Supplementary file S1.

Search terms

1) ethical framework; ethical principles; resource allocation; pandemic; emergency preparedness plan. (free text);
Explanatory notes of the selected ethical principles as valued, discussed and merged by the expert panel

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<th>No.</th>
<th>Ethical Principle</th>
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| 1   | Transparency     | Overarching principle with the highest priority in the principle hierarchy. Fair allocation is grounded on transparency. The model that better represents the value intended in this combined principle includes three key value elements: transparency, procedural justice and accountability.  
• **transparency** about how decisions are grounded (transparency) includes:  
• **procedural justice** refers to the rationale that everybody can accept a decision as fair if clear, actionable and criteria are adopted and transparent steps are made to reach a fair decision;  
• **accountability**: full disclosure procedures for making decisions publicly available; possibility of revising triage decisions for appeal |
|     | **Transparency** |                   | • Fostering stakeholders’ involvement in advance of planning and issuing any triage framework/tool.  
• Ethical duty to plan accurately pandemic plans in advance and making them actionable in case of need, including the legal and organisational framework behind;  
• Implementation of rationing only after all of the other measures have been adopted and resulted no more effective (contingency health-plans);  
• Coordination of care at regional/national level avoiding unequal treatment of patients with similar clinical features, with centralized triage executive services gauging and steering local triage stations;  
• Clarity of criteria for deriving life years saved or other items for decision-making: quantitative scores vs. discrete judgement  
• Ensuring that triage criteria are evidence based, updated to the most recent evidence, and modified timely if necessary.  
• Defining in advance, with juridical input, the feasibility or not of withholding/withdrawing respirators;  
• Defining legal basis of the triage tool licensed by a public health authority and extent of the legal shield offered to healthcare workers supported by triage tools engaged in decisions;  
• Defining the role, if any, of triage officer/team and that of centralized triage steering and control committees;  
• Defining who whether and how can challenge the triage decision;  
• Planning and implementing alternative routes of care (compassionate and palliative care). |
| 2   | **Number of lives saved** | Utilitarian value aimed at maximizing the number of lives saved. This principle assigns to each life saved the same value, and it is related to the concept of sacrality of life which has deep roots across most societies. |
|     |                   |                   | • Preserving the individual duty to care by physicians and beneficience / non-maleficence principle with the utilitarian approach;  
• Balancing the utilitarian approach with other ethical perspectives (egalitarian, worst-off). |
### 3 Life-years saved (prognosis)

- The principle of life years saved or prognosis, unlike the number of lives saved, aims to maximize the years of life saved, therefore it is based on the life expectancy of the people to be saved. This is a fairly intuitive value, however it cannot simultaneously consider the quantity and distribution of years of life saved.
- Trade off between accountability of quantitative prognostic tools (SOFA score, for example) which cannot be manipulated and their limited accuracy in predicting individual patients’ life years saved. Whether it is fair to adopt disease specific prognostic tools if available;
- Addressing dilemmas on whether is better to save few life years to many or many life years to few;
- Societal inequality index and its influence on creating disparities of long-term life years saved between patients of different socioeconomic status or ethnic origin.
- Wide discussion as whether to consider or not long-term life years saved as triage criterion, finally accepting it with some caveats
- Difference between lifetable and individual life expectancy, necessitating an overall assessment taking both into account

### 4 Respect for Persons and their Autonomy:

- **Dignity**
- **Beneficence/not maleficence**
- **Informed consent**
- **Anticipated willingness of care**

- It recognizes the right of people to be treated with dignity and the individual’s right to self-determination. Respect for the patient's autonomy is the basis for informed consent and Anticipated willingness of care. Individualized approach must be preserved also during a pandemic emergency and persons cannot be allocated to critical resources on the basis of “blanket” criteria such as age, disease or disease stage, gender, religion, political beliefs, ethnic or socioeconomic status.
- Considering local legislation on anticipated willingness of care;
- Respecting informed consent legislation for persons with cognitive limitations;
- Planning and implementing procedures of communicating and sharing triage decisions to patients and caregivers;
- Acknowledging that baseline non clinical conditions may worsen short term and long term life years saved (see above) and that this needs to be taken into account;
- Right to respect and compassion extended to that of compassionate and palliative care.
| 5 | **Equity vs. equality** | A strictly equalitarian perspective means that the same amount of care is given to all, irrespective of the clinical and extraclinical determinants of health. Availability of a national, clearcut, accountable and appropriate triage tool is an example of equality to overcome unacceptable variability of treatment across Italian regions for the COVID-19 pandemic. At the triage level, lottery and first-come-first-served are examples of such an approach. In contrast, **Equity**, also considers the other determinants of health and therefore allows unequal distribution of resources to those more disadvantaged for clinical or extraclinical (i.e. mainly socioeconomic) reasons. The unequal burden of COVID-19 on minorities and marginalized people is well known and results in their paying a disproportionate toll in terms of mortality, suffering, and social and economic costs from the disease. The Rawls’ approach we adopted permitted an in-depth focus on this aspect and clarified that unequal distribution of critical resources in favor of the disadvantaged is a condition of fairness that a triage tool must take into careful consideration. | • The application of this principle is enabled by implementing validated triage systems for patient evaluation, a clear infrastructure managing triage at local and central level. Interoperability and consistency of triage tools and infrastructure need to be accurately defined across the regionalized health system in Italy;  
• It should be made clear that prognostic tools not validated make choices equitable at population level, not at individual patient level;  
• Social determinants of health must be taken into account as a baseline imbalance to be compensated: underserved minorities are more burdened by chronic, poorly controlled diseases  
• QALY and DALY should not be used ad triage criteria, being unreliable and offering biased estimates disadvantaging the disabled;  
• Differing scarce resources may require prioritisation of differing criteria to make equitable choices. |
| 6 | **Youngest first (life cycle principle)** | According to a justice principle that states that all people should have the same opportunity to live a normal life cycle (fair innings), those who have had fewer years to live, i.e. the youngest, are prioritized. However, as Persad and Emanuel pointed out: “it is intuitive that the death of adolescents is | • The life cycle principle does not establish age limits for access to critical resources. Rather it values different age groups in a not linear fashion with most value attributed to the young and middle aged and lower values to extreme age groups.  
• **Personal conduct leading to unsafe and unhealthy lifestyle** was not considered morally relevant for modifying the way this principle should be adopted |
worse than that of infants or elderly... everyone has an interest in living through all life stages”. We thus adopted this point of view, as incorporated into the “complete life system” of Persad & Emanuel and depicted in the figure where the non linear relationship between the probability to receive scarce medical interventions and age is depicted. We called this the “life cycle principle”.

| 7 | **Prioritarian: Sickest first** | It requires to prioritize the sickest patients who, if not treated immediately, would risk dying. In pandemic emergency situations, it must be applied to identify individuals who objectively need a critical treatment more urgently the critical resource |
| 8 | **Reciprocity** | It requires that the society support those who face disproportionate risks in protecting the community. In the event of a pandemic, for example, health workers who get sick by treating COVID patients and people who in the past have performed acts of altruism (e.g. donors of organs, war or civil heroes). |
| 9 | **Instrumental value** | The instrumental value gives priority to individuals who have an important role in increasing the common value for society which is instrumental in combatting that specific health emergency (multiplier effect). It therefore differs from a broad social value |
| 10 | **Lottery** | It consists in the random choice between two or more people, it supports the value of equity and justice as it places individuals on the same level. In this perspective, the application of the |

- The principle must never be applied alone, but rather as tiebreaker: only in the case of two patients with the same life years saved and clinical conditions with different ages, it would be ethical to allocate the resource to the youngest, and if instead all conditions are equal (including age), the lottery principle applies.

- Prioritizing the sickest may not maximize number of life saved.
- Depending on the contest, anticipated time length and amount of resources required may or may not be considered (for example: anticipated days of bed occupancy).
- In combination with other principles, as tie breaker

- It requires broad consent and wide stakeholder involvement to be accepted smoothly.
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- It requires broad consent and wide stakeholder involvement to be accepted smoothly.
- In the specific context of COVID 19, some ethicists argue that individuals with high instrumental value would not have the time to recover and thus contribute to society at that time. This principle must never be applied alone, but in combination with others (i.e., with sickest-first, life years saved and youngest first principles)
- For some resources (e.g. vaccines), it may obtain higher priority scores

- Last resort tiebreaker when all of the remaining principles do not allow the prioritization of patients.  
- Procedures of lottery should be fair and transparent
lottery principle is justified only in the case where it is necessary to choose between people with similar clinical and prognostic characteristics. First-come-first-served was rejected as unfair since the likelihood of accessing critical resources may depend on logistics, census, level of literacy, availability or not of the proper level of primary healthcare assistance.