

The importance of the autopsy in medicine

Clinical autopsy is integral to public health, it has brought critical advances in the understanding of disease and its treatment, leading to improvements in many people's lives and to many lives being saved. Despite this, there has been a gradual demise in the use of clinical autopsy in medical practice. Professor L. Maximilian Buja of the McGovern Medical School, University of Texas, a revered expert academic pathologist alongside his colleagues describes clearly why it is imperative to reinstate the practice of clinical autopsy as an integral part of international healthcare systems.

The literal translation of 'Autopsy' is 'seeing with one's own eyes.' Clinical autopsy is a medical procedure that involves direct examination and dissection of the body of a decedent. This procedure is performed by a pathologist in a morgue with an autopsy suite where "Ibi Mortui Vivos Docent" – "Let the dead teach the living" is well described in the scientific literature (Geller, 1983; Hill & Anderson, 2016).

Professor L. Maximilian Buja and his colleagues champion the clinical autopsy as an essential tool in understanding the cause and mechanism of death, the progression of disease, and effectiveness of any treatments prescribed. Professor De Cock and colleagues as public health professionals provide a global perspective confirming the importance of the autopsy. Professors Buja and Krueger have produced two atlases of human pathology that stress the importance of linking clinical findings with autopsy findings to bring about an understanding of human disease.

Disappointingly, despite the recognition of the importance of clinical autopsies, their rates have rapidly declined. Professor Buja and his associates advocate the clinical autopsy for its benefits to decedents' families, healthcare providers, medical science and society at large.

WHAT HAS AUTOPSY ACHIEVED?

Professor Buja is clear that autopsy has provided many 'guiding visions' for advancement of scientific medicine. There have been major advances in treatment for children born with heart disease. We have a far greater understanding of the nature and progress of heart disease and heart attacks; pathologists have discovered ground-breaking knowledge on other cardiovascular phenomena, such as sudden cardiac death, which devastates families. The findings from clinical autopsy leads directly to improving patient outcomes and saving lives. Outside heart disease, clinical autopsy gave us a great understanding of the 1917 flu pandemic and this knowledge is still valid today with the advent of new strains of the flu virus. Globally, clinical autopsy has enhanced our clinical understanding of a multitude of infectious diseases that lead to the death of many people.

Professors Buja and De Cock describe how, due to autopsy, we have a better understanding of how treatments work. For example, their works describe how people living with human immunodeficiency viral infection (HIV) have benefitted from knowing that tuberculosis (TB) has a big influence on death in HIV. This knowledge means that TB can be anticipated and treated before it occurs. Professor Buja, with regret, explains that a decline in clinical autopsy rates now means that research into TB is now dominated by animal studies, which do not directly relate to humans. Autopsy ultimately improves knowledge, leading to better treatments and prevention, which saves lives.

CLINICAL AUTOPSY: THEN AND NOW

There is one certainty in that we will all die, and useful information

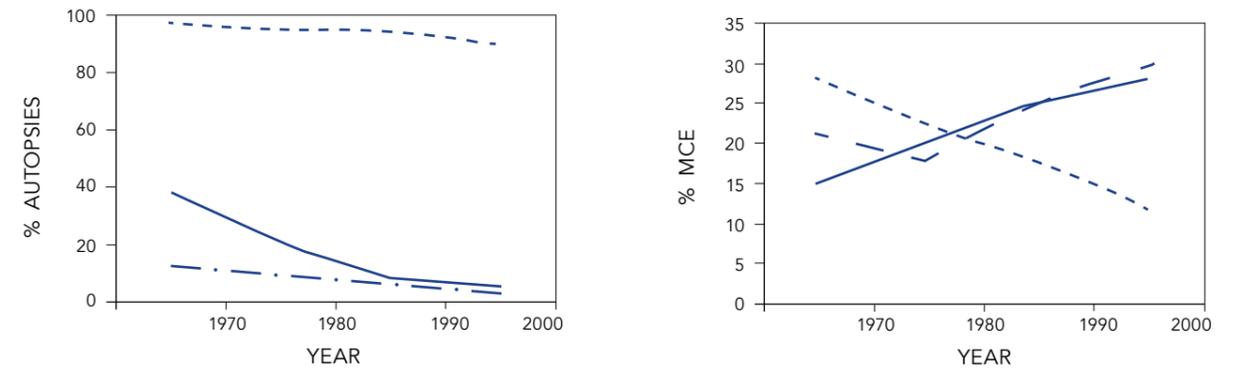


FIGURE 2. Relationship between declining autopsy rates (left) and incidence of major clinical error (MCE, right). USA (straight line), Germany (broken line), Zurich/Switzerland (dotted line). Note declining MCE rates in continuously high autopsy rates. (Reproduced from Xiao et al., 2009).

is associated with death. In De Cock and colleagues' 2019 paper, 'Learning from the Dead' the authors highlight how older physicians recall the regular visits to the autopsy room in their earlier career and recognise, with unease, the gradual decline in the frequency that clinical autopsies are carried out. This decline is caused by a number of factors to include not only, a reduction in healthcare and educational costs and advances in technology such as diagnostic imaging, but also a cultural aversion to the autopsy and a reluctance to ask relatives and loved ones for consent. Doctors are also concerned about litigation if it were to transpire that their diagnoses were incorrect. In reality, more often than not, autopsies may reduce rather than increase the possibility of litigation by answering questions that otherwise would have increased the chances of litigation. Buja and colleagues found that we are at a stage where medical students have little knowledge around the value of autopsy.

THE THREATS IN DECLINE

De Cock and colleagues point out that there is a lot to lose from declining autopsy rates. Autopsies have been used as a form of medical audit and quality control. The less autopsies are performed the less skilled pathologists become at performing them. Professors Krueger and Hunter have emphasised that the autopsy is essential for the training of pathology generalists by providing a solid knowledge in classical pathobiology of diseases and a creative mind able to synthesise highly specialised diagnostic data.

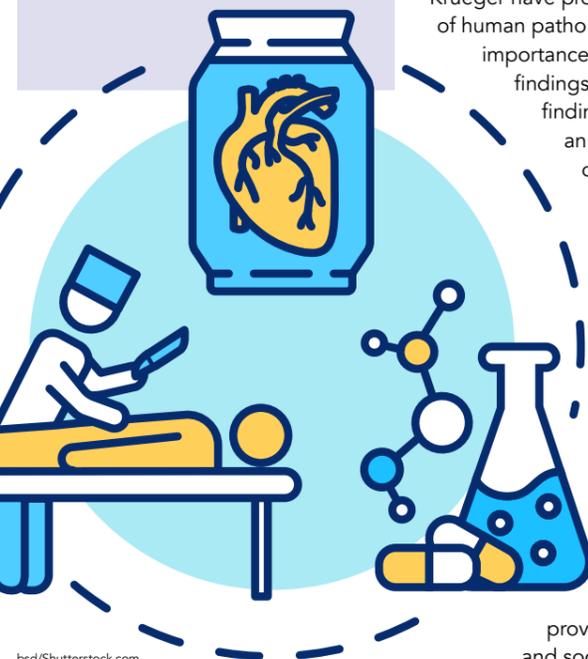
Professor Buja and colleagues highlight that decreasing autopsy rates reduces the opportunities to study the effects of certain diseases on other organs in the body, and to discover and clarify many medical disorders. For example, the understanding of influenza and its burden will be less and Buja points out that although imaging technology has advanced and is useful, it is not useful in accurately identifying infectious diseases. The reduced opportunity to understand disease, its progression and treatment will have tangible negative health implications for the whole world.

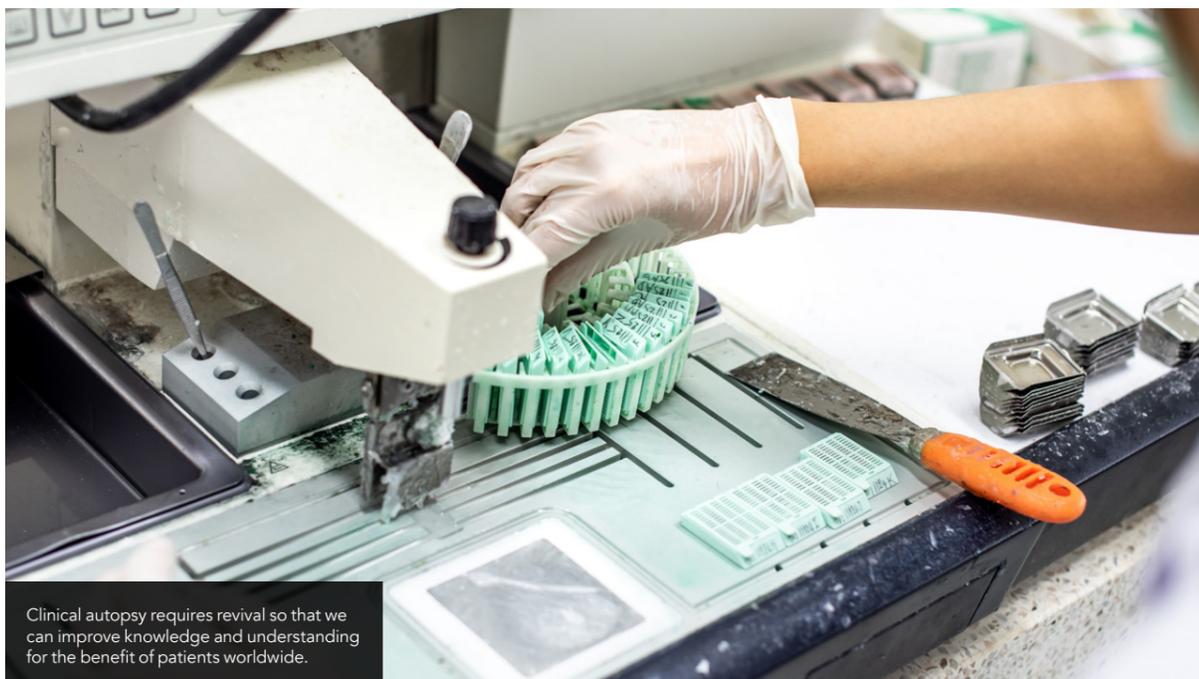
EMBRACING THE OPPORTUNITIES

The opportunities in properly recognising and embracing the benefits of clinical autopsy are significant with low- and middle-income countries being set to reap the most reward.

Tissues from many diseases are only available from the completion of an autopsy. De Cock points out the potential for the capture of 'rich' data for research and surveillance in the interests of public health, through pandemic control and the understanding of new diseases as was done with the presentation

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of HIV and severe acute respiratory distress syndrome (SARS). With new ways of working, pathologists recognise that the use of simpler and less invasive methods of organ tissue sampling can provide reliable data on specific causes of death (Damore et al., 2000).

Professor Buja advocates embracing technological advances in the pursuit of cutting-edge research into human disease. The autopsy can provide a major opportunity for the application of next generation DNA sequencing to obtain understanding of the genetic and molecular bases of human disease. Studies into cancer lesions using autopsy can be combined with enhanced imaging and studies on animals to provide new opportunities in cancer treatment. Coordinated studies with human TB lung tissue and results from animal studies can improve outcomes.

Buja and colleagues also highlight the opportunities to better understand environmental pollution and occupational hazards. They advocate the benefits of understanding discrepancies between clinical

and post-mortem diagnoses and not being fearful of litigation. Indeed, since 1924 the Clinicopathological Case Series published in the *New England Journal of Medicine* has used case studies to educate medics. At a regular conference, a guest physician is asked to use clinical findings and a medical history to diagnose a patient, a member of the pathology team then presents the actual diagnosis based on pathology reports. Sometimes there are discrepancies between the medics and the pathologists, but this is all about education and the anonymous

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cases are published for the benefit of the wider medical community. Castleman and colleagues stress that these Clinical Case Series 'remain a vital part of the Harvard Medical School training, and they are read by physicians and medical students all over the world'.

There are evidenced based opportunities to better communicate the benefits of autopsy to medics and the wider public. There could be an opt out approach to autopsy which may

overcome some of the perceived issues around consent for autopsy.

There is a unanimous view amongst these leading pathologists in their fields that clinical autopsy remains a valid and essential tool in the understanding of disease, public health and medical education. The clinical autopsy has achieved great things and there are endless opportunities to embrace and expand clinical autopsy going forward.

A communication strategy is required to advocate the huge benefits of autopsy to the health of patients and to rekindle the interest of clinicians in the study of pathology. The fear of litigation needs to be alleviated

where there are errors in clinical diagnosis. The challenge is to not just reverse the decline in autopsy rates, but to take the opportunity to learn as much as possible from the dead, embrace technology and new techniques and to establish sustainable working practices and public health databases. We need a change in healthcare policy regarding clinical autopsy. Clinical autopsy requires revival so that we can improve knowledge and understanding for the benefit of patients worldwide.



Behind the Research

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Research Objectives

Professor L. Maximilian Buja, an academic pathologist whose career has been moulded by involvement in the autopsy, champions the mission that pathologists need to work at the local, national, and international levels to be proactive advocates of the autopsy to medical students in the preclinical and clinical years, residents, fellows, pathology faculty colleagues, faculty in other departments, medical school leaders, hospital administrators, nursing staff, and when the opportunity arises, the general public. The challenges are great but the benefits for medicine and society are enormous.

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Bio
L. Maximilian Buja, MD is a physician-scientist and academic pathologist who has had longstanding involvement in medical education with regular direct engagement with medical students, residents and fellows during the course of a long career in academic medicine. Dr Buja is Professor of Pathology and Laboratory Medicine, McGovern Medical School, The University of Texas Health Science Center at Houston.

Personal Response

What do you consider to be the greatest threat to public health if the clinical autopsy does not become reinstated as an integral element of medical practice?

“ The autopsy is the ultimate quality control instrument for accurately documenting medical diagnoses as well as cause of death in patients. Death certificates signed without input from a clinical autopsy are highly inaccurate and give false impressions as to the incidence and prevalence of various diseases. This can lead to very misguided public health policy and decision making. ”

What do you think will be the most effective way of reinstating clinical autopsy back into medical education and international healthcare systems?

“ Continue to have pathology organisations such as the College of American Pathologists (CAP) advocate for the autopsy with major regulatory bodies including the Joint Commission (accreditor of hospitals and healthcare organisations), the American Association of Medical Colleges (AAMC) and the American Medical Association (AMA). ”

