Autopsy is a surgical procedure that consists of a thorough examination of a corpse by dissection to determine the cause, mode, and manner of death; or the exam may be performed to evaluate any disease or injury that may be present for research or educational purposes. The term *necropsy* is generally used for non-human animals.Autopsies are usually performed by a specialized medical doctor called a pathologist. Only a small portion of deaths require an autopsy to be performed, under certain circumstances. In most cases, a medical examiner or coroner can determine the cause of death.

Purposes of performance

Autopsies are performed for either legal or medical purposes. Autopsies can be performed when any of the following information is desired:

- Manner of death must be determined
    - Determine if death was natural or unnatural
    - Injury source and extent on the corpse
- Post mortem interval
- Determining the deceased's identity
- Retain relevant organs
- If it is an infant, determine live birth and viability

For example, a forensic autopsy is carried out when the cause of death may be a criminal matter, while a clinical or academic autopsy is performed to find the medical cause of death and is used in cases of unknown or uncertain death, or for research purposes. Autopsies can be further classified into cases where an external examination suffices, and those where the body is dissected and an internal examination is conducted. Permission from next of kin may be required for internal autopsy in some cases. Once an internal autopsy is complete, the body is reconstituted by sewing it back together.

There are four main types of autopsy:

Medico-legal or ***forensic*** or ***coroner's autopsies*** seek to find the cause and manner of death and to identify the decedent. They are generally performed, as prescribed by applicable law, in cases of violent, suspicious or sudden deaths, deaths without medical assistance, or during surgical procedures.

- ***Clinical*** or ***pathological autopsies*** are performed to diagnose a particular disease or for research purposes. They aim to determine, clarify, or confirm medical diagnoses that remained unknown or unclear before the patient's death.
- ***Anatomical*** or ***academic autopsies*** are performed by students of anatomy for study purposes only.
- ***Virtual*** or ***medical imaging autopsies*** are performed utilizing imaging technology only, primarily magnetic resonance imaging (MRI) and computed tomography (CT).

Forensic autopsy

A forensic autopsy is used to determine the cause, mode, and manner of death. Forensic involves the application of the sciences to answer questions of interest to the legal system. Medical examiners attempt to determine the time of death, the exact cause of death, and what, if anything, preceded the death, such as a struggle. A forensic autopsy may include obtaining biological specimens from the deceased for toxicological testing, including stomach contents. Toxicology tests may reveal the presence of one or more chemical "poisons" (all chemicals, in sufficient quantities, can be classified as a poison) and their quantity. Because post-mortem deterioration of the body, together with the gravitational pooling of bodily fluids, will necessarily alter the bodily environment, toxicology tests may overestimate, rather than underestimate, the quantity of the suspected chemical. Following an in-depth examination of all the evidence, a medical examiner or coroner will assign a manner of death from the choices proscribed by the fact-finder's jurisdiction and will detail the evidence on the mechanism of the death.

Clinical autopsy

Pathologist performing a human dissection of the abdominal and thoracic organs in an autopsy room Clinical autopsies serve two major purposes. They are performed to gain more insight into pathological processes and determine what factors contributed to a patient's death. For example, material for infectious disease testing can be collected during an autopsy. Autopsies are also performed to ensure the standard of care at hospitals. Autopsies can yield insight into how patient deaths can be prevented in the future. Within the United Kingdom, clinical autopsies can be carried out only with the consent of the family of the deceased person, as opposed to a medico-legal autopsy instructed by a Coroner (England & Wales) or Procurator Fiscal (Scotland), to which the family cannot object. Over time, autopsies have not only been able to determine the cause of death, but have also led to discoveries of various diseases such as fetal alcohol syndrome, Legionnaire's disease, and even viral hepatitis.

Academic autopsy

Academic autopsies are performed by students of anatomy for the purpose of study, giving medical students and residents firsthand experience viewing anatomy and pathology. Postmortem examinations require the skill to connect anatomic and clinical pathology together since they involve organ systems and interruptions from ante-mortem and post-mortem. These academic autopsies allow for students to practice and develop skills in pathology and become meticulous in later case examinations.

Virtual autopsy

Virtual autopsies are performed using radiographic techniques which can be used in post-mortem examinations for a deceased individual. It is an alternative to medical autopsies, where radiographs are used, for example, magnetic resonance imaging (MRI) and computed tomography (CT scan) which produce radiographic images in order to determine the cause of death, the nature, and the manner of death, without dissecting the deceased. It can also be used in the identification of the deceased. This method is helpful in determining the questions pertaining to an autopsy without putting the examiner at risk of biohazardous materials that can be in an individual's body.

Biopsy

A biopsy is a medical test commonly performed by a surgeon, an interventional radiologist, or an interventional cardiologist. The process involves the extraction of sample cells or tissues for examination to determine the presence or extent of a disease. The tissue is then fixed, dehydrated, embedded, sectioned, stained and mounted[1] before it is generally examined under a microscope by a pathologist; it may also be analyzed chemically. When an entire lump or suspicious area is removed, the procedure is called an excisional biopsy. An incisional biopsy or core biopsy samples a portion of the abnormal tissue without attempting to remove the entire lesion or tumor. When a sample of tissue or fluid is removed with a needle in such a way that cells are removed without preserving the histological architecture of the tissue cells, the procedure is called a needle aspiration biopsy. Biopsies are most commonly performed for insight into possible cancerous or inflammatory condition

Biopsied sites

Bone	A bone biopsy is a procedure in which bone samples are removed to find out if cancer or infection or other abnormal cells are present. A bone biopsy involves the outer layers of bone, unlike a bone marrow biopsy, which involves the innermost part of the bone. Bone biopsy should as rule be done after all necessary imagings performed. Jamshidi needle has replaced the open-biopsy and fine-needle aspiration
Bone marrow	Since blood cells form in the bone marrow, a bone-marrow biopsy is employed in the diagnosis of abnormalities of blood cells when the diagnosis cannot be made from the peripheral blood alone. In malignancies of blood cells (leukemia and lymphoma) a bone-marrow biopsy is used in staging the disease. The procedure involves taking a core of trabecular bone using a trephine, and then aspirating material.
Breast	Breast biopsy is often performed to assess or diagnose breast cancer, and can be performed by various methods such as fine needle aspirate (FNA), core needle biopsy (CNB), or surgical removal.[25]
Endovascular endothelial cells	A micro-3D-printed device adapted for endovascular techniques has been shown to harvest endothelial cells for transcriptomic analysis.[26]
Gastrointestinal tract	Flexible endoscopy enables access to the upper and lower gastrointestinal tract, such that biopsy of the esophagus, stomach and duodenum via the mouth and the rectum, colon and terminal ileum are commonplace. A variety of biopsy instruments, such as the bioptome, may be introduced through the endoscope and the visualized site biopsied.[27] Until recently, the majority of the small intestine could not be visualized for biopsy. The double-

	balloon "push-pull" technique allows visualization and biopsy of the entire gastrointestinal tract.[28] Needle core biopsies or aspirates of the pancreas may be made through the duodenum or stomach.[29]
Lung	Biopsies of the lung can be performed in a variety of ways depending on the location.
Liver	In hepatitis, most biopsies are not used for diagnosis, which generally occurs by other means. Rather, it is used to determine response to therapy which can be assessed by reduction of inflammation and progression of disease by the degree of fibrosis or, ultimately, cirrhosis. In the case of Wilson's disease, clinicians use biopsies to determine the quantitative copper level.
Pancreatic cysts	Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) of cystic lesions, followed by liquid cell analysis, has been used as a diagnostic tool for differentiating benign, potentially malignant, and malignant pancreatic cysts.[30][31] 'Through-the-needle' cytologic brushes have been developed for increasing the cellular content in the aspirates.[32][33][34][35]
Prostate	Forms of prostate biopsy include transrectal biopsy, transperineal biopsy and transurethral biopsy
Nervous system	Forms include brain biopsy, nerve biopsy, and meningeal biopsy
Urogenital system	Forms include renal biopsy, endometrial biopsy and cervical conization
Other	Other sites include lymph node biopsy, muscle biopsy, and skin biopsy

Analysis of biopsied material

After the biopsy is performed, the sample of tissue that was removed from the patient is sent to the pathology laboratory. A pathologist specializes in diagnosing diseases (such as cancer) by examining tissue under a microscope. When the laboratory (see Histology) receives the biopsy sample, the tissue is processed and an extremely thin slice of tissue is removed from the sample and attached to a glass slide. Any remaining tissue is saved for use in later studies, if required. The slide with the tissue attached is treated with dyes that stain the tissue, which allows the individual cells in the tissue to be seen more clearly. The slide is then given to the pathologist, who examines the tissue under a microscope, looking for any abnormal findings. The pathologist then prepares a report that lists any abnormal or important findings from the biopsy. This report is sent to the surgeon who originally performed the biopsy on the patient.