortem findings and emphasizes the relationship or correlation between clinical findings (laboratory tests, radiology findings, etc.) and pathologic findings (those made from the autopsy). Whether it be an inquest or a criminal case, these reports are for the most part considered sufficient for admissibility without testimony from a pathologist. It will cover factual findings, but it may also include some opinions. In the case of an expert witness, like a forensic pathologist, the Inquests Act stipulates that due to experience, education and training Forensic Pathologists are allowed to provide an opinion or interpretation of the evidence. When the COD is under investigation, a pathologist may also be asked to review the police docket and formulate a secondary opinion on the cause of death.

Voice over: Elizabeth Dinkele

Slide design: Elizabeth Dinkel

Content adapted from Dr Gavin Kirk and Prof Lorna Marti



**CRIME SCENE DO NOT CROSS**

Slides provided by the Division of Forensic Medicine and Toxicology,  
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