

# Euthanasia

A neuropsychiatric researcher raises concerns

*Euthanasia in humans remains illegal in most parts of the world. In a few countries like Belgium, Canada and the Netherlands, however, euthanasia is available to people suffering from terminal conditions. F. Hanna Campbell, a researcher in neuropsychiatric AI therapeutics at the Center for Neuronal Regrowth, The Hague, Netherlands, has raised a number of concerns on current euthanasia practices. Campbell believes that patients choosing euthanasia are at risk of suffering pain during the process, and that there is not enough monitoring to ensure that patients experience the quick, painless death they were hoping for.*

Euthanasia is a deeply emotive subject. Defined in the UK as “a deliberate intervention undertaken with the express intention of ending a life, to relieve intractable suffering”, euthanasia remains illegal in most parts of the world. In a few countries, including the Netherlands, Belgium and recently also Canada, voluntary euthanasia, sometimes called assisted dying, is legal. A patient might consider euthanasia if they are suffering a terminal, irreversible illness. Non-voluntary or involuntary (i.e. without the patient’s consent) intervention is illegal almost everywhere. But, in the Netherlands, physicians can euthanise a person without consent and in some cases, a physician fails to be present.

Attitudes towards euthanasia appear to be changing among the general public. Once deeply taboo, a 2019 survey by the campaign group My Death, My Decision found that more than 90% of the UK population believe that assisted dying should be legal for those suffering from terminal illnesses. Among scientists, physicians and the general

public, attitudes towards euthanasia are varied and evolving – while many questions about this divisive topic remain unanswered.

## UNANSWERED QUESTIONS

F. Hanna Campbell is an engineer specialising in neuropsychiatric AI therapeutics – an approach that deals with neurodegenerative disorders caused by diseases of the nervous system, using real-time behavioural monitoring in virtual reality. Part of her expertise is in calibrating mixed-virtual and robotic technology for noninvasive psychiatric diagnosis and treating chronic and traumatic pain, for example experienced by amputees or Alzheimer’s disease patients. Campbell has recently raised a number of concerns with the standard euthanasia procedures allowed by law in the Netherlands.

In particular, Campbell believes that the lack of brain response monitoring in patients undergoing euthanasia raises important ethical, medical and legal questions. Normally, clinical or pharmaceutical decisions are based on specific, clearly defined data obtained by monitoring patients, with the goal of preventing suffering and reducing the risk of errors in diagnosis. However, these data are not considered in decisions on medical euthanasia. This absence allows the possibility of a patient suffering pain during euthanasia – the opposite of what is offered as a peaceful, pain-free death.

In a recent self-published article, Campbell laid out her prime concerns with current euthanasia practices. These issues lie in four areas: the use of the drug pentobarbital in euthanasia, the lack of evidence of effective pain-pathway deactivation (‘pain blocking’) during euthanasia, insufficient duration of psychiatric assessment of patients, and lack of brain monitoring.

## THE PENTOBARBITAL PROBLEM

Pentobarbital is a barbiturate drug that slows the activity of the brain and nervous system. It is sometimes used to treat insomnia or as part of anaesthesia before surgery. In high doses pentobarbital can cause death by respiratory arrest. The drug is commonly applied in veterinary medicine to anaesthetise or euthanise animals. In the Netherlands, pentobarbital is a key part of the human euthanasia process.

Campbell is concerned that the dosage and method of administration of pentobarbital used in euthanasia contravenes pharmacological warnings. Pentobarbital is injected intravenously; this should be done slowly, as the drug will not reach the brain immediately. Injecting the drug slowly allows the physician to determine the effect of the dose throughout the procedure, as the drug spreads throughout the nervous system. However, during euthanasia, the dose of pentobarbital is injected in just one minute, as described by one physician and in several publications.

Normally, pentobarbital should be injected at a rate of no more than 0.05g per minute. During euthanasia, however, pentobarbital is administered at a much higher rate of 9g per minute. Pharmacological warnings for pentobarbital state that, at doses greater than the recommended limit, the drug can cause gangrene (a condition where loss of blood supply causes tissue to die), joint pain throughout the whole body, and tissue irritation. Campbell believes that the fact the drug does not reach the central nervous system immediately means that there is a risk the high dosage used in euthanasia could cause the patient to suffer pain before they die. She points out that the neuroinflammatory architecture of the central nervous system mechanically resists neurotoxic extremes from entering the brain. This explains why it uses the neuroinflammatory system to save itself, redirecting and discharging the neurotoxins into the body rather than allowing them to penetrate the brain. For this reason, Campbell says that pentobarbital and other drugs used in the euthanasia process are not capable of causing death, or brain death, not even within one hour of administration and only partially after 36 hours. According



In the Netherlands, pentobarbital is one of the key parts of the euthanasia process. However, if the dose injected exceeds the recommended limit it can cause the patient to suffer before they die.

**Campbell believes that the lack of brain response monitoring in patients undergoing euthanasia raises important ethical and medical questions.**

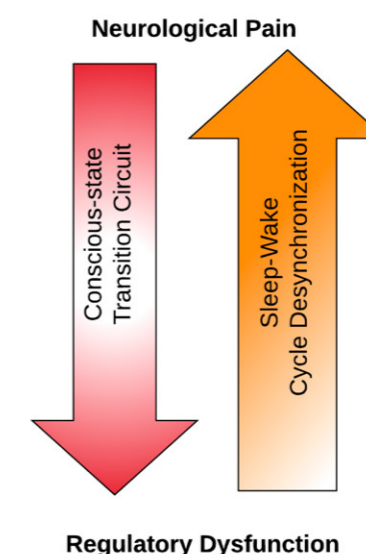
to Campbell, physicians often advise euthanasia patients that they will die within just one minute; she believes that this is false and misleading information.

## RECOGNISING PAIN

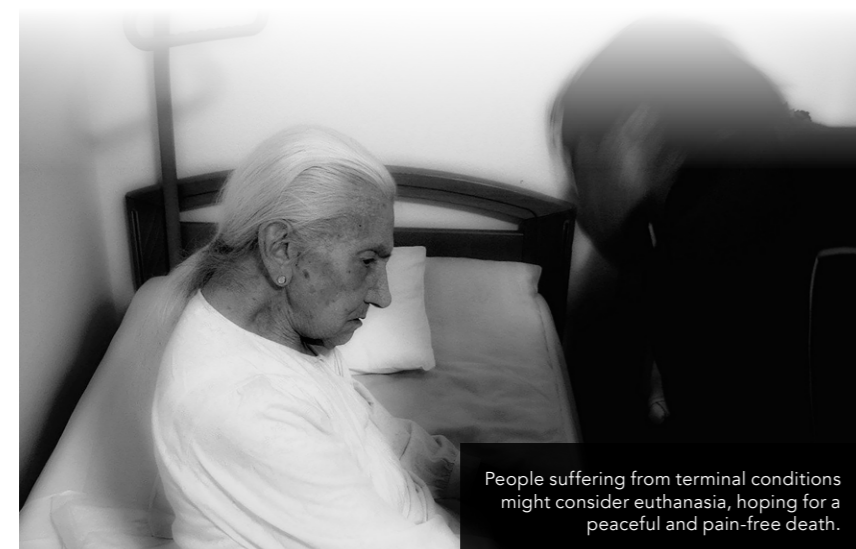
Campbell believes that part of the problem lies in the law’s failure to acknowledge scientific evidence which examines the patient’s pain, both actual

and potential, at the different stages of the euthanasia process. Firstly, if the desire for euthanasia is based on the patient’s persistent suffering, the law should require alternative ways of relieving that pain to be considered. Then, if the decision is to proceed with euthanasia, an assessment should be made to determine whether the patient is prepared for the potential of an awake state overriding unconsciousness and of pain during the actual process: of cardiac arrest, suffocation, and finally brain death. Campbell believes that patients should be made fully aware of this possible pain, and, together with their psychiatrist and physician, accept it as a potential risk of the euthanasia process. According to her, this is the only route to ensure compliance with EU laws protecting patient safety.

Another issue is the lack of differentiation between two different types of pain: nociception and neuropathic pain. Nociception is the most common type of pain, and is the type experienced as a result of injury or a health condition like arthritis. In contrast, neuropathic pain occurs as a result of damage to the nervous system. It is often described as a shooting or burning sensation. Neuropathic pain can be caused by diseases that affect



Genetic signals in the brain regulate daily changes in consciousness – during sleep and wake, for attention and focus and during survival and recovery, death and dying.



People suffering from terminal conditions might consider euthanasia, hoping for a peaceful and pain-free death.



Doctors and nurses who euthanise patients lack certified tools to detect and ensure that a patient's brain signals have ceased. Cardiac arrest and suffocation does not mean the brain is dead.

## The dosage and method of administration of pentobarbital used in euthanasia contravenes pharmacological warnings.

the nervous system, such as multiple sclerosis or injuries that cause spinal cord compression. Significantly for many euthanasia patients, chemotherapy to treat cancer is known to sometimes cause neuropathic pain.

Both types of pain – nociceptive and neuropathic – are triggered by the release of cytokines, a group of immunity-related cell-signalling molecules. Two of these molecules are tumour necrosis factor alpha and interleukin 1 beta. Previous research suggests that pentobarbital reduces the release of interleukin 1 beta by only 30-40%, while extreme doses can actually increase the activity of tumour necrosis factor alpha. Campbell proposes that high doses of pentobarbital can therefore potentially cause, rather than relieve, neuropathic pain during euthanasia. This would mean that pain-blocking during euthanasia is essentially ineffective.

### IS THE PSYCHIATRIC ASSESSMENT SUFFICIENT?

In the Netherlands, patients considering euthanasia are required to undergo psychiatric assessment. Currently, this consists of a one-hour consultation in the month leading up to euthanasia

(assuming the patient is approved and wishes to proceed). Campbell believes that this assessment is superficial and inadequate for the detailed understanding of the patient's condition that would be required to ensure euthanasia is painless.

Ideally, the pre-euthanasia psychiatric assessment would include monitoring the patient's brain for sleep-wake criteria from before morning to the arrival of night for a minimum of 30 days. This would allow physicians to understand the patient's conscious-state transition (the change from consciousness to unconsciousness), which can vary significantly between individuals. This could be particularly true of patients suffering from dementia or being treated for cancer. A transparent monitoring of this factor across diverse populations could help doctors to ensure that patients are not at risk of pain or of regaining consciousness.

### THE IMPORTANCE OF BRAIN MONITORING

Campbell notes that, at present, there is no patient-specific record, brain data registry or machine-training on behalf of simultaneous brain monitoring of patients undergoing euthanasia. Brain monitoring, she argues, would guide

doctors to check that the medications have been effective, and that there is no chance the patient regains consciousness, or appears to be unconscious while he or she is still at risk of feeling pain or potentially able to react to stimuli. Regular physicians may proceed without consent.

According to her review, after the patient has been given pentobarbital, a neuromuscular block is administered. This is intended to paralyse all muscles in the body and lead to cardiac arrest. Campbell believes that the use of a neuromuscular block makes the measurement of brain activity particularly vital, as a paralysed patient is otherwise unable to demonstrate any adverse or unintended responses to the process. Use of a neuromuscular block in the absence of brain monitoring also means that it can be difficult for the physician to determine exactly when death occurs.

Many euthanasia patients who are very frail or suffering from cancer choose to die at home, explains Campbell. In these cases, there is a particular risk of liability for suffering, as the physician usually would not have access to the monitoring equipment that would be available in a clinic or hospital. Instead, the doctor must assess the progress of the procedure by observing the patient's responses.

While euthanasia remains illegal in most countries, the amount of available data for study stays low. There's no clinical funding given to test the process with neuropsychiatric and neurosurgical supervision. The publications from the Erasmus Medical Center and Netherland's Department of Health merely describe physicians' emotions and experiences with euthanasia, but not the patients' experiences. In other words, there is no data and no funding for a treatment that should be established by proven and peer-reviewed trials. Campbell argues that this concern is especially relevant now, because the Netherlands seem to be evaluating public favourability of a new legislation to support euthanasia of mentally ill patients. She suggests that there are interests in euthanasia practice potentially not wholly devoted to compassionate disposal of persons.



# Behind the Research

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### Research Objectives

Campbell raises concerns about the lack of brain response monitoring expertise in decisions on euthanasia.

### Detail

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### Bio

Farida Hanna Campbell is an engineer and researcher in neuropsychiatric AI therapeutics from New York University and the University of Guelph. She is a certified member of the American Academy of Pain Medicine and the European Pain Federation EFIC. Campbell is experienced in urban and agricultural environmental safety and survivor rehabilitation, including chronic and traumatic pain modulation therapy and as part of wellbeing services for ageing patients. She lives and works in the Netherlands and in Germany.

### References

Campbell, F.H. (2019). Neuroinflammatory Pain in Dutch Methods of Euthanasia. *Self-published*. Available at: <https://doi.org/10.13140/RG.2.2.15139.81440>

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### Personal Response

**In your opinion, what should research priorities be if your concerns are to be addressed?**

Firstly, we need to gather minimum pain-related threshold data across each category of patient euthanised to-date, along with conscious-state transition measurement sampling from pre-dawn to post-dusk. Then, it is vital to include non-fMRI brain-region specific electrical signal monitoring as part of the patient's intrinsic recording of conscious-state transition rates and to provide evidence of brain-death. This monitoring should be established along with cardiac monitoring, and particularly during anticipated end-of-life of a chronic-disease patient or any other person seeking pain-control treatment. //

