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Criteria for Ethical Allocation of Scarce Healthcare Resources: Rationing vs. Rationalizing in the Treatment for the Elderly

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Abstract: This paper stems from the current global worsening of the scarcity of resources for healthcare, which will deepen even more in future public emergencies. This justifies strengthening the reflection on the allocation of resources which, in addition to considering technical issues, should also involve ethical concerns. The two plans in which the allocation of resources develops—macro and micro—are then systematized, both requiring the identification of ethical criteria for the respective complex decision-making. Then, we describe how the complexity at the macro level focuses on the joint consideration of the rectitude of the principles, the goodness of the ends, and the integrity—respectively the deontological, teleological, and procedural perspectives; and at the micro level, it focuses in prioritizing people, which can result in the exclusion of some, as happened with the elderly during peaks of COVID-19. The main objective of this article is to show that, in public health emergency situations, in which the daily criteria for prioritizing access to health care are not efficient, it is possible not only to ration the available means but also to rationalize them. We argue that rationing and rationalization are different concepts, entail different consequences, have different ethical foundations, and draw different guidelines for patient care. We apply them to the distribution of intensive care and vaccines to the elderly thus demonstrating the ethically legitimate domain of implementation of each of these two prioritization criteria. We conclude that rationalization respects more strictly the core ethical principles of our common morality.

Keywords: healthcare resources allocation; rationing; rationalizing; age criterium; human dignity; social justice

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1. The Growing Need for Healthcare and the Chronic Resource Scarcity

Healthcare needs have been increasing all over the world as medicine, scientifically and technologically empowered, also increases its capacity for therapeutic intervention and for promoting the well-being of people and populations. This growth has also been accompanied by an increase in the response capacity of national healthcare services, especially in more developed countries [1]. However, there is always a deficit in fully meeting all healthcare needs. Indeed, the increase in healthcare needs, which, while more or less evident in different countries, is now widely recognized as being a global phenomenon, is reflected in an obvious (and apparently consequential) scarcity of healthcare resources, both human and technical, of means and equipment, and even financial, whose generalized effective reinforcement[1] [2] cannot keep up with this growing need for healthcare, which points to persistent or chronic resource scarcity. This is why the issue of criteria for the allocation of healthcare resources is currently unavoidable.

This constant gap between healthcare needs and resources has become particularly evident for all citizens—and undisguisable for governments—during the SARS-CoV-2 pandemic, which has been ravaging the world since 11 March 2020[2] and is still continuing. Indeed, in health emergency situations—whether declared in the context of public health, or triggered by scenarios of war or natural disasters—both the healthcare needs and the scarcity of resources to fully meet them, are exacerbated.

At the level of public health—and even global health, on which we focus—the data we have at our disposal realistically points to the continued increase in healthcare needs, as well as the probability of the emergence of new epidemiological or pandemic outbreaks and, therefore, also conditions for worsening the scarcity of healthcare resources. With regard specifically to public health emergencies, their probable future outbreak could be triggered by a number of different factors—such as new viruses[3] [3], or multidrug-resistant bacteria[4] [4]—which, incidentally, increases their unpredictability and, thus, the difficulty in preparing in advance.

These realities clearly indicate the certain emergence of new health emergencies[5], adding further pressures to healthcare systems that are already struggling against a chronic shortage of resources in the face of growing healthcare needs. These needs will continue to be aggravated, not only because of the conjunctural aspects already mentioned—future pandemics outbreaks caused by viruses or bacteria—but also due to structural social factors such as scientific progress, technological innovations, and social dynamics[6].

Increasing healthcare budgets, although a justifiably popular and necessary move, does not, however, solve the problem of chronic scarcity of healthcare resources, and can only mitigate it. It is important to formulate, implement and develop other complementary measures, ranging from health education, converting each citizen into a public health agent—for example, adopting healthy lifestyles, and using antibiotics correctly—to the organization of services and management of available resources, in an efficient and humanized way.

We will focus on the allocation of healthcare resources, that is, good management practices applied to the available resources, contributing to their profitability in the reduction of the scarcity of healthcare resources, which, in turn, will be reflected in the increase in satisfaction of patients' needs (see Figure 1).

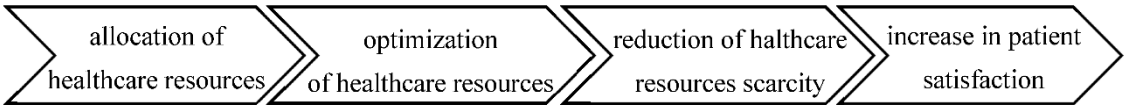

Figure 1. Why allocation of healthcare resources is important.

2. Public Health Emergencies and the Rise of Difficult Choices: Macro Allocation Ethical Complexity

In public health emergencies, the number of people needing access to health services and the severity of their clinical situation increases significantly. This can occur in a standard period of time which is foreshortened by the urgency of the care. The chronic scarcity of healthcare resources is getting worse and, given the actual impossibility of caring for all sick people, of attending to all the pathologies identified, and of carrying out all the required procedures, it is necessary to make choices; this means privileging some to the detriment of others, and ranking priorities.

Currently, seeking to assimilate and capitalize on the lessons of the SARS-CoV-2 pandemic, the World Health Organization, among other international organizations, together with the governments of several countries, have recognized the importance of preparedness and prompt response to health emergencies[7] [5]. These future response initiatives to the difficulties that the pandemic has posed, are a way of allocating resources and should mitigate the negative impacts of an upcoming public health emergency on accessibility (quantity) and adequacy (quality) of care to be provided to the population in need.

Yet they do not avoid healthcare choices which, in particularly adverse conditions and with more devastating consequences as they occur in extreme situations, are nevertheless constant events in the daily life of healthcare management and clinical practice.

Healthcare choices are essentially made at two levels: the macro level, centered on healthcare services, their organization and availability; and the micro level, centered on the patients and their prioritization in their access to medical care. At both levels, it is important

to identify the best criteria for hierarchizing the services to be provided (macro allocation) and their respective distribution to people in need (micro allocation), in order to better promote what each society perceives as the common good. This identification requires an ethical justification insofar as it stems from an evaluative assessment[8] [6]. The allocation of healthcare resources, therefore, has an indelible ethical dimension. This may refer, separately or simultaneously, to the rectitude of the principles on which the decisions taken are grounded and justified, to the goodness of the ends that are intended to be achieved, and to their effective realization (consequences, outcomes), as well as to the integrity of the procedures implemented, adopting respectively the deontological, teleological and procedural perspectives.

Let us consider the complexity and demands that the adoption of each of these three logics of action poses at the macro-allocation level, in which the choices focus mainly on the health sectors that will benefit[9]. This assay aims to show the requirements arising from a rigorous and broad ethical framework for resource allocation. Often, ethical analysis adopts only one of the three perspectives, while we recommend considering all three. Pursued at the macro level, this exercise can be reproduced at the micro level, which we will not do in the present paper. We will, however, benefit from this reflection when we move on to the consideration of micro allocation, which we will approach under another theme.

From a ***deontological perspective***, which consists of the formulation of solid ethical principles[10] [7], tacitly ratified by common morality, the principle of justice is the most often invoked as structuring the decisions to be taken. Yet, it is not sufficient to say that the structuring principle of resource allocation should be that of justice. Reality is much more complex. After all, this one has been defined differently throughout history.

The principle of justice, widely developed since Greek antiquity and especially by Aristotle is defined by the philosopher as the obligation to "treat equals as equals and different as different"[11] [8]. However, this formal, general, and abstract statement, does not identify the same and the different—for example, are all patients, in an identical clinical situation of risk to their health, the same, or are those who have COVID-19 different? It also does not present concrete rules of action—for example, should patients with COVID-19, who also pose a risk to public health, receive better and faster care? It does not clarify which structure has different criteria for the allocation of resources—for example, which are the clinical areas whose resources will be redirected to the treatment of COVID-19? This is why it is always important to specify ethical principles into rules of action, that is, to give them more content and strengthen a prescriptive dimension, making them operative and, thus, capable of being applied to concrete everyday reality.

In the case of the principle of justice, very different guidelines have been specified and structured into different theories. A utilitarian approach, which tends to be predominant in healthcare, advocates the greatest good for the greatest number of people[12] [9–11], that is, the maximization of good, in what can be interpreted as corresponding to the specification of the principle of social utility[13] [12,13]. In the context of pandemics, the utilitarian macro allocation recommends that services be reorganized in order to prioritize COVID-19 patients, even if it is at the expense of other pathologies, given the high degree of infection experienced by these patients and the imminent risk of contagion of a high number of people. In adopting this perspective, however, individual rights or the plurality of social values may be neglected; also, there is no commitment to an equitable distribution that, for utilitarians, will only be justifiable if it contributes to an increase in social utility. These three concerns are addressed by other theories or perspectives on justice.

Libertarians value individual rights and mostly liberty, but also argue that the State should not interfere in the lives of citizens, not having the authority to establish standards for the distribution of goods, including healthcare resources[14] [14]. Each citizen will benefit from the goods that he is individually capable of acquiring. Therefore, libertarian theory does not effectively invest in the allocation of resources for the promotion of public health, or in providing assistance to the health needs of those who can acquire it, and not even

subscribing to protection measures such as confinements, quarantines or the simple use of face masks.

The egalitarian theory of justice is structured precisely on the principle of equal distribution of elementary or basic goods by all people, such as primary healthcare, according to the Rawlsian maximin rule, which aims to maximize the minimum that everyone should enjoy. Strict egalitarians advocate an equal distribution of resources by all; an egalitarian such as John Rawls (who is not a strict egalitarian) advocates an equitable distribution of resources, which is one that takes into account original inequalities (arising from the "lottery" of life) and seeks to compensate for them through a distribution model that promotes equality[15] [15]. In the context of a pandemic, liberal egalitarianism, of the Rawlsian-type, will guarantee basic care to the entire population and seek to benefit people who are at a disadvantage, and who may be more vulnerable.

The communitarian rejects the hypothesis of a unique and universal model of justice, valid for all societies, stressing the importance of addressing the particular features of the different communities (such as cultural traditions, moral experiences, and individual and social rights), in order to formulate a specific theory or principle of justice, a prioritization criterion consensual within the community to which it relates[16] [16–19]. Therefore, the public health measures that are taken must be broadly consensual within the community in which they are applied, which, moreover, will testify to their effective capacity to respond to the health problems that the community values the most. It is clear that minority positions may be left unprotected.

In order to proceed with an ethical allocation of resources, it is not enough, therefore, to formulate principles that, by their abstract nature, favor consensual adhesions. It is not enough to claim social justice as a principle for the allocation of healthcare resources, being essential to specify it into norms, and rules that guide the actions to be developed.

Let us now consider the ***teleological perspective***, which requires the identification of an ***end***, objective, or aim ***of action*** widely recognized ***as a good***[17] and from which the means for its effective pursuit are organized. Today, the notion of good is particularly diverse, and even when it arises from the contexts from which the analysis starts, it does not eliminate its subjective dimension (that is, the notion of good is differently defined by different people). Thus, with regard to the domain of public health, we could confidently point to health as the ultimate consensual end and the greatest common good to be achieved. However, the context of the pandemic highlights the complexity of making such an assertion. In fact, at the beginning of the pandemic, the objective was to protect public health, the health of the greatest number of people, which determined the confinement of the infected and the quarantine of close contacts, along with restrictions on the movement of the general population, and mandatory individual and collective protection measures. However, as the economic and social impact of restrictive measures on mobility worsened, and as vaccination allowed for a reduction in severe cases and deaths, the objective became to control the number of hospital admissions so as not to exceed the number of beds available and, above all, the existing capacity for intensive care, consequently devaluing other assessment indices of the pandemic. Currently, aside from the peak of any infectious wave, the concern of most governments is almost entirely restricted to the number of deaths from COVID-19, which, obviously, they are trying to reduce. It is clear that the formulation of different ends will require different strategies of action, constituting different criteria for action.

In order to achieve an ethical allocation of resources, it is not enough, therefore, to proceed with the outlining of ends, however broad they may be, aiming to enhance consensus. The ends of action are constantly changing in an attempt to adapt to the evolution of the contexts whose interpretation is not unanimous either.

In the absence of universal principles and rules (deontological approach), and ends (teleological approach), it is essential to consider a third, complementary approach. The ***procedural perspective***[18] [20,21]—without neglecting principles and ends for the structuring of ethical action, but recognizing the difficulty, if not the impossibility of their unequivo-

cal affirmation—focuses on the decision-making process as legitimizing it, highlighting two essential ethical requirements, that of ***integrity*** and ***transparency***. In allocating scarce healthcare resources, integrity[19] [22] requires that the process be followed regardless of any external influence—for example, economic, political, scientific—in an independent and impartial way; transparency[20] requires that the process be visible and their knowledge accessible to all, and be also widely explained, rationally argued and consensually accepted. For example, during the pandemic, the process of acquisition of the first vaccines—the business negotiations between the many buyers and the several pharmaceutical industries—was not transparent [23] and, therefore, doubts arose regarding its integrity.

The ethical legitimacy of the procedures also allows for fine-tuning of the principles and their rules of application, as well as the purposes and their evolution, in as much as it facilitates citizen participation in decision-making processes, which, in turn, encourages adherence to the same. This is why it is important to always consider the three possible logics of action for an ethical allocation of resources (Table 1).

Table 1. Ethical challenges for macro allocation of healthcare resources.

Ethical Requirements	Principles (Deontological Approach)	Ends (Teleological Approach)	Procedures (Procedural Approach)
Macro allocation	Social Justice and the different theories of Justice	Common Good and the evolution of its formulation	Integrity Transparency and their fine-tuning of principles and ends

The allocation of healthcare resources is always complex and must be regularly reviewed, thus preventing it from only being undertaken in emergency conditions. At the macro level, preparedness is particularly important to anticipate future events. At the micro level, the situation is even more complex as it directly involves unique persons in particular situations. However, here too, advanced and propaedeutic reflection should help to prepare for future emergency conditions.

3. Prioritization Models and Criteria: Micro Allocation Ethical Challenges

The most difficult and serious issue that arises at the micro-allocation level is the hierarchy of access to healthcare which, in emergency conditions, may exclude some people from the necessary and adequate assistance to their health needs, as happened during the first year of the pandemic, specifically with regard to the elderly.

3.1. First-Come, First-Served, and Higher-Severity, Higher-Priority

Regarding the daily prioritization criteria for patients, when the scarcity of resources is not a variable to consider, there are two well-known systems: first-come, first-served, and higher-severity, higher-priority. In quiet situations, when all patients can receive proper care without much delay, the model can be one of ***first-come***, ***first-served***. These situations, however, are not the most common in an emergency room where, more often, professionals, not being able to attend to all patients at the same time, have to prioritize, which normally depends on the triage that identifies the most severe cases, attributing their priority. It is a system of ***higher-severity***, ***higher-priority***[21].

However, neither of these two systems works very well in public health emergencies. The "first-come, first-served" system would then correspond to a variant of the "lottery model", which some advocate in extreme situations: when it is not possible to propose a consensual interpretation of the principle of justice, "drawing lots" might be the fairer option because it eliminates any subjectivity and establishes a selection method that treats everyone equally. Nonetheless, it would then also correspond to the refusal to assume responsibility by those who have the power and, therefore, the responsibility to decide. "Higher-severity, higher-priority", despite being sensitive to people's suffering and seeking

to provide priority relief to those who suffer the most, cannot be applied in a public health emergency and in an aggravated situation of scarce resources, because it would imply using the most efficient therapeutic resources in patients who are the least likely to recover, and, therefore, the least likely to benefit from them.

Daily prioritization criteria do not work in public health emergency situations when the scarcity of resources becomes a variable to consider in clinical care, and it is not possible to provide medically necessary and urgent care to all those in need.

3.2. Rationing and Rationalizing[22]

It then becomes necessary to move toward other systems of allocating scarce healthcare resources, the most common being rationing. We will argue, however, that the range of ethical applications of rationing are very narrow, and that rationalizing scarce healthcare resources in general, and also in emerging situations, although very seldom referred to, is ethically more consistent [24].

Rationing and rationalization are two different resource allocation and prioritization-setting strategies. Nonetheless, the two concepts have the same etymology[23], and this may be why they seem to be easily confused and their difference has not been valued[24]. We argue that they are different concepts; entail different consequences; have different ethical foundations; and draw different guidelines for patient care. In this difference between the two, lies an obvious first advantage, which consists in the existence not only of one but rather two alternative instruments, two different logics of prioritization [26].

Concerning the ***conceptual definition***, rationing broadly refers to official restrictions to the access or to consumption of essential goods, and to the limitations to the quantity of a product available when there is a shortage of goods. It has a negative connotation by focusing on the limitations or restrictions. Within the healthcare sector, it refers to the distribution of limited resources to a limited number of people (following specific criteria). It focuses on the person's features (such as their profession, but also age, gender, nationality, etc.). Throughout the pandemic, there were multiple incidents of scarcity of goods; for example, personal protective equipment, such as face masks and disinfectants. In order for a greater number of people to have access to these goods, they were rationed; each person only had access to a reduced number of these goods. At the same time, access priority was given to health professionals and other professionals who were at greater risk of infection.

Rationalizing broadly refers to the most rational, logical, reasonable use of limited resources solely under the criterion of making the most of those resources. The goal is the optimization of the resources available, making their use as efficient as possible. It has a positive connotation by focusing on performance. Within the healthcare sector, it refers to the rational use or optimization of the limited resources available to increase productivity. It focuses on taking full advantage of its performance. One of the scarcest health-related items during the pandemic was *inpatient* hospital *beds*. Assigning them to the most seriously ill is to adopt a logic of higher-severity, higher-priority; but if there are not enough beds for all the seriously ill, the most common logic that takes place is one of rationing, allocating available beds only to some patients who need them, following a distribution criterion: such as health professionals, those who can pay for the beds, or young patients. Another logic of action concerns the reorganization of healthcare services, releasing beds in sectors where they are not truly indispensable. It is then a matter of rationalizing the existing beds and assigning them to those who may have the better outcome. Briefly, rationing focus on persons and their characteristics; rationalizing focus on resources and their performance.

Concerning the ***implementation model*** and its consequences, rationing relies on a selection of criteria that fall on people, including some and excluding others, based on their specific traits, on valued characteristics; it implies that scarce resources are allocated following a social evaluation of personal features, such as, as formerly suggested, being a health professional or a rich person. Of course, the ethical evaluation of both criteria is not the same: prioritizing the health of healthcare professionals reverts to the promotion of public health, and it can be supported by the utilitarian concept of justice; prioritizing

the richest, even with the intention of reinvesting the profit obtained in public health and thus reducing the scarcity of resources, will still aggravate discrimination and deepen the vulnerability of those excluded.

Rationalization adopts a single allocation criterion, that of efficiency, assessing the conditions under which the maximum performance of available resources can be obtained. Returning to the example of the *inpatient* hospital *beds*, another way of implementing its rationalization was to move patients—who had already been clinically discharged but had no social support—from the hospital to social institutions or also not to postpone medical discharge beyond the clinically necessary. Rationalization might not reach all people in need, and might not make available hospital beds for all that need them; however, it will not prioritize people based on social characteristics, but rather based on the expected clinical benefit to be obtained through the attribution of a specific health good to a real person in need. Summarizing, rationing focuses on a social evaluation of people; rationalization focuses on an efficiency assessment of resources.

The ***ethical foundation*** of the logics of rationing and of rationalization are different, thus contributing to establishing also a different ethical legitimacy for each procedure. Rationing proceeds by positive discrimination, favoring some to the detriment of others depending on the characteristics that are valued. All positive discrimination implies parallel negative discrimination in how much someone is excluded so that another benefits. This binomial of discrimination can be ethically justified in certain circumstances, in which the sacrifice of a few, benefits society as a whole, or in which it seeks to compensate for original disadvantages for which the individual is not responsible. Nevertheless, the excluded will be the victims of personal injustice (in comparative terms because they will be treated differently in relation to the other) in favor of social justice (the majority of citizens will be better off)—the utilitarianism that informs the rayon process admits of sacrificing some for the good of the many. In addition, and of particular importance, a hierarchy of people based on physical characteristics, which the person does not control (such as ethnicity), or other features chosen by free personal development (such as religion) invariably offends human dignity, in as much as it attributes a differentiated and relative value to each person. Respect for human dignity requires the recognition of the absolute (non-gradual), indelible (cannot be suppressed), and inalienable (cannot be discarded) value of each and every human being, whose worth is independent of any identified characteristic. The inclusion or exclusion of someone based on a personal characteristic is always an act, respectively, of positive or negative discrimination.

Regardless of the ethical grounding, the procedure—in this case, the criteria for allocation and prioritization—should focus on people's healthcare needs, and be transparent (visible or accessible to all who want to know), consensual (gathering the agreement of the majority) and fair (treating all citizens equally), thus promoting equity (acknowledging avoidable or remediable differences among persons and developing the adjustments needed to imbalances).

Rationalization requires that the efficiency assessment of the resources be impartial (independent of any outside interests), accurate (objective and verifiable) and transparent. Once these requirements are met, the proposed allocation methodology will also be recognized as promoting social justice, producing the greatest good for the greatest number. The logic of attributing the scarce existing resources is to make them profitable. For example, when there are few beds in the intensive care unit, these are not necessarily assigned to patients who are in the most serious clinical situations, evaluated with a remote possibility of recovery, but to patients with good or reasonable probabilities of recovery and who would die without intensive care. The decision focuses on the resource to be distributed and its profitability (according to a predominant utilitarian perspective in health), and not on the patient in need and their characteristics; thus it does not discriminate (positively or negatively) nor contradicts with respect for human dignity[25]. Briefly, rationing discriminates and may endanger human dignity; rationalization does not.

From this systematization, it becomes clear that the ethically legitimate ***domain for the application*** of rationing and rationalization is not coincidental. Rationing, being implemented through the valuing of some personal characteristics, under positive discrimination, should only be applied to non-vital goods (e.g., morphine, drugs to control anxiety), establishing priorities, but not excluding people from access to goods essential for their survival. Indeed, rationing can be ethically defensible and even recommended in situations as varied as the favoring of socially unprotected people (e.g., persons with disabilities, the homeless) or those who, due to their social functions (e.g., healthcare professionals, heads of state), can contribute more decisively to the common good or to social utility. However, this is only in the case of a hierarchy of people, where those initially deprived, might gain access to the necessary goods or be rewarded later—which is possible only with non-vital goods—and never with a definitive exclusion of people, causing their death—which would happen if the goods were vital (e.g., oxygen, ventilators). The eventual rationing of vital goods, of healthcare resources, would infringe social justice—no one should be left to die on behalf of others, even for the greater good of the majority—and also human dignity—deprivation of access to healthcare resources would be justified on the basis of personal characteristics.

Rationalization can be applied to the allocation of vital and non-vital resources because it does not discriminate between people, nor infringes social justice or human dignity, although some people might be excluded from access to goods essential for their survival. It is thus concluded that, from an ethical perspective, rationing is applicable to non-vital goods, and rationalization to vital (but also non-vital) goods (Table 2).

Table 2. Models for the establishment of priorities in access to resources in emergency situations.

Different	Concepts	Consequences	Foundations	Guidelines
Rationing	Limitation of resources; focus on persons and their characteristics	Allocation of resources relies on a selection of criteria that fall on people; focus on a social evaluation of persons	Discriminates positively and negatively (criteria should be transparent, consensual, and fair); promotes equity, but may endanger human dignity	Applies to the distribution of non-vital scarce resources
Rationalization	Optimization of resources; focus on resources and their performance	Allocation of resources adopts one single criterion, that of efficiency; focus on an efficiency assessment of resources	Does not discriminate (when complying with the duty of objectivity, accuracy, and transparency); promotes social justice and respects human dignity	Applies to the distribution of non-vital or vital scarce resources

Reflection on the ethical limits of rationing and the alternative of rationalization for the management of scarce resources would have contributed to better management of the pandemic, mostly at its peaks, and especially with regard to the exclusion of the elderly from therapeutic care (referred only to palliative care), on an age-based healthcare rationing[26].

4. The Age Criterion in the Allocation of Limited Resources during the Pandemic[27]

The age criterion is not infrequently invoked in the context of resource scarcity, thus invariably leading to the exclusion of the elderly[28], in a tacit decision, accepted as reasonable by the general population, and as once again occurred during the pandemic. In fact, many of those potentially excluded ratified this same collective decision. The exclusion of the elderly in a situation of resource scarcity thus seems to have been assimilated by common morality. Yet it is ethically quite problematic, as well as being clinically equivocal.

4.1. The Puzzling Age Factor

Indeed, the "age" criterion is not unambiguous. There are many different approaches to a person's age, reflected in a parallel diversity of adjectives. In our context, it is, above all, important to consider two of these definitions: the ***chronological age*** and the ***biological age***. Chronological age is the one that results from the difference between the date of birth of the person and the present, that is, the number of years (months, weeks, days) that each person adds from the day of their birth to the present date, and which is shown objectively and unequivocally in the identity documents of each citizen. Biological age corresponds to the level of organic aging of each person, not necessarily coinciding with chronological age. Indeed, people do not all grow old at the same pace, and this process can be influenced by factors as diverse as genetics, lifestyle choices, and traumatic events. In addition, certain organs in the body can also show particular vigor or premature aging.

Chronological age is decisive at a social level, although there are also discrepancies between this and other approaches to age. This is evident, for example, at the beginning of formal schooling for children or at the end of professional practice for the elderly, with both moments being attributed to a certain chronological age, despite the fact that there are children who would be receptive to entering school earlier and adult professionals who might wish to retire later.

At the level of clinical care, however, chronological age can only play the role of a very useful indicator, in the way in which it influences and conditions biological age. It is more likely that a patient with a high chronological age will also have high biological wear to their body, which will bring them lower probabilities of recovery in the face of certain clinical events. Biological age may be a clinical exclusion factor; chronological age will always be a factor of social exclusion. It is the biological age that should be the basis for medical decisions[29].

Nevertheless, this was not always the procedure followed during the pandemic, such as the recommendation which was issued by the Italian Society of Anaesthesia Analgesia Reanimation and Intensive Care (SIAARTI), regarding the "clinical ethics for admission to intensive care and for their suspension" [30]. This advised doctors to use the age criterion—chronological age and not the biological age—to discard patients above a certain age and favor younger patients, and even remove the elderly from life-saving treatment, reallocating it to the youngest.

It is obvious that if the medical decision is based only on chronological age and not on biological age, younger patients may be admitted in a more serious clinical situation and less likely to recover compared to other older patients—which, from a clinical point of view, will be counterproductive, in addition to being ethically controversial. From this last perspective, using only chronological age at the clinical level is equivalent to excluding people from vital healthcare resources based on their physical characteristics, that is, for social and not clinical reasons. It should be stressed that we all recognize that negative discrimination and exclusion, which is based, for example, on ethnicity or gender (physical characteristics), but also on religion or sexual orientation (traits of personality development), violates human dignity[30]. Consequently, any differentiation of treatment on the basis of chronological age also violates human dignity. This interpretation, truly irrefutable, has not been presented, sheltered by the comfort conveyed by the tacit acceptance of the subordination of the elderly. Yet, human dignity, as an absolute value, without gradation, does not grow to adulthood, nor does it wear out as the years add up. It is always the same.

Therefore, it is not surprising that, over time, other terminologies have emerged that invoke similar practices, by excluding people from access to healthcare based on chronological age, but under different arguments that, more elaborated, intend to make them ethically legitimate (and politically correct). This trend shows the predominance of the utilitarian perspective in healthcare decision-making and, thus, the devaluation of respect for human dignity which, in official statements, remains the foundation of human relations, in an unavoidable inconsistency. We can include within this scope a variety of different expressions, such as: ***life expectancy***, ***life years*** (***LY***) ***saved***, ***quality adjusted life***

years (***QALY***) ***saved***—as being different approaches and interpretations of how the "age" criterion can work[31] [32].

Thus, instead of prioritizing patients based on chronological age—the older they are, the less likely they are to be admitted to intensive care—it is sometimes based on life expectancy—the lower the life expectancy is, the fewer years missing to reach the average life expectancy for their sex in that country, the less likely they are to be admitted. The irreducible and objective fact of the number of years of each one, of their chronological age, is replaced by an estimate of longevity, by the average of years that the majority of the population reaches. The uniqueness of a person is, therefore, subsumed into a category, to which they may not even correspond, and that person is treated in a standardized and non-personalized way, potentially becoming the victim of a numerical average. The depersonalization of the individual and its reduction to a probabilistic arithmetic mean, once again offends human dignity and contradicts a patient-centered clinical practice.

Another type of age criterion in the allocation of limited resources is the life years (LY) saved. Prioritization is not directly based on the patient's chronological age, but on the basis of the number of years that can be saved. It is evident that the number of years to be saved will always correspond to an estimate calculated from the chronological age of the patient and the life expectancy for their sex in that country. It could be said, therefore, that this is only a matter of semantics. However, there is effectively a different logic in this prioritization model, due to the assumption that the essential objective of clinical practice is no longer saving lives, but rather the number of years of life to be saved. Two obvious consequences follow. The first is that lives are worth more or less depending on the number of years of life expected or actually lived. Once again, human dignity is seen as a commodity that is spent over time. The second is the devaluation of the person in their singularity and their reduction to a number. In addition to the invariable and irreducible depersonalization in the application of any variant of the age criterion, in this case we also have the reconstruction of the purpose of medicine.

Another type of age criterion in the allocation of limited resources, which is already well established, is the quality-adjusted life years (QALY) saved, which, in the current context, becomes even more restrictive than the previous paradigms by subjecting the life years saved to a quality criterion. Therefore, it shows all the ethical problems already mentioned and also adds those arising from the scrutiny of the quality of a life, as if, once again, the value of life was not absolute and could be externally evaluated. In addition to the QALY (Quality of Life/QoL entered Medline in 1975 and the Index Medicus in 1977), there are now many different metrics that seek to value increasingly broad parameters that control symptoms, decrease mortality or increase life expectancy. These indices—common outcome measures in economic evaluations of health interventions—can also be quite useful for designing therapeutic measures which are adapted to the uniqueness of each patient. However, due to their inherent and irreducible subjective dimension, and also to the strong external weight in the evaluation carried out, they cannot be legitimately used as a factor for the exclusion of vital goods, when recovery is still possible and probable.

If the "age" criterion is quite ambiguous and ethically controversial, infringing structuring and even identifying principles of our contemporary pluralistic societies, it can only be considered with great caution, always in its biological dimension[32] [33] and preferably applied to the allocation of non-vital goods.

The distinction between rationing and rationalization, and the legitimacy of its application, respectively, to non-vital and vital goods, contributes not only to a more efficient allocation of healthcare resources in general, but also to preventing the ill-considered and reckless, counterproductive, and ethically objectionable use of social age for clinical decisions.

4.2. Rationing vs. Rationalization in the Elderly

Finally, it is important to verify the various possible modalities of application of rationing and rationalization in the allocation of healthcare resources during the pandemic, specifically at the micro level, that is, in the prioritization of patients, and adopting age as a

criterion. Although all resource allocation is technically complex and ethically challenging, and particularly so during public health emergencies, macro allocation, by focusing on health services and not on patients, does not gain the same acuity as micro allocation. Furthermore, macro allocation also more frequently adopts the rationalization model as a way of avoiding rationing, which is ethically more problematic.

During the pandemic, age-based rationing, always restricted to chronological age, was used in two paradigmatic situations: access to mechanical ventilation and to vaccination, when both, vital and non-vital goods, respectively, were quite scarce.

With regard to access to ventilation, we already know that, when the number of ventilators was too scarce for the existing needs, rationing was based on the number of years of the patient. Life expectancy may also have been invoked. The elderly were excluded. The exclusion criterion was social, based on an irreducible physical characteristic. It was therefore ethically unjustifiable; and non-medical, in the assessment of the general clinical situation that deteriorates with age and is reflected in biological age, and which could also lead to exclusion, being then, however, ethically justifiable. In this case, not even the principle of social justice can be invoked because valuing chronological age over biological age does not guarantee the greatest good for the greatest number.

The rationalization model would have adopted biological age[33] as its basis to better assess the effective impact that the available ventilators would have on each of the patients who needed them, regardless of chronological age. However, it is not pre-established whether, in the calculation of the ventilator's efficiency, they would additionally adopt the criterion of life years (IL) saved or quality-adjusted life years (QALY). A utilitarian would do it (from a consequentialist teleological perspective that places the emphasis on the results obtained), but not a libertarian (from a deontological perspective, focused on respect for principles, regardless of the consequences).

If these were adopted as additional criteria, it could be concluded that, having not proceeded to the indignity of evaluating a person by their chronological age, one would have, nevertheless, quantified human life, disrespecting human dignity, under a utilitarian conception of social justice that allows the sacrifice of the few for the sake of the majority. The additional consideration of life years (IL) saved or of quality-adjusted life years (QALY) saved would be ethically justifiable as the ultimate access criterion for a similar clinical evaluation situation of two patients for a single available ventilator. In general, rationalization is more likely to achieve better clinical performance in an ethically defensible way.

Yet, it is important to emphasize that the current ethical requirement is not limited to choosing between outcomes and principles. The greatest challenge will always be to articulate teleological perspectives, ensuring good outcomes (ends), deontological, in compliance with fundamental principles, and procedural, guaranteeing a decision-making process acceptable to all those potentially affected.

Concerning access to vaccination, we already know that the number of vaccines available was lower than required to inoculate the entire population, so, once again, a logic of priority distribution was needed. This time, a combined model of rationing and rationalization was put in place. Rationing continued to be based on chronological age; however, no longer a factor of exclusion, but of prioritization, starting by distributing the existing vaccines from the oldest to the youngest. The rationalization process continued to give priority to biological age, taking into account the fragilities of each person, such as those recovering from cancer or chronically ill patients; no longer excluding the biologically most vulnerable, but rather prioritizing them.

In both logics of allocation of scarce resources, the principle of vulnerability and the duty of protection it entails were valued. As vaccines became available, they were distributed to the most vulnerable—for example, elderly, immunocompromised, people with several comorbidities—to those at higher risk—health professionals—and then to the lowest—ordinary citizens. The dignity of each and every citizen was always respected, and a model of justice based on the principle of vulnerability was promoted, of a Rawlsian egalitarian type (equity), which uses differentiated treatment (positive discrimination) to

restore social equality. The quantification (life years (IL) saved) or the qualification of life (quality-adjusted life years (QALY) saved) were not considered (Table 3).

Table 3. The age criterion in the allocation of limited resources during the pandemic.

Age/Elderly	Ventilators (Vital)	Vaccines (Non-Vital)
Rationing	Rationing (requires prioritization/selection criteria) of ventilators adopted chronological age as a criterion. When there were no ventilators for everyone who needed them, health professionals started by excluding the older patients on behalf of the younger ones, progressively and according to ventilator availability **Infringes Human Dignity and Social Justice**	Rationing of the scarce vaccines available prioritized the chronologically oldest as they were the most vulnerable (regardless IL and QALY), and vaccination improved their resistance to infection **Ethically sound (Human Dignity + Social Justice)**
Rationalization	Rationalization would have evaluated, among all patients in need of ventilation, those who were more likely to survive (saving lives), considering (not chronological age) their general state of health (including biological age) **Ethically sound (Human Dignity + Social Justice)** Rationalization would have adopted biological age as a criterion (saving lives); in addition, it could also have considered life years (IL) or quality-adjusted life years (QALY) saved **Exchanges Human Dignity for Social Justice**	Rationalization of the scarce vaccines available prioritized the biologically most vulnerable (regardless IL and QALY), and vaccination improved their resistance to infection **Ethically sound (Human Dignity + Social Justice)**

In both micro-allocation models, there was an inversion of the prioritization logic in the transition from considering vital to non-vital goods, thus fulfilling the fundamental ethical requirements. We believe that this indicates (1) a correct knowledge and application of ethical requirements in the distribution of scarce healthcare resources, (2) that life-threatening situations, with a strong emotional nature, disturb.

We conclude that the application of the rationalization model, and not just rationing, together with the broader and more rigorous consideration of the age factor, will help to maintain fidelity to the highest ethical standards of action, including in extreme life or death situations, such as occur in emergency conditions.

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Notes

1 "Between 2000 and 2017, the global economy grew 1.6 times in real GDP per capita. As countries became richer, the demand for healthcare increased along with people's expectations for their government to increase access to quality services. Concurrently, the cost of health services rose because of more expensive technologies. These factors drove up health spending globally. The increase has been particularly rapid in lower middle income and upper middle income countries".

2 The World Health Organization (WHO) declared COVID-19 a pandemic on 11 March 2020: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-March-2020 (accessed on 30 September 2022).

3 Let us consider, for example, the current health crisis which is viral and most likely zoonotic. Today, zoonoses account for about 60% of recognized pathogens (viruses, bacteria, protozoa, parasites, and fungi) and 75% of emerging (see [3]; their incidence rate in human health tends to increase due to human invasion of natural habitats, greater proximity between humans and animals, and increased human mobility with ease of travel, amongst other causes. Many zoonotic diseases do not yet have a cure, so the risks of infection and contagion become high. Furthermore, it is important to consider the viral mutations that whilst unavoidable, are also uncontrollable, only allowing forms of action *a posteriori*. Even though most viral mutations do not have a significant impact on public health, and the average speed of effective response to their health impacts is increasing—as was evident in the

production of vaccines against COVID-19—health systems will only be able to react to new and harmful virus variants when they have already started to be transmitted within the wider community.

[4] The current threats to public health do not result only from viruses, but also from bacteria and their increasing resistance to antibiotics, with the parallel loss of effectiveness of these, as is the case with some microorganisms (bacteria, fungi, viruses, and parasites) which are designated as ultra-resistant to most antimicrobials (See [4]). This is a reality that has been developing for a long time and that, during the pandemic, has been neglected, without, however, the risk having ceased to increase. The growing resistance to antibiotics heralds a reversal of the successes of recent centuries of progressive capacity to cure diseases, corresponding with a disturbing resurgence of untreatable pathologies.

[5] While the world is still struggling with the COVID-19 pandemic, on 23 July 2022, WHO declared Monkeypox as a new global health emergency: https://www.who.int/news/item/23-07-2022-second-meeting-of-the-international-health-regulations-(2005)-(ihr)-emergency-committee-regarding-the-multi-country-outbreak-of-monkeypox. (accessed on 30 September 2022)

[6] We refer, then, for example, to the growing number of patients with chronic diseases who, in a not-so-distant past, would not have survived, but who today can enjoy a long life with good control of a chronic pathology; significant increases in life healthcare worldwide (albeit mostly in the Western world), also increasing the number of years that each person needs healthcare which, as in the previous example, sends a growing influx of users to health services; and demographic growth all over the world (mostly in Asia and the Southern hemisphere), also increasing the number of people in need of healthcare. We also refer to cutting-edge technologies and state-of-the-art drugs that benefit patients who might otherwise be condemned to a life with some degree of limitation and certainly one which is shorter, but whose very high price significantly burdens national health services. It is, in fact, this constant scientific-technological innovation and the high cost of the products that are materializing which confirms the permanent deficit of healthcare resources: if there are new and better healthcare resources, they should be made available; however, their high price does not allow them to become accessible to all who need them, which results in chronic resource scarcity.

[7] This will require, in terms of resource management, the elaboration of contingency plans—arrangements (identification, organization, coordination) in advance, to enable timely, effective, and appropriate responses to possible emergency situations—as well as the organization of strategic reserves—maintaining a pre-positioned backup of essential goods and emergency medical supplies to ensure a swift response to critical needs in cases of public health emergencies (See [5]).

[8] "The term itself may refer either to the interests that members have in common or to the facilities that serve common interests. [. . .] The common good is an important concept in political philosophy because it plays a central role in philosophical reflection about the public and private dimensions of social life."

[9] We understand its importance by remembering the recent pandemic experience. A large proportion of the existing healthcare resources were redirected to the fight against COVID-19, which has consequently dramatically affected other health sectors as diverse as oncology, surgery, prevention, and primary care, with very high costs in terms of human lives, and in the number of years of life and general well-being of citizens and populations. A good macro allocation is therefore an ethical imperative.

[10] The deontological perspective began, in the western history of ethics, with Kant (See [7]), in 1785, and his enunciation of the moral law in whose fulfillment morality consists (regardless of the consequences). Morality consists of obedience to principles.

[11] We refer to the Aristotelian formulation of the principle of "justice" in a very broad sense, as a guide to action (being a consequentialist or teleological principle). Aristotle defines "justice" specifically as a virtue (one of the four cardinal virtues) (See [8]).

[12] Jeremy Bentham (1776), the founder of utilitarianism, in his *Fragment on Government* (see [9]) refers to the "fundamental axiom" as "the greatest happiness of the greatest number that is the measure of right and wrong." A utilitarian approach to justice was developed by Stuart Mill (see [10]) and Henry Sidgwick (see [11] being also a consequentialist or teleological principle).

[13] The specification of ethical principles into rules of action, that is, trying to qualify them, to give them more content when solving concrete problems, was first proposed by Henry S. Richardson (See [12], pp. 279–310). Richardson proposes the "specification" of principles to solve concrete ethical problems, instead of "applying" them directly to cases or to "balance" them when they are in conflict: (see [13], pp 285–307).We are freely using the model of specification to explain how the maximization of good corresponds to the principle of social utility.

[14] The ideas of self-ownership and of minimal state are shared by libertarians in general, and well developed by Robert Nozick [14]. Distributive justice depends on a legitimate acquisition of goods, and also on the consideration of respect for the persons' rights and for their possessions.

[15] John Rawls [15] presents two major principles of justice: the (first, the one that takes priority over the second) principle of equal basic liberties; and the second principle (with two parts, the first taking priority over the second) of fair equality of opportunity together with the difference principle, under which special benefits can be attributed to the least advantaged members of society.

[16] This is a common view of communitarian philosophers such as Michel Sandel (see [16]), Alasdair MacIntyre [17], Charles Taylor [18], or Michael Walzer [19] who criticize the liberal theory of justice, namely Rawls' perspective. These philosophers, however, never claimed to be communitarian.

[17] The teleological perspective dates back to Ancient Greece, having been systematized by Aristotle, the founder of ethics, in his hierarchy of ends or goods and the establishment of means (virtues) to achieve them. Morality consists of the realization of successive goods, of the greater good.

[18] The procedural perspective is contemporary, having begun to be developed within the scope of the discourse ethics by Karl-Otto Apel [20] and Jürgen Habermas [21], in their valorization of (rational) communication, of dialogue as a process of building (communicative) consensuses that legitimize action. This is what morality consists of.

[19] Integrity, etymologically, refers to a whole, considered in its unaltered completeness, without fissures or gaps affecting or corrupting it, an incorrupt totality; which, in terms of action, translates into a behavior that cannot be influenced by sectarian and particular interest (see [22], pp 181–187).

[20] Transparency, etymologically, refers to that which 'lets the light through', thus also letting the eye see or become visible; this, in terms of action, translates into making a given reality publicly accessible.

[21] Extraordinarily, in exceptional situations such as those of war, natural disasters, and pandemics, triage can lead to discarding the most severe patients, those evaluated as beyond salvation.

[22] The literature on the allocation of healthcare resources is very often focused on the issue of "rationing". The conceptualization of "rationalization" is rare, and the term "rationing" is sometimes used to classify a procedure that, in fact, corresponds to "rationalization". Therefore, there is no really relevant bibliography on rationing vs rationalization. Nevertheless, its objective and clear distinction makes available two possible instruments, or strategies for the allocation of healthcare resources with obvious benefits for citizens and for national health systems, as we will show.

[23] Both words derive etymologically from the Latin word *ratio*, *onis*, which could mean: the "calculation", a numerical calculation; and also the capacity to calculate, that is, intelligence or judgment. Rationing focuses on the result of the judgment (its product), the ratio between two values, such as the goods to be assigned and the people in need of them: that which enables a relationship to be established between both. Rationalization focuses on the ability to make good judgments (the exercise of reason), applying reason to any decision, including the allocation of resources, in order to obtain the maximum benefit, making it more effective. Therefore, although rationing and rationalization have the same etymological source, they also have different meanings.

[24] Eva Winkler [25] is one of the few scholars that present "rationalization", "rationing", and "prioritization" as "strategies to reduce the utilization of limited resources". However, the definition of "rationalization" and "rationing", and the comparison between both is not rigorous and clarifying enough.

[25] The decision-making process satisfies the prevailing utilitarianism in health (following a teleological logic), based on respect for human dignity (following a deontological logic).

[26] Even if, in some cases, the outcome is the same, whatever the logic used, the process will have been different. The teleological perspective (such as utilitarianism), would focus solely on the outcomes; the procedural perspective would also value the process adopted. When the outcome is the same, the difference lies in the procedure. This is particularly important when the outcome is negative, such as the exclusion of some people from healthcare.

[27] The bibliography on the age criterion in the allocation of health care resources is very extensive and varied, and can adopt different perspectives, and invoke different reasons. As it is not our purpose, in the present context, to carry out a survey of the plurality of positions on the matter and respective grounds, we chose to systematize our position on the subject, based on the prevailing practices, in the healthcare setting, in this area.

[28] "Age" has been a recurrent theme in the scrutiny of access to scarce healthcare resources and almost invariably a factor of exclusion (not admitting patients over a certain age), or of secondary access (admitting the elderly only in the absence of pressure on resources) (see [27], pp. 272–273). Yet, it was Daniel Callahan [28] who strongly proposed that life-extending medical care for the elderly (beyond the age of 70 or 80) should not be provided at state expense. This work—in the wake of Alasdair MacIntyre [29]—has been seminal and headed a position defended by many in a panoply of publications that have multiplied up to the present day. Nevertheless, this was not the predominant orientation during the pandemic, according to most of the guidelines that several national and international organizations have published since the beginning of the pandemic and that the WHO makes available under the title "Statements by National Ethics Committees" (https://www.who.int/teams/health-ethics-governance/diseases/covid-19/resources). (accessed on 30 September 2022)

[29] We recognize that the use of biological age is not easy, especially in emergency situations, and neither does it have a parallel accuracy to that of chronological age. These facts, however, do not advocate the use of chronological age, but rather reinforce the ambiguity of using the age criterion. Either the biological age, the most clinically relevant, is used, or the age factor should not be used at all.

[30] The attribution of a specific value to a person based on a characteristic constitutes a double violation of human dignity: (firstly) the intangible identity of the person cannot be reduced and objectified to no matter which characteristic, (secondly) because all people and each one has unconditional value—in the Kantian definition of the dignity of the person that is still predominant today.As Solomon, Wynia and Gostin argue [31], the same logic of exclusion due to physical characteristics (banned in democracies when referring to gender, ethnicity, etc.), such as age, could be coherently extended to the exclusion of many other individuals: for example, disabled persons or those with genetic or chronic diseases.

[31] Joebges and Biller-Andorno [32], analyzing a few European triaging guidelines, also refer to the role of short-term vs. long-term survival as a key triaging criterion. Another expression also used within this context is the "natural life span" used to point out that some individuals have already achieved it and therefore their access to health care should be restricted (Callahan, 1987) [28].

[32] Vinay R, Baumann H, Biller-Andorno (see [33]) consider that, in triage protocols, at the international level, there is a highly consensual agreement to rely on medical prognosis, maximizing lives saved, and avoiding a quality-adjusted life-years policy.

[33] The assessment of biological age (at the peak of COVID-19 or other public health emergencies) would have been difficult and even quite inaccurate. However, it would be preferable to the automatic exclusion of a person from intensive care solely because of their chronological age. The awareness of the distinction between biological age and chronological age and the greater importance of the first, taking into account the objective of saving lives, would have led to a personal (clinical evaluation) and not to an administrative (screening of personal identification) evaluation.

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