

# Hard choices during complex times require wisdom

Mirella Rebello Bezerra<sup>1,3</sup>, Laiane Moraes Dias<sup>2,3</sup>, Jurema Telles de Oliveira Lima<sup>1</sup>, Maria Júlia Gonçalves de Mello<sup>1</sup>, Rui Nunes<sup>3</sup>

1. Instituto de Medicina Integral Professor Fernando Figueira, Recife/PE, Brasil. 2. Hospital Universitário João de Barros Barreto, Belém/PA, Brasil. 3. Universidade do Porto, Porto, Portugal.

## Abstract

The increasing number of seriously ill individuals during the COVID-19 pandemic made it necessary to consider which aspects would guide access to mechanical ventilation. Priority criteria for intensive care unit admission had to be established and the bioethical basis upholding triage models analyzed. Amidst doubts and distress brought on by the pandemic, Bioethics became a guiding compass for physicians and public policies aiming for social good. In this regard, bioethics should be a concrete instrument for resolving complex problems that involve life and all its dimensions.

**Keywords:** Pandemics. SARS-CoV-2. Intensive care units. Triage. Health systems.

## Resumo

### Escolhas difíceis em tempos complexos devem ser feitas com sabedoria

O aumento do número de pessoas gravemente doentes durante a pandemia de covid-19 tornou necessário considerar os aspectos que deveriam orientar o acesso a ventiladores mecânicos. Foi preciso determinar critérios de priorização para unidade de terapia intensiva e analisar as bases bioéticas que sustentam a criação de modelos de triagem. Em meio a dúvidas e angústias trazidas pela pandemia, a bioética desempenhou papel de bússola norteadora para as ações dos médicos e as políticas públicas na conquista do bem social. Assim, entende-se que a bioética deve ser instrumento concreto para a solução de problemas complexos que envolvem a vida em todas as suas dimensões.

**Palavras-chave:** Pandemias. SARS-CoV-2. Unidades de terapia intensiva. Triagem. Sistemas de saúde.

## Resumen

### Las decisiones difíciles en tiempos complejos deben tomarse con prudencia

El incremento del número de enfermos graves durante la pandemia de la COVID-19 planteó la necesidad de considerar los aspectos que deben guiar el acceso a los respiradores mecánicos. Para ello, se determinaron criterios de priorización para las unidades de cuidados intensivos y se evaluaron las bases bioéticas que componen la creación de modelos de triaje. Ante dudas y angustias provocadas por la pandemia, la bioética jugó un papel de brújula orientadora de las acciones de los médicos y de las políticas públicas para lograr el bien social. Así, se entiende que la bioética debe ser un instrumento concreto para resolver problemas complejos que involucran la vida en todas sus dimensiones.

**Palabras clave:** Pandemias. SARS-CoV-2. Unidades de cuidados intensivos. Triaje. Sistemas de salud.

The authors declare no conflict of interest.

The large increase in the number of cases of severe acute respiratory syndrome (SARS) as a result of the pandemic caused by the SARS-CoV-2 virus, a new coronavirus identified in 2019, created an imbalance between the clinical needs of the population and the availability of advanced life support resources in various parts of the world<sup>1</sup>. This forced medical societies and health managers to consider the aspects that should guide access to intensive care and, especially, mechanical ventilators<sup>2-4</sup>.

## SARS-CoV-2 Pandemic

The first known case of infection by the SARS-CoV-2 virus, the causative agent of COVID-19, was reported in Wuhan, in the province of Hubei, China, at the end of December 2019<sup>5</sup>. However, patient zero has not yet been identified. The disease is believed to have been transmitted from animals to humans in a seafood market where wild animals were also sold<sup>6</sup>.

The disease spread quickly throughout China and cases were subsequently reported in other countries, starting its global dissemination<sup>6</sup>. COVID-19 then became a pandemic, affecting almost all countries in the world. On January 30, 2020, the World Health Organization (WHO) declared the disease a global public health emergency, and on March 11, 2020, it considered the crisis a pandemic, recognizing the seriousness of the situation on an international scale<sup>7</sup>.

## COVID-19 in Brazil

The declaration of emergency was made on March 4, 2020, following a significant rise in cases in different Brazilian states. The first of them was confirmed on February 26, 2020, in the state of São Paulo, in a 61-year-old man who had returned from a trip to Italy, a country that was facing a major epidemic at the time<sup>8</sup>. Thenceforth, numbers began to increase rapidly in several regions, triggering the spread of the disease across Brazil, with the first death occurring on March 17, in the state of São Paulo<sup>9</sup>.

By June 7, 2023, 767,750,853 cases of COVID-19 had been confirmed worldwide,

37,601,257 in Brazil. Regarding deaths, 6,941,095 had been confirmed worldwide, 702,907 in Brazil. The highest number of notifications of new cases in a single day (150,106 cases) was on September 18, 2021, and that of new deaths (4,249 deaths) was on April 8, 2021<sup>8</sup>.

## Allocation of resources during the pandemic

SARS-CoV-2 is a highly transmissible virus and can, due to a systemic inflammatory response, evolve into a serious clinical condition involving acute respiratory distress syndrome<sup>10,11</sup>. The growing demand for intensive care unit (ICU) beds led to the need to increase the availability of this resource worldwide<sup>12</sup>. However, despite the great effort to open new beds, there was a shortage, even in places with plentiful financial and human resources<sup>13</sup>, making it necessary to set priority criteria for intensive care.

After the WHO declared the COVID-19 pandemic<sup>14</sup>, new public health policies aimed at protecting the population became essential and urgent. In Brazil, with the first cases reported in February 2020, a pandemic mitigation phase was introduced, which was effective in flattening the curve for new cases and hospitalizations in many areas of the country<sup>15</sup>. However, in the second wave in Brazil, from March 2021, many more cases and deaths were recorded<sup>16</sup>.

At the beginning of the pandemic, Brazil already met the WHO recommendation of one to three ICU beds per 10 thousand inhabitants<sup>15</sup>. However, most were offered in the private health network and/or were in more developed regions, which resulted in large resource shortages, especially in the North and Northeast regions<sup>17</sup>. The Brazilian reality at the beginning of the pandemic was a large shortage of ICU beds and access to quality care for more than 80% of the population, who depended on the Unified Health System (SUS)<sup>15</sup>.

According to the WHO, governments and health systems have the obligation to ensure, to the best of their ability, adequate provision

of health care for all, but that was not possible during the pandemic, leading to the need to set priorities and ration resources<sup>14</sup>. Therefore, in such contexts, policies and practices must be ethically justified<sup>14</sup>.

Intensive care should only be rationed when resources are actually or almost overstretched, despite all efforts to increase them<sup>14</sup>. In such cases, the competent regional authority, judging the situation, must declare an emergency and activate its mass critical care plan<sup>18</sup>.

Triage should be avoided whenever possible, but when necessary, human rights and humanitarian laws should be observed<sup>4</sup>, especially the 1864 *Geneva Convention* and the 1948 *Universal Declaration of Human Rights*, as noted by Domres and collaborators<sup>19</sup>.

In cases of scarce resources, the principles of biomedical ethics and international law provide the use of triage protocols to guide their allocation<sup>20</sup>. International law also requires a triage plan that provides everyone with an equal chance of survival<sup>21</sup>. However, it does not guarantee survival or the type of treatment.<sup>20</sup>

In Brazil, triage instruments at the outset of the pandemic were based on poor scientific evidence and, in general, structured by various clinical, non-clinical and tiebreaker criteria. Few included public participation in design or validation. There were recommendations that demanded objective inclusion criteria in order to provide the appropriate and rapid referral of potential survivors during pandemics or major disasters<sup>22,23</sup>. On the other hand, exclusion criteria should identify patients who are unlikely to benefit from intensive care<sup>22-25</sup>.

In order to save more lives with transparency, affording protection to healthcare providers, the Brazilian Association of Intensive Medicine (AMIB), the Brazilian Society of Geriatrics and Gerontology (SBGG), the Brazilian Association of Emergency Medicine (ABRAMEDE) and the National Academy of Palliative Care (ANCP) designed the *Recommendations for allocating depleted resources during the COVID-19 pandemic*<sup>26</sup>. This document was evaluated and approved by the Brazilian Medical Association (AMB)<sup>27</sup>.

Despite this recommendation by national medical organizations, the Brazilian Ministry of Health did not design a unified national strategy for access to intensive care beds, leaving it up to the states and municipalities to create their own. This issue was addressed, in the *Brazilian Journal of Intensive Care*, as a challenge to deal with future pandemics. The publication considered the need for planning aimed at adequate preparation for new pandemics, observing equal access to intensive care<sup>15</sup>.

### Bioethics for survival in complex times

During the 1970s, when the neologism “bioethics” was described by Potter—considered the father of bioethics—the subtitles “The Science of Survival” and “Bridge to the Future”<sup>28,29</sup>. Thus, as Zanella<sup>30</sup> argues, Van Rensselaer Potter sought to establish a dialogue between the science of life (biology: *bios*, “life”) and practical wisdom (philosophy, ethics, values) when coining the innovative term. He considered bioethics a renewed ethics, combining humility, responsibility and interdisciplinary and intercultural competence, expanding the sense of humanity.

On the back cover of the book *Bioethics: Bridge to the Future* (1971), as Pessini reports, the following passage appears:

*This new science, bioethics, combines the work of humanists and scientists whose goals are wisdom and knowledge. Wisdom is defined as the knowledge of using knowledge for social good. The search for wisdom follows a different path for man’s survival is at stake*<sup>29</sup>.

The invention of the term “bioethics” is also credited to another researcher, more widely known in medical practice. This is the Dutch obstetrician André Hellegers, linked to Georgetown University, who, six months after the publication of Potter’s book, used the concept in a new study center, the Joseph and Rose Kennedy Institute for the Study of Human Reproduction and Bioethics, now known as the Kennedy Institute of Bioethics. Hellegers headed a group made up of physicians and theologians,

both Protestant and Catholic, who observed with critical concern the technological advances in medicine, which raised complex and significant challenges for the ethical systems of the Western world<sup>31</sup>.

The focus at the institute was the discussion of issues related to medicine, philosophy and ethics, giving birth to medical or clinical ethics. This branch of applied ethics, more widespread among healthcare providers, is known as micro bioethics for mainly addressing issues between doctor and patient or researcher and research subject<sup>29,31</sup>. Garrafa<sup>32</sup> argues that this served as a basis for the four fundamental principles of bioethics introduced by Beauchamp and Childress—autonomy, beneficence, non-maleficence and justice—devised as a simplified tool for the practical evaluation of conflicts that arise in the field of clinical bioethics.

Clinical bioethics is an area of bioethics focusing on specific ethical issues that arise in direct patient care. It addresses complex ethical dilemmas that involve medical decisions in situations such as end of life, informed consent, research with humans, use of advanced medical technologies and resource allocation, among others<sup>29,31</sup>.

This involves ethical reflection and decision-making in daily medical practice. While medical ethics focuses on the ethical responsibilities of physicians and the principles that guide their behavior, clinical bioethics expands the scope to consider broader ethical dilemmas that arise in clinical practice and aims to address these issues in a reflective manner grounded in ethical principles. Both areas are important to ensure ethical and quality medical practice<sup>29,31</sup>.

In the first three decades, bioethics developed mainly in the field of clinical bioethics and, more recently, of ecology and the environment, with so-called global bioethics<sup>33,34</sup>. However, especially after the declaration by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2005, researchers from peripheral countries in the southern half of the world presented a criticism of clinical bioethics. In their view, this approach based on principles was insufficient and/or ineffective to analyze the persistent or everyday ethical macro problems of

concrete reality<sup>32,34,35</sup>. Thus, bioethics returns to its Potterian epistemological origins, becoming a “science of survival” and a concrete tool to improve democracies, citizenship, human rights and social justice<sup>29</sup>.

Besides clinical bioethics, so-called social bioethics gains prominence in Latin America, analyzing ethical problems in health institutions, public health and public policies. It is closely related to biopolitics, which addresses state power over human life in its different aspects and deals with policies linked to life, public health and the environment, playing a key role in bioethics<sup>33</sup>.

Different approaches have emerged to address the political aspect of bioethics, such as intervention bioethics, which is intertwined with biopolitics<sup>32,33</sup>. Some experts argue that bioethics should guide the social valuation of life and health in relation to biomedicine within the sphere of politics, which is based on the broader ethics of social being and justice<sup>34,35</sup>. Thus, bioethics encompasses ethical values, principles and standards, while biopolitics encompasses laws, regulations and action plans<sup>33</sup>.

## Pandemic versus public health ethics

The prospect of a serious pandemic poses a frightening threat to public health. Therefore, the aim in preparing for and responding to it is to protect public health in order to minimize morbidity and mortality during that period. This leads to a shift in focus from clinical bioethics, centered on the autonomy of individuals, to public health ethics, which mainly addresses community health<sup>36</sup>.

Under normal circumstances, all patients should have equal rights to receive the health care they need. Unfortunately, during a pandemic, limited resources prevent the provision of intensive care to everyone. A triage protocol can help distribute available resources fairly, referring patients who will benefit less from intensive care to non-critical care management and reserving critical care resources for patients who are most likely to benefit from them<sup>20</sup>.

However, any restrictions imposed on care should observe the principle of proportionality, according to which restrictions on individual freedoms should not exceed what is required to meet the essential needs of the community<sup>36</sup>. While it may be unfortunate that some patients do not receive everything they could, it is not unfair<sup>36</sup>.

Nevertheless, studies reveal that triage is generally unofficial and that its practical aspects are implemented in different ways, without clear, concise and explicit guidelines. Thus, triage is often viewed by patients as inadequate or poorly organized, which poses specific ethical challenges for healthcare providers<sup>37</sup>. Triage planning can be defined as the process of setting criteria to prioritize health care. It should be clear and transparent, enabling society to view different cases in the context of different perspectives, the reality of limited resources and the high demands for health care<sup>21,38</sup>.

Some authors believe that it should always follow pre-established medical criteria and cannot be based on any other principle<sup>4,20</sup>. In addition, triage involves the constant reevaluation of patients, considering that their clinical conditions and the available resources are continually changing<sup>4,20,21</sup>. A review study grouped the factors identified in prioritizing patients into two categories: medical (clinical need, probability of benefit and survivability) and non-medical (saving more lives, the youngest first, preserving the function of society, protecting vulnerable groups, necessary resources and impartiality in selection)<sup>37</sup>.

Bioethical principles applied in disaster situations were widely discussed during the pandemic. Criteria such as “first come, first served” and “sickest first” should be avoided to prevent squandering resources and to promote fairness<sup>4,39</sup>. Some authors suggest appreciating the principle of maximizing the number of lives saved by associating it with life years gained, in addition to observing the life cycle principle<sup>1,2,5</sup>.

To merge these three principles into an action strategy, Sociedad Española de Anestesiología, Reanimación y Terapéutica del Dolor recommended the scale adapted from White and collaborators, as reported by Espinosa and

collaborators<sup>39</sup>. That would require estimating short-term survival to maximize the number of lives saved<sup>9,22</sup> and evaluating the chances of long-term survival to maximize life years gained. In order to incorporate the life cycle principle, White and collaborators<sup>3</sup> scored age groups differently.

The life cycle principle considers that everyone has the right to health care according to criteria that take into account their position in the life cycle, although the exclusive use of chronological age is criticized for promoting ageism, that is, discrimination against older individuals<sup>40</sup>. Some argue that it would be more appropriate to evaluate factors such as biological age, functional reserve and life expectancy to determine prioritization of health care<sup>40,41,43</sup>. The debate on how to evaluate and prioritize health care based on the life cycle is still ongoing and is not widely consensual among bioethical trends<sup>41</sup>.

### Prognostic estimates for triage and resource allocation

During the pandemic, several scores were described to triage patients with COVID-19 who needed ICU, depending on the context and available resources. Some of the most commonly used were:

- Sequential Organ Failure Assessment (SOFA)<sup>23</sup>: the Sofa score assesses the failure of several organs and systems, including the respiratory, cardiovascular, hepatic, renal and central nervous systems, in addition to coagulation. It is widely used in intensive care and can be administered to assess the severity of the disease in patients with COVID-19.
- Quick Sequential Organ Failure Assessment (qSOFA)<sup>23</sup>: The qSOFA score is a simplified version of Sofa and focuses on three clinical criteria: change in mental status, increased respiratory rate and hypotension. It can be used as a quick triage tool to identify patients at increased risk of progression to severe sepsis or septic shock. It considers three criteria: respiratory rate equal to or above 22 breaths per minute, change in mental state

and systolic blood pressure equal to or below 100 mmHg. qSOFA is used as a quick and simple tool to identify patients with suspected sepsis and at increased risk of complications.

- CURB-65<sup>42</sup>: Although it was originally developed to assess the severity of community-acquired pneumonia, the CURB-65 score can also be used as a tool to assess the severity of COVID-19 infection. It takes into account five criteria: mental confusion, high serum urea, increased respiratory rate, low blood pressure and age equal to or above 65 years.

All of these scores assess acute illness, but do not take into account multimorbidity, frailty and functionality, aspects known to be involved in an individual's ability to deal with adverse events, such as SARS<sup>43-45</sup>. In addition, several studies show the effectiveness of these assessments in estimating survival and predicting death. Articles, consensuses and recommendations published prior to the pandemic and by mid-April 2020 recommended assessing frailty in older adults, as well as looking for serious comorbidities that indicated short survival and palliative care for patients with advanced diseases, i.e., their health condition before becoming severely ill due to COVID-19<sup>43-49</sup>.

The Charlson Comorbidity Index (CCI) is widely used in clinical practice to assess a patient's burden of comorbidities. It was developed by Mary Charlson and her colleagues in 1987 and later revised to include a more comprehensive scoring system. The CCI works by assigning weights to specific comorbidities based on their association with mortality. Each medical condition of the patient receives a specific score and the sum of those scores results in the final CCI score<sup>50</sup>. The higher the CCI value, the greater the burden of comorbidities and the worse the patient's prognosis.

The CCI is used to assist in prognostic assessment, risk stratification and clinical decision-making, and can be used in several areas of medicine, such as oncology, cardiology, nephrology and geriatrics<sup>51</sup>. It has been especially useful for predicting long-term risk of mortality in different populations, such as clinical and surgical patients and trauma victims,

and in intra-hospital care, including ICU, helping physicians personalize treatment and make informed decisions about health care<sup>51-54</sup>.

It is important to stress that the CCI is an auxiliary tool that assesses individuals based solely on their comorbidities, which is why it should be used in tandem with clinical assessment. Moreover, it is essential to consider individual patient characteristics and take into account other relevant risk factors for a complete and accurate assessment<sup>55,56</sup>.

It is also known that frailty syndrome in older adults may occur even without a diagnosed disease. This happens due to a combination of factors, such as natural aging of the organism, biological changes, decreased recovery capacity and greater susceptibility to external stressors. These conditions may lead to a progressive decline in physical function, loss of muscle mass and reduced resistance, as well as compromise the functional capacity, making older adults more vulnerable to adverse events<sup>57</sup>.

Frailty syndrome is a complex multifactorial condition that can be influenced by a combination of genetic, environmental and behavioral factors, as well as interaction between them. When it occurs in older adults, it is characterized by a decrease in physiological and functional reserve, resulting in greater vulnerability to stressors and a greater risk of adverse events, such as falls, hospitalizations and mortality<sup>57</sup>.

The assessment of frailty in older adults, despite comorbidities, is important for several reasons, such as risk identification, personalization of health care, early prevention and intervention, prognostic information and multidisciplinary intervention<sup>57,58</sup>. Frailty assessment makes it possible to identify older adults who are at greater risk of complications, adapt care according to their needs, prevent worsening, obtain information about the prognosis and involve a multidisciplinary team for comprehensive care<sup>58</sup>.

Developed to help healthcare providers identify individuals with greater vulnerability and less ability to cope with acute illnesses or medical stressors, the Clinical Frailty Scale (CFS) is an assessment tool that measures the level of frailty in older patients<sup>59</sup>. The CFS involves a

global assessment of the patient's functional and cognitive condition, taking into account aspects such as mobility, everyday activities, cognition, social support and independence. The scale is made up of nine levels of frailty, ranging from very fit (level 1) to terminally ill (level 9)<sup>60</sup>.

The scale is quick and easy to administer and does not require laboratory tests or invasive procedures. It has been widely used in clinical research and epidemiological studies to assess frailty in older adults. In addition, it is used in clinical practice to assist in medical decision-making, such as triaging older patients in emergencies, identifying candidates for geriatric interventions and assessing surgical risk in frail older adults. However, it is important to note that this is a frailty assessment tool that cannot be used as the sole criterion for making clinical decisions, and should be interpreted in combination with other clinical information and consider the individual context of each patient<sup>61,62</sup>.

Developed by David A. Karnofsky and his colleagues in the 1940s as a measure to assess the functional performance of cancer patients, the Karnofsky Index is based on a scale of 0 to 100, in which 0 is the worst health condition and 100 is a normal state of health, without restrictions. It can be administered to patients with a variety of health conditions, including cancer and chronic diseases such as heart failure or chronic obstructive pulmonary disease (COPD), and used in frail older adults. It is widely used in clinical research and medical practice to assess the functional capacity of patients<sup>63</sup>.

In the case of patients with COVID-19, the Karnofsky Index can be useful to assess the severity of the disease and the functional impact on patients. It also provides an objective measure of general health conditions and assists in making decisions about care management and prognosis prediction. However, this index is only one part of the comprehensive assessment of patients with COVID-19, so other clinical and laboratory measures should also be considered<sup>63</sup>.

In Pernambuco, experts developed the Unified Score for Intensive Care Prioritization (EUP/UTI), aiming to identify COVID-19 patients

with a greater chance of survival in order to prioritize ICU beds in case of shortage of resources. The score was based on an analysis of acute organ failure, previous comorbidities or clinical frailty, and global functionality that indicates biological (rather than just chronological) age and a possible therapeutic response<sup>64</sup>.

Each of these analyses is capable of predicting, respectively, short-term, long-term and global survival. In theory, patients with lower scores were considered more likely to survive and thus would be given priority access to ICU. On the other hand, those with higher scores would be referred to palliative care, with the curative therapies available at that time<sup>64</sup>.

## Discussion

The pandemic posed numerous global challenges. In the health area, shortage of resources, especially in ICU, such as beds, medication, oxygen and equipment, made the situation even worse. The allocation of these resources became essential, taking into account ethical and moral criteria, since such decisions involved lives at risk<sup>13</sup>. Bioethics proved to be a concrete instrument for solving complex problems that involve life in all its dimensions, and the administration of EUP/UTI throughout the state of Pernambuco made it possible to distribute scarce resources in a less unfair manner<sup>64</sup>.

An article published in April 2020 recognizes the relevance of a comprehensive consensus on ethical recommendations for making difficult decisions during pandemic crises<sup>65</sup>. Although there are some limitations arising from the haste with which they were made and the scarcity of specific bibliographical references on ethics in epidemiological crises, most publications emphasized the need for ethical guidelines for the entire process of allocating resources and for offering quality alternatives to alleviate symptoms if worsening condition.

Resource allocation should be based as much as possible on clinical and technical criteria, allocating resources to those with the greatest probability of recovery and shortest care time<sup>13</sup>. Although there was a consensus that it was

important to maximize the benefit for the greatest number of people and increase survival until hospital discharge, as well as the number of life years gained, most articles suggested dissociating the allocation of resources from chronological age, considering variables such as “frailty,” which would be equivalent to biological age<sup>65</sup>.

Chronological age, however, was one of the main risk factors for the development of severe COVID-19 and death, regardless of other age-related comorbidities. Observational studies during the pandemic indicated that age is a risk factor for adverse outcomes from COVID-19 in several countries, with older patients experiencing greater severity and mortality rates. On the other hand, the role of aging in these consequences is still unclear<sup>66</sup>.

A Mendelian randomization study was carried out using epigenetic clocks and telomere length as biological indicators of aging to assess their effect on COVID-19. The results showed that aging is not a risk factor for infection, but may be associated with telomere shortening. In addition, severe infection with the disease may slow down the acceleration of the epigenetic clock. These findings provide partial evidence for the causal effects of aging on COVID-19 susceptibility and severity<sup>66</sup>.

During the pandemic, the priority was to save as many lives as possible, but the lack of clear criteria made universal consensus difficult. In the context of intensive care, the severity of the patient was considered, since those with a greater chance of recovery tended to spend less time in the ICU<sup>13</sup>. Ethical concerns arose, such as age-based discrimination, especially in Italy, as the preference was to favor younger patients in cases of similar clinical conditions, with a slight inclination to promote intergenerational equity<sup>67</sup>.

Therefore, it was essential to base resource allocation on clinical and technical criteria, avoiding factors such as age, gender, socioeconomic conditions or ethnicity. Ethical decision-making involved individualized assessment, prioritizing clinical and technical criteria that considered the patient's actual situation, their recovery prospects and the care time required<sup>13</sup>.

Guidelines and protocols were developed in several places to reduce subjective criteria and favor clinical, technical and transparent standards

shared by everyone in the health system<sup>12</sup>. The decision on resource allocation should not overload front-line professionals lest it interfere with decision-making and lead to failures and injustices, besides being traumatic for triage professionals and family members<sup>12,4</sup>.

Although Resolution 2,156/2016, of the Federal Council of Medicine (CFM), established prioritization criteria for Brazil<sup>43</sup>, it was not sufficient for exceptional situations such as the pandemic, making it necessary to develop new protocols for the distribution of limited resources<sup>13</sup>. The legal system was already seeking to safeguard intrinsic human dignity, but existing legislation, such as the Child and Adolescent Statute (ECA) and the Statute of the Elderly, did not offer definitive conclusions for the situation. Therefore, it was recommended to share allocation criteria and define a triage plan in order to avoid individual decisions<sup>13</sup>.

## Final considerations

Amid the doubts and anxieties brought about by COVID-19, bioethics guided the actions of physicians and public policies in achieving common good. As stated by Potter, bioethics is the “bridge to the future” in the search for wisdom whenever man's survival is at stake<sup>30</sup>. Thus, it should be a concrete instrument for solving complex problems that involve life in all its aspects, making necessary to develop a body of knowledge that provides “the understanding on how to use such knowledge for common good”<sup>30</sup>.

Decision-making in prioritizing intensive care is a complex practice, especially during pandemics. In this context, bioethics should not be just a theoretical field, distant from practice and dissociated from scientific evidence. On the contrary, it should support the creation of models/flows that lead to the optimization and improvement of care in times of crisis. A concrete example of this approach can be observed in the idealization and implementation of EUP/UTI in Pernambuco. The process was started with a thorough analysis of relevant issues within bioethics and aimed to employ validated clinical tools to achieve practical solutions in the face of the complex context.

## References

1. White DB, Lo B. A framework for rationing ventilators and critical care beds during the COVID-19 pandemic. *JAMA* [Internet]. 2020 [acesso 7 jun 2023];323(18):1773-4. DOI: 10.1001/jama.2020.5046
2. Gostin LO, Friedman EA, Wetter SA. Responding to COVID-19: how to navigate a public health emergency legally and ethically. *Hastings Center Report* [Internet]. 2020 [acesso 7 jun 2023];50(2):8-12. DOI: 10.1002/hast.1090
3. White DB, Katz MH, Luce JM, Lo B. Who should receive life support during a public health emergency? Using ethical principles to improve allocation decisions. *Ann Intern Med* [Internet]. 2009 [acesso 7 jun 2023];150(2):132-8. DOI: 10.7326/0003-4819-150-2-200901200-00011
4. Emanuel EJ, Persad G, Upshur R, Thome B, Parker M, Glickman A *et al.* Fair allocation of scarce medical resources in the time of COVID-19. *N Engl J Med* [Internet]. 2020 [acesso 7 jun 2023];382:2049-55 DOI: 10.1056/NEJMs2005114
5. World Health Organization. WHO COVID-19 dashboard [Internet]. [s.d.] [acesso 7 jun 2023]. Disponível: <https://bitly.ws/3dH2R>
6. Organização Pan-Americana da Saúde. Histórico da pandemia de covid-19 [Internet]. [s.d.] [acesso 7 jun 2023]. Disponível: <https://bit.ly/3xOwsN3>
7. OMS afirma que covid-19 é agora caracterizada como pandemia. Organização Pan-Americana da Saúde [Internet]. 11 mar. 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/3SqyVlg>
8. Brasil. Ministério da Saúde do Brasil. Coronavírus Brasil [Internet]. [s.d.] [acesso 7 jun 2023]. Disponível: <https://bitly.ws/3dH2y>
9. Mato Grosso do Sul. Secretaria de Estado da Saúde. Boletim epidemiológico covid-19 e influenza [Internet]. 25 jan 2022 [acesso 7 jun 2023]. Disponível: <https://bitly.ws/3dH2p>
10. Lana RM, Coelho FC, Gomes MFC, Cruz OG, Bastos LS, Villela DAM, Codeço CT. Emergência do novo coronavírus (SARS-CoV-2) e o papel de uma vigilância nacional em saúde oportuna e efetiva. *Cad Saúde Pública* [Internet]. 2020 [acesso 7 jun 2023];36(3):e00019620. DOI: 10.1590/0102-311X00019620
11. Mehta P, McAuley DF, Brown M, Sanchez E, Tattersall RS, Manson JJ. COVID-19: consider cytokine storm syndromes and immunosuppression. *Lancet* [Internet]. 2020 [acesso 7 jun 2023];395(10229):1033. DOI: 10.1016/S0140-6736(20)30628-0
12. Satomi E, Souza PMR, Thomé BC, Reingenheim C, Werebe E, Troster EJ *et al.* Fair allocation of scarce medical resources during COVID-19 pandemic: ethical considerations. *Einstein (São Paulo)* [Internet]. 2020 [acesso 7 jun 2023];18:eAE5775. DOI: 10.31744/einstein\_journal/2020AE5775
13. Bezerra GCI, Barreto EAMB, Bezerra Filho AC, Ferro YF, Amaral WN. Ethical point: criteria for allocation of scarce resources in the COVID-19 pandemic: a review. *Revista Bioética Cremego* [Internet]. 2022 [acesso 7 jun 2023];4(1):35-40. Disponível: <https://bit.ly/3smZJOT>
14. World Health Organization. Ethics and COVID-19: resource allocation and priority-setting [Internet]. 2020 [acesso 7 jun 2023];1-5. Disponível: <https://bit.ly/3u1HpLP>
15. Lobo SM, Mello PMVC. Challenges of the coronavirus pandemic for Brazilian intensivists: present and future. *Rev Bras Ter Intensiva* [Internet]. 2021 [acesso 7 jun 2023];33(3):339-40. DOI: 10.5935/0103-507X.20210052
16. World Health Organization. Brazil: WHO Coronavirus disease (COVID-19) dashboard with vaccination data [Internet]. [s.d.] [acesso 7 jun 2023]. Disponível: <https://bitly.ws/3dH2R>
17. Distribuição geográfica: UTIs Brasileiras. UTIs Brasileiras [Internet]. [s.d.] [acesso 7 jun 2023]. Disponível: <https://bit.ly/3SnLJpp>
18. Christian MD, Sprung CL, King MA, Dichter JR, Kissoon N, Devereaux A V *et al.* Triage: care of the critically ill and injured during pandemics and disasters: CHEST consensus statement. *Chest* [Internet]. 2014 [acesso 7 jun 2023];146(4 suppl):e61S-74S. DOI: 10.1378/chest.14-0736
19. Domres B, Koch M, Manger A, Becker HD. Ethics and triage. *Prehosp Disaster Med* [Internet]. 2001 [acesso 7 jun 2023];16(1):53-8. DOI: 10.1017/s1049023x00025590

20. Christian MD, Hawryluck L, Wax RS, Cook T, Lazar NM, Herridge MS et al. Development of a triage protocol for critical care during an influenza pandemic. *CMAJ* [Internet]. 2006 [acesso 7 jun 2023];175(11):1377-81. DOI: 10.1503/cmaj.060911
21. Koonin LM, Pillai S, Kahn EB, Moulia D, Patel A. Strategies to inform allocation of stockpiled ventilators to healthcare facilities during a pandemic. *Health Secur* [Internet]. 2020 [acesso 7 jun 2023];18(2):69-74. DOI: 10.1089/hs.2020.0028
22. Santos MJ, Martins MS, Santana FLP, Furtado MCSPC, Miname FCBR, Pimentel RRDS et al. COVID-19: instruments for the allocation of mechanical ventilators: a narrative review. *Crit Care* [Internet]. 2020 [acesso 7 jun 2023];24:582. DOI: 10.1186/s13054-020-03298-3
23. Khan Z, Hulme J, Sherwood N. An assessment of the validity of SOFA score based triage in H1N1 critically ill patients during an influenza pandemic. *Anaesthesia* [Internet]. 2009 [acesso 7 jun 2023];64(12):1283-8. DOI: 10.1111/j.1365-2044.2009.06135.x
24. Christian MD, Joynt GM, Hick JL, Colvin J, Danis M, Sprung CL. Chapter 7. Critical care triage. *Intensive Care Med* [Internet]. 2010 [acesso 7 jun 2023];36(supl 1):S55. DOI: 10.1007/s00134-010-1765-0
25. White ST, Cardenas YR, Nates JL. What every intensivists should know about intensive care unit admission criteria. *Rev Bras Ter Intensiva* [Internet]. 2017 [acesso 7 jun 2023];9(4):414-7. DOI: 10.5935/0103-507X.20170073
26. Associação Médica Brasileira. Recomendações para triagem de pacientes em UTIs [Internet]. São Paulo: AMB; [s.d.] [acesso 7 jun 2023]. Disponível: <https://bit.ly/47cAch7>
27. Associação de Medicina Intensiva Brasileira. Recomendações da Amib (Associação de Medicina Intensiva Brasileira), Abramede (Associação Brasileira de Medicina de Emergência, SBGG (Sociedade Brasileira de Geriatria e Gerontologia) e ANCP (Academia Nacional de Cuidados Paliativos) de alocação de recursos em esgotamento durante a pandemia por covid-19 [Internet]. 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/3QGbj1>
28. Potter VR. Bioethics, the science of survival. *Perspect Biol Med* [Internet]. 1970 [acesso 7 jun 2023];14(1):127-53. DOI: 10.1353/pbm.1970.0015
29. Pessini L. As origens da bioética: do credo bioético de Potter ao imperativo bioético de Fritz Jahr. *Rev. bioét. (Impr.)* [Internet]. 2013 [acesso 7 jun 2023];21(1):9-19. p. 10. Disponível: <https://bit.ly/47t2PQk>
30. Zanella DC. Humanidades e ciência: uma leitura a partir da bioética de Van Rensselaer (V. R.) Potter. *Interface Comun Saúde Educ* [Internet]. 2018 [acesso 7 jun 2023];22(65):473-80. DOI: 10.1590/1807-57622016.0914
31. Pessini L. Bioética aos 40 anos: o encontro de um credo, com um imperativo e um princípio *Encontros Teológicos* [Internet]. 2014 [acesso 7 jun 2023];29(1):73-106. Disponível: <https://bit.ly/49BNfUw>
32. Garrafa V. Da bioética de princípios a uma bioética interventiva. *Rev. bioét. (Impr.)* [Internet]. 2005 [acesso 7 jun 2023];13(1):125-34. Disponível: <https://bit.ly/3SDOexa>
33. León Correa FJ. Bioética y biopolítica en Latinoamérica desde el personalismo. *Vida Etica* [Internet]. 2009 [acesso 7 jun 2023];10(1):135-46. Disponível: <https://bit.ly/3SFKUBH>
34. Arán M, Peixoto CA Jr. Vulnerabilidade e vida nua: bioética e biopolítica na atualidade. *Rev Saúde Pública* [Internet]. 2007 [acesso 7 jun 2023];41(5):849-57. DOI: 10.1590/S0034-89102006005000038
35. León Correa FJ. De la bioética clínica a una bioética institucional y social. *Rev Latinoam Bioét* [Internet]. 2009 [acesso 7 jun 2023];9(1):56-63. Disponível: <https://bit.ly/3QY8tV5>
36. Tabery J, Mackett CW 3rd. Ethics of triage in the event of an influenza pandemic. *Disaster Med Public Health Prep* [Internet]. 2008 [acesso 7 jun 2023];2(2):114-8. Disponível: <https://bit.ly/49u6grT>
37. Ghanbari V, Ardalan A, Zareiyan A, Nejati A, Hanfling D, Bagheri A. Ethical prioritization of patients during disaster triage: A systematic review of current evidence. *Int Emerg Nurs* [Internet]. 2019 [acesso 7 jun 2023];43:126-32. DOI: 10.1016/j.ienj.2018.10.004
38. Burkle FM Jr. Mass casualty management of a large-scale bioterrorist event: An epidemiological approach that shapes triage decisions. *Emerg Med Clin North Am* [Internet]. 2002 [acesso 7 jun 2023];20(2):409-36. DOI: 10.1016/s0733-8627(01)00008-6

39. Espinosa E, Galan J, Aldecoa C, Ramasco F, Llamas E. Marco ético pandemia covid 19 [Internet]. Madrid: Sociedad Española de Anestesiología, Reanimación y Terapéutica del Dolor; 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/49Ah9lr>
40. Silva TFC, Almeida DBA, Oliva EC, Kubo EKM. Além das equipes intergeracionais: possibilidades de estudos sobre ageísmo. REAd: Revista Eletrônica de Administração [Internet]. 2021 [acesso 7 jun 2023];27(2):642-62. DOI: 10.1590/1413-2311.327.101822
41. Soares TS, Corradi-Perini C, Macedo CPL, Ribeiro URVCO. Covid-19 e ageísmo: avaliação ética da distribuição de recursos em saúde. Rev. bioét. (Impr.) [Internet]. 2021 [acesso 7 jun 2023];29(2). DOI: 10.1590/1983-80422021292461
42. Demir MC, Ilhan B. Performance of the Pandemic Medical Early Warning Score (PMEWS), Simple Triage Scoring System (STSS) and Confusion, Uremia, Respiratory rate, Blood pressure and age  $\geq$  65 (CURB-65) score among patients with COVID-19 pneumonia in an emergency department triage setting: a retrospective study. São Paulo Med J [Internet]. 2021 [acesso 7 jun 2023];139(2):170-7. DOI: 10.1590/1516-3180.2020.0649.R1.10122020
43. Associação de Medicina Intensiva Brasileira. Princípios de triagem em situações de catástrofes e as particularidades da pandemia covid-19 [Internet]. São Paulo: Amib; 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/3QFCwQ0>
44. Conselho Federal de Medicina. Resolução CFM nº 2.156/2016. Define critérios para melhorar fluxo de atendimento médico em UTIs. Diário de Oficial da União [Internet]. Brasília, p. 138-9, 17 nov 2016 [acesso 7 jun 2023]. Seção 1. Disponível: <https://bit.ly/3G3agBS>
45. National Institute for Health and Care Excellence. COVID-19 rapid guideline: critical care in adults. London: NICE [Internet]; 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/ws/3dLAJ>
46. The gold standards framework proactive identification guidance (PIG) [Internet]. 2016 [acesso 7 jun 2023]. Disponível: <https://bit.ly/49xo6tZ>
47. Fluxo de manejo clínico do adulto e idoso na atenção especializada. Ministério da Saúde [Internet]. 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/3FXLnHT>
48. Academia Nacional de Cuidados Paliativos. Posicionamento da Academia Nacional de Cuidados Paliativos sobre covid-19 [Internet]. São Paulo: ANCP; 2020 [acesso 7 jun 2023]. p. 12. Disponível: <https://bit.ly/3QvpXXy>
49. Conselho Federal de Medicina. Resolução CFM nº 1.805/2006. Na fase terminal de enfermidades graves e incuráveis é permitido ao médico limitar ou suspender procedimentos e tratamentos que prolonguem a vida do doente, garantindo-lhe os cuidados necessários para aliviar os sintomas que levam ao sofrimento, na perspectiva de uma assistência integral, respeitada a vontade do paciente ou de seu representante legal. Diário Oficial da União [Internet]. Brasília, 28 nov, p. 169, 2006 [acesso 7 jun 2023]. Seção 1. Disponível: <https://bit.ly/3vGsJR6>
50. Bannay A, Chaignot C, Blotiere PO, Basson M, Weill A, Ricordeau P, Alla F. The best use of the Charlson comorbidity index with electronic health care database to predict mortality. Medical Care [Internet]. 2016 [acesso 7 jun 2023];188-94. DOI: 10.1097/MLR.0000000000000471
51. Hemmelgarn BR, Manns BJ, Quan H, Ghali WA. Adapting the Charlson comorbidity index for use in patients with ESRD. Am J Kidney Dis [Internet]. 2003 [acesso 7 jun 2023];42(1):125-32. DOI: 10.1016/s0272-6386(03)00415-3
52. Gabbe BJ, Magtengaard K, Hannaford AP, Cameron PA. Is the charlson comorbidity index useful for predicting trauma outcomes? Acad Emerg Med [Internet]. 2005 [acesso 7 jun 2023];12(4):318-21. DOI: 10.1197/j.aem.2004.12.002
53. Martins M, Blais R, Miranda NN. Avaliação do índice de comorbidade de Charlson em internações da região de Ribeirão Preto, São Paulo, Brasil. Cad Saúde Pública [Internet]. 2008 [acesso 7 jun 2023];24(3):643-52. DOI: 10.1590/S0102-311X2008000300018
54. Wei D, Sun Y, Chen R, Meng Y, Wu W. Age-adjusted Charlson comorbidity index and in-hospital mortality in critically ill patients with cardiogenic shock: a retrospective cohort study. Exp Ther Med [Internet]. 2023 [acesso 7 jun 2023];25(6):299. DOI: 10.3892/etm.2023.11998

55. Gamboa-Antiñolo FM. Comorbidity, clinical complexity and palliative care. *Intern Emerg Med* [Internet]. 2020 [acesso 7 jun 2023];15(4):557-8. DOI: 10.1007/s11739-020-02317-z
56. Charlson ME, Carrozzino D, Guidi J, Patierno C. Charlson comorbidity index: a critical review of clinimetric properties. *Psychother Psychosom* [Internet]. 2022 [acesso 7 jun 2023];91(1):8-35. DOI: 10.1159/000521288
57. Lourenço RA, Moreira VG, Mello RGB, Santos IS, Lin SM, Pinto ALF *et al.* Consenso brasileiro de fragilidade em idosos: conceitos, epidemiologia e instrumentos de avaliação. *Geriatr Gerontol Aging* [Internet]. 2018 [acesso 7 jun 2023];12(2):121-35. DOI: 10.5327/Z2447-211520181800023
58. Boreskie KF, Boreskie PE, Melady D. Age is just a number – and so is frailty: Strategies to inform resource allocation during the COVID-19 pandemic. *CJEM* [Internet]. 2020 [acesso 7 jun 2023];22(4):411-3. DOI: 10.1017/cem.2020.358
59. Church S, Rogers E, Rockwood K, Theou O. A scoping review of the clinical frailty scale. *BMC Geriatr* [Internet]. 2020 [acesso 7 jun 2023];20(1):393. DOI: 10.1186/s12877-020-01801-7
60. Rodrigues MK, Rodrigues IN, Silva DJVG, Pinto JMS, Oliveira MF. Clinical frailty scale: translation and cultural adaptation into the Brazilian Portuguese language. *J Frailty Aging* [Internet]. 2020 [acesso 7 jun 2023];10(1):38-43. DOI: 10.14283/jfa.2020.7
61. Using the clinical frailty scale to rapidly assay grades of fitness and frailty [Internet]. 2020 [acesso 7 jun 2023]. Disponível: <https://bit.ly/3ukS8km>
62. Clinical Frailty Scale (CFS) training module. Ottawa Hospital [Internet]. 2019 [acesso 7 jun 2023]. Lesson 3: The Clinical Frailty Scale (CFS). Disponível: <https://bit.ly/3QGp3aV>
63. Péus D, Newcomb N, Hofer S. Appraisal of the Karnofsky performance status and proposal of a simple algorithmic system for its evaluation [Internet]. *BMC Med Inform Decis Mak* [Internet]. 2013 [acesso 7 jun 2023]. DOI: 10.1186/1472-6947-13-72
64. Bezerra MR, Mello MJG, Lima JTO, Cavalcanti ZDR, Bezerra GMP, Dias LM *et al.* Prioritization to ensure care in COVID-19 pandemic. *Rev Bras Saúde Mater Infant* [Internet]. 2021 [acesso 7 jun 2023];21(supl 2):S519-27. DOI: 10.1590/1806-9304202100S200011
65. Rubio O, Estella A, Cabre L, Saralegui-Reta I, Martín MC, Zapata L *et al.* Recomendaciones éticas para la toma de decisiones difíciles en las unidades de cuidados intensivos ante la situación excepcional de crisis por la pandemia por COVID-19: revisión rápida y consenso de expertos. *Med Intensiva* [Internet]. 2020 [acesso 7 jun 2023];44(7):439-45. DOI: 10.1016/j.medin.2020.04.006
66. Xu W, Zhang F, Shi Y, Chen Y, Shi B, Yu G. Causal association of epigenetic aging and COVID-19 severity and susceptibility: A bidirectional Mendelian randomization study. *Front Med (Lausanne)* [Internet]. 2022 [acesso 7 jun 2023];9:989950. DOI: 10.3389/fmed.2022.989950
67. Calderón Ramírez C, Farmer Y, Bouthillier ME. Public voices on tie-breaking criteria and underlying values in COVID-19 triage protocols to access critical care: a scoping review. *Discov Health Syst* [Internet]. 2023 [acesso 7 jun 2023];2(1):16. DOI: 10.1007/s44250-023-00027-9

**Mirella Rebello Bezerra** – Master – mirebello@outlook.com

 0000-0003-1130-1098

**Laiane Moraes Dias** – PhD – laianemoraes@hotmail.com

 0000-0002-6714-1970

**Jurema Telles de Oliveira Lima** – PhD – jurematsales@gmail.com

 0000-0003-2671-3570

**Maria Júlia Gonçalves de Mello** – PhD – mjuliagmello@gmail.com

 0000-0003-4645-8343

**Rui Nunes** – PhD – ruinunes@med.up.pt

 0000-0002-1377-9899

**Corresponding author**

Mirella Rebello Bezerra – Rua dos Coelhos, 300, Boa Vista CEP 50070-550. Recife/PE, Brasil.

**Contributions of the authors**

Mirella Rebello Bezerra contributed to study design, literature review and manuscript editing. Laiane Moraes Dias actively collaborated in the literature review and manuscript preparation. Maria Júlia Gonçalves de Mello supervised the study design and, with Jurema Telles de Oliveira Lima and Rui Nunes, reviewed and corrected the paper. All authors contributed significantly to this study, read and approved the final manuscript, and agree to its submission.

**Received:** 6.13.2023

**Revised:** 9.13.2023

**Approved:** 10.10.2023