

# Decision-making in clinical (bio)ethics: contemporary approaches

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## Abstract

Taking decisions in the face of moral problems in clinical practice has become a very important aspect for all professionals involved in health care. This study considers this context of uncertainty, in which there are discussions regarding the real benefits and access to new technologies in health, and assumes that any resolution in clinical (bio)ethics results from the principle that respect for the human being is indispensable for correct actions. This article aims to 1) identify in literature some of the aspects that cause anguish in health care professionals and/or researchers in clinical practice, and 2) briefly present the reflections or correlated approaches used in the decision-making process in clinical (bio)ethics of identified cases. This study's process refers to a review of scientific literature with a defined search strategy.

**Keywords:** Bioethics. Clinical ethics. Decision-making.

## Resumo

### Tomada de decisão em (bio)ética clínica: abordagens contemporâneas

Tomar decisões diante de problema moral na prática clínica tornou-se aspecto de suma importância para todos os profissionais envolvidos no cuidado da saúde. Este estudo considera esse contexto de incertezas, em que se discutem reais benefícios e acesso às novas tecnologias em saúde, e parte do pressuposto que qualquer deliberação em (bio)ética clínica resulta do princípio de que respeito pelo ser humano é indispensável para o agir correto. Este artigo tem como proposta 1) identificar na literatura alguns dos aspectos que transpassam e angustiam os profissionais de saúde e/ou pesquisadores na prática clínica, e 2) apresentar sucintamente reflexões ou abordagens correlacionadas ao processo decisório em (bio)ética clínica em relação aos casos identificados. O caminho percorrido neste estudo diz respeito a revisão da literatura científica com estratégia de busca definida.

**Palavras-chave:** Bioética. Ética clínica. Tomada de decisão.

## Resumen

### Toma de decisiones en (bio)ética clínica: enfoques contemporáneos

Tomar decisiones frente a un problema moral en la práctica clínica se ha tornado un aspecto de suma importancia para todos los profesionales involucrados en la atención de la salud. El presente estudio considera este contexto de incertidumbre en el que se discuten los beneficios reales y el acceso a las nuevas tecnologías en materia de salud, y parte del supuesto de que cualquier deliberación en (bio)ética clínica se desprende del principio de que el respeto por el ser humano es indispensable para actuar correctamente. Este artículo se propone: 1) identificar en la literatura algunos de los aspectos que atraviesan y generan angustia a profesionales de la salud y/o investigadores en la práctica clínica, y 2) presentar brevemente las reflexiones o enfoques relacionados al proceso decisório en (bio)ética clínica en relación a los casos identificados. El camino recorrido en este estudio da cuenta de una revisión de la literatura científica con una estrategia de búsqueda definida.

**Palabras clave:** Bioética. Ética clínica. Toma de decisiones.

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Declararam não haver conflito de interesses.

In the face of the changes that took place during the twentieth century and of the scientific and biotechnological advances - especially in research involving human beings - (bio)ethics emerged as an attempt to provide answers to arising challenges and transformations. Its origin explained the desire for ethics that is not limited to deontological concepts and moral relations of "good relationship", but that would allow reflection and debate regarding health and life sciences, restoring respect, care and protection not only of human beings themselves but of all living beings<sup>1</sup>.

In the mid-1970s, by recognizing that not everything that is scientifically possible is morally correct, the American oncologist and professor Van Rensselaer Potter coined the term "bioethics", conceiving it in one of his works as a "bridge" between the life sciences and the humanities<sup>2,3</sup>. As time went by, (bio)ethics became fundamental for dialogue between different knowledge, disseminating concepts of ethics, morality, religion, law, science, technics and decision-making, seeking to appreciate, describe and propose means capable of protecting everyone involved.

In general, decision-making sets/configures an extremely diverse area, as the decision-making process can be investigated at different levels of complexity, from neurosciences to applied social sciences, finding different concepts, many of which come from management sciences<sup>4</sup>. Significantly, and with specific relevance, are the initial contributions of Bethlem<sup>5</sup>, which initially characterized the decision-making process in a generic model consisting of four stages: 1) the decision to decide; 2) the definition regarding what one is going to decide; 3) the formulation of alternatives; and 4) the definition of the alternative considered most appropriate. The characterization made by Idalberto Chiavenato, which considered decision-making as *the process of analysis and choice between several available alternatives to determine the course of action that a person should follow*<sup>6</sup>, is also considered relevant.

From a health science perspective, - especially neuroscience and neuroethics<sup>7</sup> -, it is known that the basis of human neurobiological decision-making involves complex neural processes and biochemical events, which have been contemporaneously investigated in order to identify areas and cortical circuits responsible for all activities involved in the decision-making process<sup>8,9</sup>. Significantly, studies published in international scientific literature point to the

prefrontal cortex as an important link in decision-making, given its importance in realizing projections and connections to different cortical areas of the central nervous system, also being influenced by them<sup>10-12</sup>, and intrinsically correlating with the process of evaluation and filtering emotional and social afferents, which form the basis of the decision-making process<sup>13,14</sup>.

Making decisions in the face of moral dilemmas in clinical practice has become an important issue for all professionals involved in health care, once it shows the ability - or lack of it - to recognize an ethical problem and to then make use of (bio)ethical tools appropriate to each situation at any health care level - primary, secondary, tertiary and quaternary.

In a context marked by significant uncertainty - in which the real benefits and access to new technologies in health are being discussed - and assuming that any decision on clinical (bio)ethics implies respect for human beings, this article aims to 1) identify in literature situations afflicting healthcare professionals and/or researchers in clinical practice; and 2) briefly present thoughts or approaches correlating to the decision-making process in clinical (bio)ethics regarding the identified situations.

## Method

The path taken in this study includes a review of scientific literature with a defined search strategy. Initially the appropriate terms were identified in the Descritores em Ciências da Saúde - DeCS - (Health Sciences Descriptors) of the Biblioteca Virtual em Saúde - VHL (Health Virtual Library). The second phase included the completion of a search undertaken in the PubMed, Literatura Latino-Americana e do Caribe em Ciências da Saúde - LILACS (Literature in the Health Sciences in Latin America and the Caribbean) and Scientific Electronic Library Online - SciELO - databases using the descriptors in a combined form, as shown in Table 1. Considering the publication of articles in three languages (Portuguese, English and Spanish), the selected descriptors were: 1) "*bioética*" (bioethics; *bioética*); 2) "*temas bioéticos*" (bioethical issues; *discusiones bioéticas*); 3) "*técnicas de apoio para a decisão*" (decision support techniques; *técnicas de apoyo para la decisión*); 4) "*teoria da decisão*" (decision theory; *teoría de las decisiones*); 5) "*ética clínica*" (ethics, clinical; *ética clínica*).

**Table 1.** Descriptors used, search strategies and number of citations obtained

Descriptors and search strategies	Databases consulted		
	PubMed	Lilacs	SciELO
Bioethics + decision support techniques	3	102	0
Bioethics + decision theory	12	0	0
Bioethics + ethics, clinical	2	27	0
Bioethical issues + decision support techniques	1	0	0
Bioethical issues + decision theory	0	0	0
Bioethical issues + ethics, clinical	4	1	0
<b>Total</b>	<b>152 publications</b>		

*SOURCE: Bibliographic research*

The articles that compose the sample of this study contemplated the following inclusion criteria: scientific articles published in the last ten years, with the end date defined as 31<sup>st</sup> December 2014; publications in indexed journals; and availability of (free) access to the content in full for download. Articles presented only in summary/abstract format and publications that required access to content dependent on Programa de Comutação Bibliográfica – Comut - (Bibliographical Switching Program) were excluded at the discretion of the authors.

The third and final stage involved the selection of texts for inclusion in the review. Articles were chosen by the systematic reading of titles and abstracts,

having as criteria the presence in the text of an approach focused on ethics/(bio)ethical practice. After analysing the obtained publications, fourteen articles were chosen, complemented by references and textbooks on related topics.

## Results

Articles were subjected to a classification of analytical nature, from which a demonstrative chart (Table 2) was drafted. The chart, in which titles were arranged in ascending order by year of publication, includes the level of knowledge regarding the discussions on the subject of study.

**Table 2.** Distribution of titles, authors, year of publication, methods, conflicts and considerations regarding clinical (bio)ethics identified in selected articles

Title	Method(s)	Major conflicts / consideration on clinical (bio)ethics
Ética na decisão terapêutica em condições de prematuridade extrema [Ethics in therapeutic decisions in extreme prematurity conditions] <sup>15</sup>	<ul style="list-style-type: none"> <li>Qualitative study, critical review of literature</li> </ul>	<ul style="list-style-type: none"> <li>Uncertain prognosis of infants born extremely premature and ethical considerations regarding autonomy and therapeutic decisions</li> <li>The increasing technological advancement in health care and the need for humane intervention - as a (bio) ethics imperative – in the routine of neonatal units</li> <li>Artificial maintenance of vital functions in the context of lack of reasonable recovery expectations</li> </ul>
Implantação de comitês de bioética em hospitais universitários brasileiros: dificuldades e viabilidades [Bioethics committees deployment in Brazilian university hospitals: problems and viabilities] <sup>16</sup>	<ul style="list-style-type: none"> <li>Qualitative study, case report</li> <li>Scenario: hospital complex of a Brazilian public university</li> </ul>	<ul style="list-style-type: none"> <li>Contextualisation of the development and proposal of bioethics committees in Brazil</li> <li>Little understanding by health professionals regarding the basic (bio)ethical knowledge and ability to deal with moral issues in clinical and care environments</li> </ul>

Title	Method(s)	Major conflicts / consideration on clinical (bio)ethics
Modelos de tomada de decisão em bioética clínica: apontamentos para abordagem computacional [Decision-making models in clinical bioethics: notes for a computational approach] <sup>17</sup>	<ul style="list-style-type: none"> <li>• Qualitative study, literature review</li> </ul>	<ul style="list-style-type: none"> <li>• Rise of the applicability of computer systems in clinical practice</li> <li>• Presentation of artificial neural networks as computer support to decision-making in clinical (bio)ethics</li> </ul>
Tomada de decisão em bioética clínica: casuística e deliberação moral [Decision-making in clinical bioethics: casuistry and moral deliberation] <sup>18</sup>	<ul style="list-style-type: none"> <li>• Qualitative study, update article</li> </ul>	<ul style="list-style-type: none"> <li>• Presentation and discussion of two procedures for decision-making in clinical (bio)ethics: casuistry and moral deliberation by Diego Gracia</li> </ul>
Conflitos éticos na comunicação de más notícias em oncologia [Ethical conflicts in the communication of bad news in oncology] <sup>19</sup>	<ul style="list-style-type: none"> <li>• Qualitative and exploratory study with semi-structured interviews</li> <li>• Participants: 15 clinical oncologists and surgeons</li> <li>• Scenario: Municipality of Rio de Janeiro</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulties experienced by oncologists in the process of communicating bad news</li> <li>• Ethical problems arising from tensions between paternalism and respect for patient autonomy</li> </ul>
Cuidados paliativos em pacientes com HIV: princípios da bioética adotados por enfermeiros [Palliative care of patients with HIV: bioethical principles adopted by nurses] <sup>20</sup>	<ul style="list-style-type: none"> <li>• Qualitative and exploratory study</li> <li>• Participants: 12 nurses</li> <li>• Application of structured form and thematic categorical analysis (Bardin)</li> <li>• Scenario: Infectious diseases clinic and specialised medical service from a public hospital in the city of João Pessoa / State of Paraíba</li> </ul>	<ul style="list-style-type: none"> <li>• Appreciation of the principles of respect for autonomy, beneficence, non-maleficence and justice in the practice of palliative care for patients with HIV</li> <li>• Physicians' difficulty to safely decide when to offer palliative care and the perpetuation of a long process of dysthanasia of patients with HIV</li> </ul>
Bioética clínica e sua prática [Clinical bioethics and its practice] <sup>21</sup>	<ul style="list-style-type: none"> <li>• Qualitative study, update article</li> </ul>	<ul style="list-style-type: none"> <li>• Debate on methodological tools that aid in clinical practice and better decision-making</li> <li>• Presentation of methods for decision-making in clinical (bio)ethics based on the proposals of Diego Gracia, Albert Jonsen and James Drane</li> </ul>
Acerca da bioética da beira do leito [About bedside bioethics] <sup>22</sup>	<ul style="list-style-type: none"> <li>• Qualitative study</li> <li>• Scenario: university hospital in the municipality of São Paulo</li> </ul>	<ul style="list-style-type: none"> <li>• Doctor-patient relationships and the ethics of interaction at the bedside as challenges</li> <li>• (Bio)ethics at the bedside as a comparative examination of multiple consequences of assistance and success in the reconciliation and sharing of clinical decisions</li> </ul>
Bioética e nutrição em cuidados paliativos oncológicos em adultos [Bioethics and nutrition in cancer palliative care for adults] <sup>23</sup>	<ul style="list-style-type: none"> <li>• Qualitative study, literature review</li> </ul>	<ul style="list-style-type: none"> <li>• The importance of nutritional treatment in the palliative care of cancer patients</li> <li>• Describes the (bio)ethical dilemma between palliative care and nutrition in cancer patients</li> </ul>
The principle of respect for autonomy: concordant with the experience of oncology physicians and molecular biologist in their daily work? <sup>24</sup>	<ul style="list-style-type: none"> <li>• Qualitative, empirical study</li> <li>• Phenomenological hermeneutic approach with methods of moral philosophy, through semi-structured interviews</li> <li>• Participants: 12 Danish oncologists and molecular biologists</li> </ul>	<ul style="list-style-type: none"> <li>• (Bio)ethical reflection of a principlist character</li> <li>• Vulnerability and external constraint of circumstances experienced as factors that influence patients to consent to any form of treatment</li> <li>• Circumstances in which the principle of respect for autonomy is not respected and oncologists and molecular biologists decide to include or not patients in treatment</li> </ul>

Title	Method(s)	Major conflicts / consideration on clinical (bio)ethics
Bioética clínica: contribuições para a tomada de decisões em unidades de terapia intensiva neonatais [Clinical bioethics: contributions to decision-making in neonatal intensive care units] <sup>25</sup>	Qualitative study, update article	<ul style="list-style-type: none"> <li>• Decision-making for neonatal ICU admission based on the principle of distributive justice</li> <li>• Dilemma of NICUs professionals in relation to decision-making regarding who and how should be benefit with available public resources</li> </ul>
O médico frente ao diagnóstico e prognóstico do câncer avançado [The physician in the face of the diagnosis and prognosis of advanced cancer] <sup>26</sup>	<ul style="list-style-type: none"> <li>• Quantitative, empirical, study using a multiple-choice questionnaire</li> <li>• Participants: 38 medical specialists working with oncology</li> <li>• Scenario: Hospital de Base do Distrito Federal [Brasilia Base Hospital]</li> </ul>	<ul style="list-style-type: none"> <li>• Not providing information of the diagnosis of severe terminal illness as a form of medical paternalism.</li> <li>• (Bio)ethical conflicts involving beneficence and respect for the autonomy of the patient experienced in medical practice</li> </ul>
From cure to palliation: concept, decision and acceptance <sup>27</sup>	<ul style="list-style-type: none"> <li>• Qualitative empirical, study, with a questionnaire</li> <li>• Participants: Swedish 1,672 medical professionals and nurses from 10 different specialties, chosen at random</li> </ul>	<ul style="list-style-type: none"> <li>• Different perceptions of professionals regarding transition concepts between curative treatments and palliative care, and the respective influence of these distinctions in care strategies</li> <li>• Disagreements between professionals on the team regarding the decision-making concerning the interruption of curative treatment and the start of palliative care</li> <li>• Ethical reflection and analysis on the principles of virtue ethics, professional deontology, consequentialism and casuistry</li> </ul>
Informed consent and refusal of treatment: challenges for emergency physicians <sup>28</sup>	• Qualitative study, update article	<ul style="list-style-type: none"> <li>• Informed consent as a legal right and morally recommended process that enabled patients to be able to participate in the decision process regarding their care</li> <li>• (Bio)ethics and the four skills cited as fundamental to sharing the medical decision-making process</li> </ul>

SOURCE: Bibliographic research

## Discussion

Considering the fourteen selected articles, the results demonstrate that the main discussions regarding (bio)ethical issues<sup>29,30</sup> experienced in different health care settings or clinical research are diverse and relate to the debate regarding the autonomy of the subjects involved; the issues referring to beneficence, non-maleficence and justice – concepts *prima facie* of the principlist school of thought –; the difficulty of access to health goods and services; the vulnerability of the subjects regarding health care; the conflict to share or not clinical diagnoses and bad news directly with patients and/or their families; the obstacles in the doctor-patient or patient- health professional relationship; the issue of informed consent; the dilemma of end of life and maintenance or interruption of the technologies used in

critically ill or terminal patients admitted in ICU; the decision-making process not being shared among health teams; and referential from the bioethics of protection vs. the bioethics of intervention.

In the examination of the articles selected and presented in Table 2, it was possible to list some of the aspects glimpsed as relating to decision-making in clinical (bio)ethics, discussed below.

### *Perceptions regarding conflicts in the diversity of everyday health care practices*

The NICUs are health care structures recognized in contemporary societies, especially in Brazil, as essential to the care of new-borns (NB), since they are configured as a space for the care of infants with immediate or potential threat to life<sup>31</sup>. Without proper strategic planning in this sector, NICUs professionals are faced with a (bio)ethical dilemma: how to decide

on the choice of which NB should benefit - and how - from the resources available for neonatal care<sup>25</sup>?

Although the decline in mortality of live births in extreme prematurity is evident, prolonged time in the very stressful environment of the NICU, the various moments of manipulation and even the resuscitation interventions expose the premature NB to unwanted stimuli that later will be expressed in abnormal brain and sensory development, hearing and vision loss, and language disorders<sup>15</sup>.

It is recognized that artificial life support without reasonable recovery expectations - in cases of severely compromised new-borns - sets (bio)ethical dilemma in clinical practice of NICU professionals, given the possibility of prolonging the suffering of the sick individual and also of their families, putting into question the very protection of human dignity of new-borns in intensive care<sup>15, 32</sup>.

Given the above, in the case of neonatology, respect for autonomy appears as a bridge to the consideration of shared decision. Although these patients are unable to decide about their lives, the protection of their dignity involves sharing the decisions of the health team with the patient's parents, who are legally authorized to give consent for performing certain type of treatments<sup>25, 32</sup>. Ribeiro and Rego<sup>25</sup> in this case also include in their thinking bioethics of protection and the capabilities approach of Nussbaum<sup>33</sup> as a State responsibility to meet fairly the needs of vulnerable people in their care.

#### • (Bio)ethical conflicts end of life

In the examination of the elements of the selected articles, it was possible to detect strains in multidisciplinary teams providing care to patients with advanced and / or terminal diseases<sup>34</sup>, especially in the context of palliative care. According to the World Health Organization, palliative care corresponds to the active and total care of patients whose pathogenesis is no longer responsive to curative treatment alternatives. The approach of care is different because it proposes to improve the quality of life for patients as well as of their families or guardians<sup>35, 36</sup>.

By proposing improved quality of life, nutrition *per se* is also pertinent to palliative care, which is necessary in different therapeutic approaches, including feeding through catheter or ostomy. Besides, it has important preventive significance, providing means and routes to feed, reducing adverse effects caused by chemo-toxic treatments and slowing anorexia-cachexia syndrome<sup>23</sup>.

Benarroz et al.<sup>23</sup> depict specifically the (bio)ethical concerns and conflicts with which nutrition professionals deal in the daily oncological palliative care of adults. It is clear that food will not always promote comfort and well-being. On the contrary, undesirable effects of nutritional techniques - in particular, the artificial - are sometimes exacerbating, damaging the primary goal of palliative care. In the referenced article, (bio)ethics participation in nutritionist clinical practice included the principlist aspect, which offered (bio)ethical arguments for dialogue between health staff, patients and family members<sup>23</sup>.

Palliative care was also addressed in the care of patients with HIV in a recent study<sup>20</sup> aimed to investigate which principles of (bio)ethics were considered by nurses in their practice. From the analysis of the empirical material emerged two main categories, which refer to principlist bioethical reflections: 1) respect for the autonomy of patients with HIV under palliative care, allowing them to exercise their right to participate in decisions; and 2) appreciation of the principles of beneficence, non-maleficence and justice in the practice of palliative care for patients with HIV, providing humane conduct to patients and protecting them from possible harm during hospitalization<sup>20</sup>.

In research conducted with twelve Danish physicians and molecular biologists specialised in oncology, there was also reference to Beauchamp's and Childress' principlism. Interestingly, though participants affirmed that respect for the autonomy of cancer patients should always be based on the desires and knowledge of the patient regarding their illness, the behaviour that was usually adopted was to decide without consulting patients or family members when they were considered to lack the necessary competence to make decisions<sup>24</sup>.

In another study<sup>27</sup> it was noted that the decisions regarding treatment options were not always shared between the team and the patient and family, even lacking discussion between the parties involved. At other times, such decisions were characterized as the role of physicians themselves. Moreover, when the teams did not clarify the disease process to the patients and family members, the stress related to accepting the disease was evident. In the study, four (bio)ethics theories were used for the analysis of conflicts and improvement of decision-making: 1) the ethics of virtues; 2) deontology; 3) consequentialism; and finally, 4) casuistry as a strategy for comparison of moral cases and conclusion of events.

Moskop<sup>28</sup> studied, in US emergency departments, the use of informed consent as a legal right

and morally recommended process that enabled patients to be able to participate in making decisions regarding the care they would receive. From an ethical point of view, four functional skills were identified as fundamental in sharing the medical process of decision-making in clinical emergencies and imminent risk of death situations: 1) the patient's ability to understand information relevant to the decision of his/her treatment; 2) the ability of those involved to appreciate the significance of each information for each situation faced; 3) the ability of health professionals to use reason to contribute to the logical process of treatment options; and 4) the patient's ability to express his/her choice<sup>28, 36, 37</sup>.

• *(Bio)ethical conflicts and communication of bad news in oncology*

One of the identified studies, conducted in the Federal District with physicians who provided care to patients with malignant neoplasm<sup>26</sup>, highlighted that informing patients and their families of the diagnosis has been recognized as one of the pillars of the doctor-patient relationship, promoting assurance and providing patients with the possibility of exercising autonomy. In the cases of restricted diagnostic information – prohibited by the Code of Medical Ethics, except when information is likely to bring more harm to the patient – the authors stressed situations related to physicians' "paternalistic" behaviour (to protect patients from suffering), minimizing the occurrence of distress in hopeless contexts (non-maleficence).

Using semi-structured interviews, Geovanini and Braz<sup>19</sup> conducted a study with oncologists focusing on ethical conflicts in the communication of bad news in oncology. The main conflicts were related to fair moral propriety regarding the use of truth in the communication and management of medical relationships with patients' families. The most obvious difficulty faced by respondents related to the unpredictability of the consequences of decisions taken and therefore the behaviour of some in not communicating properly with those involved, culminating in paternalistic attitudes that interfere with the full exercise of patient autonomy<sup>19</sup>.

*The role of hospital (bio)ethics committees and commissions*

Differently from hospital ethics committees and commissions – that are always composed exclusively of members of one corporation – bioethics committees are necessarily multiprofessional and multidisciplinary, because they propose to deal with

more specific references: those of bioethics itself. Although they initially emerged in the United States in the period from 1960 to 1970, since 2005 these committees are now recommended by UNESCO, as stated in Article 19 of the *Universal Declaration on Bioethics and Human Rights*<sup>38</sup>. In fact, they allow for more extended discussion of more difficult clinical cases from the point of view of decision-making in situations of moral conflict. Through them, forums that involve not only health professionals, but also professionals from other fields and representatives of users and community, were created.

The proposal of the committees is to become an open space focused on dialogue, valuing all individuals involved in the search for conflict resolution in the context of health institutions and improving the care provided to patients. These forums enable cases that require ethical evaluation to be addressed, allowing the opportunity to search for the role of patients and their representatives, as well as offering a greater repertoire of (bio)ethical actions to health professionals and managers<sup>16</sup>. However, these committees and commissions are not intended to eliminate the responsibility of health professionals – or clinical teams – regarding the decisions to be taken in each case<sup>39</sup>.

Interestingly, despite the importance of such committees and commissions, the study considered in this article points to the difficulties still encountered in the implementation of such forums assisting clinical (bio)ethics decisions. Marinho et al.<sup>16</sup> recounts the experience with the implementation of these committees in four health units in Brazilian public universities: they were created through a bottom-up initiative, this means, an initiative starting with the professionals involved with medical education in the hospital, but without effective participation of the unit's managers, little involvement and participation of students from other areas of health, and the absence of some professionals<sup>16</sup>.

*Computer support to decision-making in clinical (bio)ethics*

The computational approach has become valuable tool to aid decision-making, with applications in the fields of industry, various engineering, finance, commerce, agriculture, health and scientific research itself<sup>17</sup>.

After World War II, artificial intelligence (AI) developed significantly<sup>17, 40, 41</sup>, seeking to systematize and replicate human intellectual tasks. In this process, the applications of connectionist AI focused on the

methods they use 1) artificial neural networks, which arose more specifically at the end of the 1980s<sup>42-45</sup>; and 2) expert systems (1970), computer systems characterized by the symbol AI, which considers that global intelligent behaviour can be simulated. These systems perform functions considered “similar” to those routinely performed by human experts<sup>42,46,47</sup>.

From this perspective, a recent study has proposed the use of machine learning algorithms for the development of computer systems to support decision-making in clinical (bio)ethics, incorporating aspects related to the decision-making process, the initial prototype, Bio-Oracle (Bio from “bioinformatics” and Oracle from “Organizer of the Rational Approach in Computational Learning Ethics”), is under development<sup>17</sup>.

### Decision-making in clinical (bio)ethics: the methods

The relationship between doctor and patient is often uneven: the first has knowledge concerning the problem afflicting the last. The professional is responsible for the diagnosis, prognosis and treatment

options. On the other hand, the patient only has the ability to decide based on a clear and true communication performed by the doctor. Thus, the attitudes of health professionals become critical to the positioning of their patients: who can either be treated as a subject of his/her own life or as an object of therapeutic interventions<sup>22,48</sup>.

In this context, the proposal of clinical (bio)ethics covers all situations that require decision-making in the everyday life of the various health professions or in particular situations in ethics committees. Indeed, Table 3 presents methods developed by different authors with the objective of guiding the analysis of conflicts and moral dilemmas that arise in clinical practice, and of assisting the decision-making process.

In addition to the methods presented, other procedures for decision-making in clinical (bio)ethics, which are also recognized in the literature, are proposed: 1) casuistry and 2) moral deliberation. Casuistry is considered by Albert Jonsen and Stephen Toulmin<sup>51</sup> as a valid tool for discussing (bio) ethical problems in clinical practice. Specifically

**Table 3.** Auxiliary methods for decision-making in clinical (bio)ethics by the author

David Thomasma	Diego Gracia	Albert Jonsen	James Drane	Fermin Schramm
<p>Thomasma proposes the establishment of priorities when indicating the best course of action or making decisions:</p> <ol style="list-style-type: none"> <li>1. Describe all the facts of the case;</li> <li>2. Describe the relevant values for all involved;</li> <li>3. Determine the main value at threat;</li> <li>4. Determine possible courses of action that can protect the largest number of values;</li> <li>5. To elect a course of action;</li> <li>6. To defend this course of action based on the core values.</li> </ol>	<p>Gracia recommends a thorough analysis of the clinical history in question, prior to applying the method:</p> <ol style="list-style-type: none"> <li>1. Identification of the problem;</li> <li>2. Analysis of the facts: the clearer they are, the easier the ethical analysis will be;</li> <li>3. Identification of the implied values, identification of conflicting values, reformulation of the problem;</li> <li>4. Identification of the fundamental conflict;</li> <li>5. Resolution on the fundamental conflict;</li> <li>6. Decision-making;</li> <li>7. Assurance Criteria (defend it publicly and verify whether the decision is wrongful).</li> </ol>	<p>Jonsen considers that moral issues should be analysed based on the clinical history (and not, initially, on the principles):</p> <ol style="list-style-type: none"> <li>1. Stating the case, the moment at which all clinical data necessary for moral analysis is presented;</li> <li>2. Moral review or discussion, based on four categories: medical criteria, patient preferences, quality of life and socioeconomical factors;</li> <li>3. Moral advice stage: it is the physician duty to recommend the treatment, but the patient has the right to accept it or not.</li> </ol>	<p>Drane uses the principles of autonomy and beneficence, besides using as a base a set of moral values captured from the description of the relevant clinical factors, to guide the reflection. The systematization of proposed ethical methodology is structured in three phases:</p> <ol style="list-style-type: none"> <li>1. Descriptive, which serves to guide the identification of relevant factors;</li> <li>2. Rationale, which is used to direct the reasoning about the relevant facts;</li> <li>3. Volitional, which refers to the factors considered that served as a basis for decision-making: ordering of goods, principles and decision-making.</li> </ol>	<p>Schramm considers that both theoretical reasoning (descriptive and comprehensive) and practical reasoning (applied) are indispensable tools of (bio) ethics, and proposes the use of “tools” in light of practical reasoning:</p> <ol style="list-style-type: none"> <li>1. Moral intuition;</li> <li>2. Exemplification of facts and concrete situations as arguments;</li> <li>3. Use of analogies, facilitating the search for the best arguments;</li> <li>4. Slippery slope argument;</li> <li>5. The role of “devil’s advocate” or debating with oneself;</li> <li>6. Search for commitment and critical evaluation of the proposed solution.</li> </ol>

Fonte: adaptado de Zoboli<sup>18</sup>, Figueiredo<sup>21</sup>, Gracia<sup>49</sup> e Schramm<sup>50</sup>.

in clinical area, it begins with the ethical analysis and the assessment of cases of medical indications, followed by the patient's preferences, quality of life and ending with the circumstantial aspects. All these issues allow for the drafting of the (bio) ethical facts relevant to the case and to obtaining a practical solution from the decision-making process<sup>18,50,51</sup>.

The procedure of moral deliberation regarding (bio)ethical problems considers the values and duties involved in concrete facts, seeking to manage the moral conflict in a reasonable and prudent manner, through meticulous discussions. Proposed by one of its experts, Diego Gracia, the method should be systematized and contextualized to find concrete solutions, through judicious alternatives; that is, it refers to expressing the ability to appreciate what is involved in the case, always from the perspective of reaching reasonable decisions<sup>18,51-53</sup>.

### Final considerations

In line with the studies presented, this article reviews some of the key issues regarding the decision-making process in clinical (bio)ethics, making use of bibliographic research with a defined search strategy. Based on the texts obtained, it was observed that decision-making in clinical (bio)ethics constitutes an extremely difficult process for health professionals.

The questions that unsettle these professionals are diverse, permeating situations of conflict and tension regarding the decision more suited to situations relating to the beginning and end of life. In addition, communication of bad news to patients and/or to their family members, installation of palliative care, respect for the patient's autonomy and dignity of life, and recognition of the search for concepts and practices beyond technical expertise and professional ethics, are also factors that entail difficulties for health teams.

Based on the observations made by the authors while writing this essay, and on the recognition of the importance of moral pluralism, this study proposes a criticism of the plethora of principlism - adopted in most studies - as the approach to decision-making in clinical (bio)ethics. The authors propose that the discussion and reflection be expanded, using other streams of (bio)ethics. Undoubtedly, one should consider the need to develop new theoretical models - and related methods - for the expansion of "the (bio)ethical toolbox" for decision-making in clinical (bio)ethics.

Based on the above, the development of new strategies to support decision-making is recommended. These new strategies should consider, among them 1) consultation to (bio)ethical commissions; 2) application of a computational approach; and 3) procedures that allow the pragmatic approach of the relationship between means, ends and the people involved, enabling the decision-making process to include values and preference systems that are reasonable and prudent.

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### Participation of the authors

Luis Claudio de Souza Motta designed and coordinated the writing of the manuscript, in addition to guiding Lucas Nicolau de Oliveira in the collection of bibliographic data, summaries of the selected articles, and preparation of the draft article. Eugenio Silva and Rodrigo Siqueira-Batista – supervisors of the doctoral thesis to which the article is linked - participated in the drafting of the text outline and performed the critical review of the final manuscript.

