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ORIGINAL RESEARCH

The prospects of using AI in euthanasia and physician-assisted suicide: a legal exploration

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Abstract
The Netherlands was the first country to legalize euthanasia and physician-assisted suicide. This paper offers a first legal perspective on the prospects of using AI in the Dutch practice of euthanasia and physician-assisted suicide. It responds to the Regional Euthanasia Review Committees' interest in exploring technological solutions to improve current procedures. The specific characteristics of AI – the capability to process enormous amounts of data in a short amount of time and generate new insights in individual cases – may for example alleviate the increased workload of review committees due to the continuous increase of euthanasia cases. The paper considers three broad categories for the use of AI in the Dutch euthanasia practice: (1) the physician's assessment of euthanasia requests, (2) the actual execution of euthanasia, and (3) the retrospective reviews of cases by the Regional Euthanasia Review Committees. Exploring the legal considerations around each avenue, both in the EU AI Act and the Dutch legal framework, this paper aims to facilitate the societal discussion on the role of technology in such deeply human decisions. This debate is equally relevant to other countries that legalized euthanasia (e.g. Belgium and Canada) or physician-assisted suicide (e.g. Switzerland and numerous states in the US).

Keywords Healthcare · EU law · Euthanasia · End-of-life · Physician-assisted suicide · The Netherlands

1 Introduction

The Netherlands was the first country to legalize euthanasia and physician-assisted suicide [1]. In 1998, the Regional Euthanasia Review Committees (RTEs) were established by law to carry out retrospective reviews of performed euthanasia and assistance to suicide to ensure compliance with due care criteria. Since 2002, euthanasia and physician-assisted suicide have been legal under stringent conditions codified by law. In 2023, the RTEs celebrated their 25th anniversary with a symposium focusing on the future of euthanasia procedures in the Netherlands. One of the key topics concerned the possibilities of using Artificial Intelligence (AI) technology in Dutch euthanasia and physician-assisted suicide practice. This research responds to the Committees' interest in exploring technological solutions to improve current procedures.

Worldwide, euthanasia and physician-assisted suicide remain a controversial issue, with only a handful of countries having legalized the practices. There is little attention to the possibilities of using AI technology in the context of end-of-life decisions, while AI is rapidly incorporated in other areas of medical care (e.g. cancer diagnostics, medical treatment recommendations, and AI-assisted surgery) [2]. The specific characteristics of AI – the capability to process enormous amounts of data in a short amount of time and generate new insights in individual cases – may for example alleviate the increased workload of review committees due to the continuous increase of euthanasia cases [3].

The limited existing scholarship approaches the issue from an ethical perspective and questions the morality of using AI in euthanasia and physician-assisted suicide [4]. Some ethicists support AI in this field because of its potential for empowerment in relation to death, others argue that it can relieve physicians from the burden of making complex moral decisions [5]. Research into whether current legal frameworks provide for the use of AI is however non-existent. Leaving aside the—immensely important—ethical debate for now, this paper offers a first *legal* perspective on the prospects of using AI in Dutch euthanasia

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and physician-assisted suicide practice. It first examines to what extent the recently adopted EU Artificial Intelligence Act (EU AI Act) accounts for the use of AI systems in this controversial area. Subsequently, after concluding that the AI Act does not obstruct their use but does set certain minimum standards, it delves into the applicable legal framework in the Netherlands.

This paper considers three broad categories for the use of AI in the Dutch euthanasia practice: (1) the physician's assessment of euthanasia requests, (2) the actual execution of euthanasia, and (3) the retrospective reviews of cases by the Regional Euthanasia Review Committees. Exploring the legal considerations around each avenue, this paper aims to facilitate the societal discussion on the role of technology in such deeply human decisions. This debate is equally relevant to other countries that legalized euthanasia (e.g. Belgium and Canada) or physician-assisted suicide (e.g. Switzerland and numerous states in the US). Indeed, worldwide, it provides the basis for ethical debates on the morality of using AI tools in this contentious area.

2 Regulating end-of-life AI systems in the EU Artificial Intelligence Act

The recently adopted EU AI Act regulates the development, placing on the market, putting into service, and use of AI systems in the EU. Its objective is to foster innovation by harmonising the market, while simultaneously offering protection for fundamental rights. The AI Act takes a risk-based approach to the regulation of AI systems: the higher the risk, the stricter the rule. While the EU AI Act does not directly mention the area of end-of-life, it applies across all sectors, and thus also covers this type of AI systems.

First, the EU AI Act provides a list of 'prohibited unacceptable AI practices'[6]. Generally, it prohibits four categories: manipulative practices, exploitative practices, social scoring systems, and real-time remote biometric identification systems [7]. AI systems used by a health professional in the context of medical treatment, whether this is the medical assessment of euthanasia requests, the actual execution of euthanasia, or the evaluation of cases, do not seem to fall into either of these categories. Such systems will likely not make use of biometric data and do not resemble 'social scoring systems'. Besides, manipulative and exploitative AI practices used in the context of medical treatment and carried out in accordance with the applicable law and medical standards, are specifically exempt from this prohibition [8]. In order words: the EU AI Act does not obstruct the use of AI for euthanasia practices.

Indeed, the EU AI Act stipulates rules for high-risk AI systems in relation to their development, marketing, and use. AI systems assisting in medical decisions, such as aiding the health professional in conducting the assessment of euthanasia requests filed by patients, could be classified as high-risk applications due to their potential impact on health and fundamental rights. For example, if assisting AI tools qualify as medical devices covered by the EU Medical Devices Regulation (NB: tools with an explicit medical purpose), the AI Act classifies them as 'high risk' [9]. Moreover, AI systems that are used to control access to and enjoyment of essential public services, including healthcare services, are considered high-risk AI systems [10]. Using AI to determine who qualifies for euthanasia and physician-assisted suicide may fall into this category. The AI Act also qualifies AI systems that assist judicial authorities in 'researching and interpreting facts and the law and in applying the law to a concrete set of facts' to be high-risk [11]. Deploying AI for the retrospective review of euthanasia cases would most likely qualify as such.

Systems that fall into the 'high-risk' category need to demonstrate compliance with the requirements set out in the AI Act, such as the use of high-quality data to develop the system, the implementation of quality management systems, and registration in a public database [12]. While for AI medical devices (e.g. AI for medical assessment or physical treatment) it is not necessary to conduct a 'fundamental rights impact assessment' before use [13], deployers of AI systems for judiciary activities (e.g. AI for retrospective euthanasia case review) do need to explicate the specific risks for users and describe mitigating measures, such as human oversight and complaint mechanisms [14]. For Euthanasia Review Committees it is also important to safeguard the right to explanation of individual decision-making of the people involved, as both medical decisions related to access to euthanasia (for the patient) and judicial decisions (for the health professional) significantly affect their health, safety, or fundamental rights [15].

In summary, under EU law, the use of AI for euthanasia practices is considered to pose high risks to health, safety, and fundamental rights, and is therefore only permitted under the outlined conditions. In the absence of further EU legislation in this area, it is interesting to examine how this relates to national legal frameworks on euthanasia and assisted suicide. The next sections discuss the legal framework of the Netherlands – one of the few States worldwide with a specialized medical and judicial system in this field.

3 The legal landscape on euthanasia and assisted suicide in the Netherlands

In the Netherlands, euthanasia and assisted suicide are practices enshrined in legal frameworks and subject to rigorous judicial review, codified in the Termination of Life on Request and Assisted Suicide Act ('Wet toetsing

levensbeëindiging op verzoek en hulp bij zelfdoding' (Wtl)). The key objectives of the Wtl are establishing legal certainty, due care, and transparency [16]. The legal framework mandates that patients must experience unbearable suffering with no prospect of improvement, make a voluntary and well-considered request for euthanasia, and be fully informed about their situation and prospects. The physician must be convinced of the patient's enduring suffering and the lack of a reasonable alternative solution. Moreover, at least one other independent physician must be consulted who examines the patient and provides a written opinion on the due care criteria. The execution of euthanasia or assisted suicide is reserved for physicians, who must report the case to the municipal pathologist and the regional euthanasia review committees (RTEs), providing the relevant medical records and the independent consultant's report [17].

The RTEs, comprising legal, medical, and ethical experts, then review each case to assess compliance with the legal criteria. If the committee concludes that the physician acted following the due care criteria, the case is closed. However, if they determine that the physician did not meet the necessary standards, the case is forwarded to the Public Prosecutor and the Health Care Inspectorate, potentially leading to legal consequences [18]. This retrospective review process upholds the law's integrity, balancing the respect for patient autonomy with the sanctity of life. The Dutch model emphasizes both the compassionate response to suffering and the careful safeguarding of life-ending procedures under the law [3].

4 Three avenues for using AI in the euthanasia and physician-assisted suicide practice

4.1 AI in assessing euthanasia requests

The assessment of a patient's request for euthanasia entails a delicate procedure involving – amongst other things – the evaluation of their medical decision-making capacity and the severity of their suffering. In this procedure, the physician could employ an AI system as a clinical decision-support tool to assess the patient's eligibility for euthanasia, meeting the statutory due care criteria listed in Table 1. However, it should be noted that with the current state of technology and the highly personal circumstances surrounding euthanasia requests, AI systems may not be capable of generating accurate decisions at this point.

First, physicians must assess the decision-making capacity of the patient to determine whether the request is voluntary and well considered. AI could assist in this – sometimes complex – evaluation [16]. For instance, neurotechnology can be used to read brain activity which can subsequently be analysed by AI to predict the decision-making capacity of an individual. These techniques are primarily developed in light of forensic psychiatry and criminal justice, but could theoretically also serve physicians in assessing the decision-making capacity of the patient requesting euthanasia [19]. The law does not specify whether the physician can make use of technological tools in its evaluation. The guidelines of the Royal Dutch Medical Association – the professional organisation for medical practitioners that issues guidelines and codes of conduct – do however require the physician to have a physical conversation with the patient making the request. If the patient is no longer capable of verbally communicating, the physician must determine voluntariness and well-consideration "in a different manner through expressions, including non-verbal communication" [20]. It is conceivable that for this, physicians could use AI brain-reading implants in the near future, as two studies in August 2023 in Nature reported significant developments in technologies designed to help people with facial paralysis to communicate [21]. It is however questionable whether this is an attractive pathway for physicians, because, under Dutch medical liability law, physicians can generally be held accountable for the potential harm caused by technological tools used in medical decision-making.

Second, physicians must decide whether the patient's suffering is "unbearable, with no prospect of improvement". Most of the euthanasia notifications concern patients suffering from a somatic illness (in total 88.6% or 7.726/8.720 notifications in 2022), mainly uncurable cancer (57.8% of all notifications in 2022) [22]. In these cases, AI may aid physicians in the decision, as it can learn from medical

Table 1 Statutory due care criteria in the termination of life on request and assisted suicide act

Under Sect. 2 (1) of the Termination of Life on Request and Assisted Suicide Act, the physician must:
a. be satisfied that the patient's request is voluntary and well considered;
b. be satisfied that the patient's suffering is unbearable, with no prospect of improvement;
c. have informed the patient about his situation and his prognosis;
d. have come to the conclusion, together with the patient, that there is no reasonable alternative in the patient's situation;
e. have consulted at least one other, independent physician, who must see the patient and give a written opinion on whether the due care criteria set out in (a) to (d) have been fulfilled; and
f. have exercised due medical care and attention in terminating the patient's life or assisting in the patient's suicide

databases containing disease characteristics and prospects, clinical protocols and guidelines, and previously approved requests. In the case of psychiatric disease, physicians put forward that it is complex to decide on "unbearable suffering, with no prospect of improvement", also because "suicidal thoughts" are often considered clinical symptoms [23]. While the number of granted requests remains low (1.3% or 115/8.720 notifications in 2022), requests from patients suffering from psychiatric illnesses are steadily increasing [24]. In these cases, AI could potentially aid in the physician's decision. However, in the case of psychiatric disease, it may be more difficult to develop an accurate AI system, as it must consider many highly personal variations. Third, the AI system may also advise on the existence of reasonable alternatives based on large-scale medical databases, in the same way AI-assisted clinical decision support systems are used for personalized treatment recommendations. These systems are already widely used by physicians and considered a standard tool in medical practice [25].

On the contrary, while some people have opted for the use of AI for medical second opinions [26], the current law does not allow the external consultation of the euthanasia request to be performed by an AI system, as it explicitly states that the consultation must be performed by an independent physician who must see the patient.

4.2 AI in the execution of euthanasia

While physicians cannot be forced to perform euthanasia under Dutch law, the majority of physicians is open to performing this exceptional medical act as a deed of beneficence [27]. The execution of euthanasia or physician-assisted suicide however places a high burden on the physician. In a cross-sectional study conducted in 2016 on 3000 Dutch physicians, the emotional burden of preparing and performing euthanasia was commonly reported by physicians, for example, due to concerns about administering the lethal drugs [28]. A qualitative study performed in 2016 of 17 in-depth interviews with Dutch psychiatrists found that psychiatrists are particularly reluctant to perform euthanasia and physician-assisted suicide – and their reluctance has grown over the years. A possible explanation for this is the lack of physical medical practice among psychiatrists, but the interviews revealed great diversity around psychiatrists' considerations for supporting or rejecting euthanasia requests from psychiatric patients [23]. As a result of this, psychiatrists often refuse the increasing requests from psychiatric patients. In light of the emotional burden of preparing and performing euthanasia and the growing reluctance amongst certain physicians, in combination with the growing number of euthanasia requests, the execution of euthanasia itself presents another area where the use of AI could be considered.

The SarcoPod, for instance, represents a technology designed to allow individuals to self-administer euthanasia: users lay down in the machine, and can decide to release nitrogen gas by pressing a button from the inside [29]. The current model does not use AI, but the developers are working on integrating AI software that will ask the user a series of mandatory questions before it can be activated, to test the person's identity, state of mind, and informed decision-making [30]. In this case, the machine will replace the physician in the execution of euthanasia. Alternatively, one could think of physicians working with AI robot assistance to administer the lethal medication, to ensure correct dosage. AI monitoring systems could also be deployed to monitor the patient's vital signs and other health indicators during the euthanasia process to ensure that the process is proceeding as planned without complications.

Using AI could provide a means for executing euthanasia that is potentially less prone to human error. It could also make the process more accessible in situations where physicians are unwilling to participate. However, a legal issue may be that the Wtl assigns responsibility to physicians for "have exercised due medical care and attention in terminating the patient's life or assisting in the patient's suicide". It is therefore questionable whether assigning this task to a technological device can be considered "due medical care". Moreover, if the actual termination is executed by an AI, this may create new issues for medical liability: is it possible – and fair – to ascribe liability to the physician if the actual termination is performed by an autonomous machine? Another legal question is what the use of AI tools in the execution of euthanasia implicates for the duty to respect and protect human dignity.

4.3 AI in the retrospective reviews of euthanasia case reports

Finally, AI could be deployed in the retrospective reviews of euthanasia cases to assess compliance with the legal criteria as performed by the RTEs. The first possibility is to use AI for the primary classification of incoming case notifications into straightforward notifications (95,9% of cases in 2022) and non-straightforward notifications that raise questions (4,1% of cases in 2022). The classification is currently made by the secretary of the RTE and depends on the complexity of the case. The secretary could use an AI tool to assist in the classification decision or let an AI system autonomously decide. AI assistance could significantly reduce the workload of the secretary. The law does not describe the decision-making procedure to be followed by the secretary, therefore it is not impossible to implement robust AI systems in this process.

The second possibility is to use AI for the review of straightforward notifications. Currently, straightforward

notifications are decided on digitally by the committee, while non-straightforward notifications require a physical meeting. The RTE then decides whether the euthanasia case was performed in accordance with the due care criteria. In 2022, out of 8707 euthanasia cases, the RTEs decided on 13 cases that the due care criteria were not complied with. A study published in December 2023 in Frontiers in Artificial Intelligence developed numerous AI models to classify 72 euthanasia case reports according to the categories defined in the law [31]. The study concluded that AI could enhance the efficiency and consistency of reviews, by quickly identifying patterns or discrepancies that warrant further human attention. In this way, the burden on judicial bodies could be reduced, especially considering the increasing amount of euthanasia reports submitted. However, while using AI recommendation systems could be admissible within the current legal framework – similar to legal expert systems in other areas – the autonomous deployment of AI systems in the review of straightforward notifications would require a legislative amendment.

5 Concluding remarks

AI could be used in several avenues in the euthanasia and assisted suicide practice in the Netherlands. In all pathways, the integration of AI however presents a landscape fraught with legal, ethical, and medical implications. While AI offers promising avenues for enhancing objectivity and efficiency, it is imperative to navigate these waters with caution, ensuring that the protection of the core principle of human dignity is not overshadowed by technological advancements. The debate must continue to evolve, considering not only the legal possibilities to deploy AI under current regulatory frameworks but also the wider ethical and societal consequences of using AI in the controversial domain of euthanasia and physician-assisted suicide.

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Declarations

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