



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



## Prioritization of COVID-19 vaccination. The added value of the “VALIDATE” approach

Pietro Refolo<sup>a,b,\*</sup>, Bart Bloemen<sup>c</sup>, Barbara Corsano<sup>a,b</sup>, John Grin<sup>d</sup>, Iñaki Gutierrez-Ibarluzea<sup>e,f</sup>, Bjørn Hofmann<sup>g</sup>, Wija Oortwijn<sup>c</sup>, Laura Sampietro-Colom<sup>h</sup>, Lars Sandman<sup>i</sup>, Gert Jan van der Wilt<sup>c</sup>, Dario Sacchini<sup>a,b</sup>

<sup>a</sup> Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy

<sup>b</sup> Department of Healthcare Surveillance and Bioethics, Università Cattolica del Sacro Cuore, Rome, Italy

<sup>c</sup> Department of Health Evidence, Radboud University Medical Centre, Nijmegen, The Netherlands

<sup>d</sup> University of Amsterdam, Amsterdam, The Netherlands

<sup>e</sup> Basque Foundation for Health Innovation and Research (BIOEF), Barakaldo, Spain

<sup>f</sup> Basque Office for HTA (Osteba), Barakaldo, Spain

<sup>g</sup> Department of Health Science, Norwegian University of Science and Technology, Gjøvik, Norway

<sup>h</sup> Assessment of Innovations and New Technologies Unit, Hospital Clínic, University of Barcelona, Barcelona, Spain

<sup>i</sup> Department of Health, Medicine and Caring Sciences, National Centre for Priorities in Health, Linköping University, Linköping, Sweden

### ARTICLE INFO

#### Keywords:

Prioritization

Vaccine

Ethics

Science

Italian COVID-19 vaccination program

### ABSTRACT

Prioritization of COVID-19 vaccines is one of the most relevant topics in the current pandemic emergency. Prioritization decisions are political decisions that are value-laden, and as such of ethical nature. Despite the clear political and ethical nature of this topic, prioritization decisions are often interpreted and presented as scientific decisions. The aim of this article is twofold. First, we aim to show critical points that characterize certain pandemic vaccination plans from the ethical viewpoint using four dimensions (problem definitions, incorporation of different perspectives, context, and specification). The four dimensions were drawn from findings of the European project “VALIDATE” (VALUES In Doing Assessments of healthcare TECHNOLOGIES”, <https://validatehta.eu>). Second, we aim to reframe the issue about prioritization itself in the light of the four dimensions mentioned. Our conclusion is that policy-problem definitions, incorporation of different perspectives, contextual considerations and specification of moral principles seem to be common critical points of some vaccination plan documents. The European project “VALIDATE” seems to be able to provide a useful and profitable approach to address many of these critical points.

### 1. Introduction

Prioritization of COVID-19 vaccines has been and continues to be one of the most relevant topics in the current pandemic emergency. Once that vaccines have become available, how should they be distributed? [111] Prioritization is employed in order to decide which persons or subgroups of persons should have priority access to which vaccines and in what order. Allocative decisions can be made with respect to two aspects: (1) global distribution among countries and (2) national distribution among population groups. Here, we will focus on the second dimension even though similar considerations can be extended to the first dimension.

Prioritization decisions are political decisions that are value-laden, and as such of ethical nature. Based on different single key values (for example, liberty, welfare, (medical or social) utility, solidarity, equity, trust and/or accountability) or on a combination of them, aims of pandemic vaccine programs may include several options. These include protecting those at greater risk, and/or preventing (as much as possible) spread of the disease, saving the most lives or life-years possible, and/or ensuring social benefit, and so on. In turn, the aforementioned options can be framed in a variety of ways: “benefitting greatest number of individual people; maximizing Quality of Life Years Saved (QALYS) or minimizing years of life lost (YLL); saving the worst off; saving those most likely to recover; saving younger lives; saving those most likely to

\* Corresponding author.

E-mail address: [pietro.refolo@unicatt.it](mailto:pietro.refolo@unicatt.it) (P. Refolo).

<https://doi.org/10.1016/j.healthpol.2022.05.005>

Received 21 July 2021; Received in revised form 4 May 2022; Accepted 14 May 2022

Available online 20 May 2022

0168-8510/© 2022 Elsevier B.V. All rights reserved.

contribute to a flourishing society (either economically or socially), and; saving those who can most usefully contribute to minimizing the impact of the pandemic” [12, p. 4].

Despite the clear political and ethical nature of this topic, prioritization decisions are often interpreted and presented as scientific decisions [12,13]. Tangible signs of this framing issue have been the limited public debate, which has accomplished the drafting of some national pandemic vaccination plan documents (it seems to be the case of Italy, Spain, Sweden and some other countries, as we will argue), the high technical content of the latter, and the limited presence of ethical reasoning to support certain choices. Using this perspective, vaccination plan documents seem to be more technical than ethical, organisational than social: they seem to deal more with the realm of scientific facts than with the realm of values, and a sort of “positivistic approach” to the questions seems to be still in use [14].

In this context, the role of science is merely instrumental to human purposes. In other words, science can inform us about the effects (positive or negative) of various vaccine strategies. However, what we want to achieve depends on which values we think matter the most [13]. On this basis, any plan to use pandemic vaccines should also provide robust ethical considerations for its prioritization.

The instrumental function of science also reveals why planning prioritization of vaccination in advance is not a simple, or arguably feasible, task. A large number of relevant scientific uncertainties about both the nature of the virus and its variants and the disease cannot be known in advance; “which sub-groups in a population, if any, are at greater risk will not be apparent until some time after the outbreak hits, and sufficient surveillance data is collected” [12, p. 1]; vaccine efficacy and safety data in different populations are available only after the vaccine is in widespread use; and so on [12]. As a consequence, the so-called “preparedness” which is strongly recommended by World Health Organization [15] and centres for disease prevention and control is just a starting point. Plans need to be flexible and adapted once there is more information. On the other hand, well established general ethical values and principles might be codified in society.

The aim of this article is twofold. First, we aim to show critical points that characterize certain pandemic vaccination plans from the ethical viewpoint using four dimensions (problem definitions, incorporation of different perspectives, context, and specification). The four dimensions were drawn from findings of the European project “VALIDATE” (VALUES In Doing Assessments of healthcare TEchnologies”) [16]. This is a three-year EU Erasmus+ strategic partnerships project in which training in the field of Health Technology Assessment (HTA) is further optimized by using political science and ethics (in accordance with recently published HTA definition [17]). A key rationale of the approach taken is the insight that empirical evidence concerning a health technology (such as using a vaccine) should always be viewed in conjunction with the viewpoints (of relevant stakeholders) in which such evidence makes sense. Another one is that contextual factors influence the conditions of use of a health technology, and should be taken into account to increase validity of certain decisions. Thirdly, the key to resolving some potential ethical conflicts lies in developing alternative specifications of one or more of the general ethical principles. The analysis will do reference to the Italian COVID-19 vaccination program as case study supported with some information from literature.

Second, we aim to reframe the issue about prioritization itself in the light of the four dimensions mentioned.

## 2. Materials and methods

All the authors of the manuscript are members of the VALIDATE consortium. They met online twice during 2021 for discussion on how to apply VALIDATE methods to vaccination plan documents. The first workshop was held on March 18, 2021. Two members (PR, DS) prepared and led the discussion that was based on analysis of two documents. The first one is the Italian *Strategic Plan for anti-SARS-CoV-2/COVID-19*

*vaccination* [18,19]. It was selected as case study since PR and DS had a thorough knowledge of that document, and they were authors of an in-depth analysis published in April 2021 [20]. The second one was the paper by Williams et al [12]. It was selected since it was the only systematic review retrieved, which examines the published literature that discusses ethical arguments adopted to justify vaccine prioritization during an influenza pandemic. In the first workshop the participants critically analyzed the collected material in the light of four dimensions (problem definitions, incorporation of different perspectives, context, and specification). The results were used to prepare a draft manuscript. The latter became the focus of discussion during a second workshop held on April 19, 2021. An implementation of the analysis and suggested revision was sent by the lead authors (PR, DS) by means of e-mail to the authors. Critical comments and suggestions were fed back, analyzed and integrated in a revised version of the draft. The revised draft was then sent back to the members for continued critical analysis. The process of analysis, comments, suggestions, and revision of the paper was performed in two rounds among the authors until consensus was reached.

The paragraph “Results” reflect the results of the analysis of the two documents, while the paragraph “Discussion” reflects the application of VALIDATE methods to vaccination plan documents.

## 3. Results

### 3.1. Italy’s strategic plan for anti-SARS-CoV-2/COVID-19 vaccination

Many countries developed vaccine plans or priority setting documents for vaccination. They were based on different values and principles. Here, we will refer to the Italian strategic plan. In Italy, prioritization of COVID-19 vaccination was based on the *Strategic Plan for anti-SARS-CoV-2/COVID-19 vaccination* [18]. Published on January 2, 2021, the document was drafted by a number of scientific and policy institutions including the Ministry of Health, the Extraordinary Commissioner for the COVID-19 Emergency, the Higher Institute of Health, the Italian National Agency for Regional Healthcare Services (AGENAS), and the Italian Medicines Agency (AIFA). No huge public debate preceded the publication, and the Minister of Health directly presented the guidelines to the Parliament. Upon the conclusion of the communications, the Senate and the Chamber of Deputies approved the resolution on December 12, 2020 [19]. However, a number of questions and criticisms emerged in the society only after the plan was implemented [21–23].

Why has the issue of prioritization initially not captured the public’s attention? One reason may be the emergency situation. Nevertheless, the reason may also lie in the fact that many people do not recognize or acknowledge the ethical nature of the issue or misunderstand the role of scientific knowledge in policy-making.

The Italian guidelines initially recommended the following priority groups to get the vaccine:

- health and social care workers. The justification is that, firstly, they “have a higher risk of being exposed to COVID-19 and transmitting it to susceptible and vulnerable patients in the health and social care settings in which they work” [24]; secondly, that, by remaining healthy/by not being infected, they can help to preserve the resilience of health services.
- residents and staff of residential nursing homes for the elderly, since “residents of such facilities are at high risk of serious illness, due to their age, the presence of multiple comorbidities, and the need for assistance with feeding and other daily activities” [24].
- elderly people. The reasoning is that, on one hand, “an age-based program increases coverage in people with clinical risk factors, as the prevalence of comorbidities and disabilities increases with age” [24]; on the other hand, a vaccination program which is based on age is generally easier to implement.

The plan itself was subject to adjustments on the basis of new information resulting from scientific research. As such, on February 8, 2021, the Health Ministry released an updated version of the priority groups' list [25]. The list included six categories:

- Category 1: “people at very high risk of becoming severely ill with COVID-19, aged 16 and older. This category includes people with any of the following conditions: respiratory illness such as pulmonary fibrosis; severe cardiovascular disease; neurological disabilities or diseases such as multiple sclerosis; diabetes; cystic fibrosis; kidney failure; autoimmune diseases; liver disease; strokes and cerebrovascular disease; cancer (including patients who finished treatment less than six months ago); Down syndrome; organ or bone marrow transplants (including patients on the waiting list); severe obesity” [26].
- Category 2: people aged 75 to 79.
- Category 3: people aged 70 to 74.
- Category 4: “people aged 16 to 69 at a higher risk of illness from COVID-19. This category includes people with less severe forms of certain conditions in Category 1, as well as some others: respiratory illness; cardiovascular disease; neurological diseases or disabilities; diabetes; HIV; kidney disease; arterial hypertension; autoimmune diseases; liver disease; cerebrovascular disease; organ or bone marrow transplants” [26].
- Category 5: people aged 55 to 69.
- Category 6: this category includes everyone who does not have one of the health problems mentioned above. However, within Category 6, the following groups will be given priority: “teachers, lecturers and the rest of the staff at schools and universities; members of the armed forces, police and fire fighters; prisoners, wardens and other prison’s staff; people living in religious or other shared communities; other unspecified “key services”” [26].

Differently from the previous text, the second document explicitly mentions the “vulnerability” as a criterion for prioritizing. With this term, the document specifically indicates individuals with conditions that have a particularly high risk of developing severe or fatal forms of COVID-19 due to pre-existing organ damage (respiratory and cardiovascular diseases, diabetes, liver and kidney diseases), or due to an impaired immune response (autoimmune diseases and immunodeficiencies, Down syndrome). Therefore, the document seems to conceptualize the vulnerability in terms of clinical condition.

Both documents state that the vaccination plan has only one aim, which was common to many countries: to reduce mortality and morbidity. However, beyond the vulnerability, at least another selection criteria can be identified in the two documents: social benefit. Group 1 of the first document (when it mentions resilience of health services as one of the justifications) as well as Category 6 of the second document (when it mentions teachers, lecturers and the rest of the staff at schools and universities, etc.) do not seem to refer to clinical conditions but to social target groups. Resilience of health services or public service provision seem to have more to do with social benefits than with health condition. The question is: how were these apparently conflicting criteria acquired? What is their relation to the main purpose?

It is worth mentioning that Italy has a National Health Service (Servizio Sanitario Nazionale – SSN), whose guiding principle is the egalitarian principle. Explicitly modelled on the British National Health Service, the SSN was established in 1978 to replace a previous system based on a plethora of insurance schemes with the goal to provide uniform and comprehensive care [27]. Particularly, the SSN rests on the egalitarian principle that health care should be financed according to the ability to pay – through general taxation – but distributed according to the need, thereby setting out equity objectives both in terms of financial contribution and of access to care. That means that SSN guarantees assistance to all citizens regardless of their personal characteristics, such as gender, age, race, ethnicity, and socioeconomic status. Social utility is

not a consideration.

Due to financial constraints, a number of reforms to SSN were implemented since the early 90s. However, the statutory obligation to ensure equal provision was integrally preserved, and the egalitarian goal has been more specified through the concept of “clinical appropriateness”. The latter acquired official status with the National Health Plan 1998–2001, and it is the current guiding principle in the field of prioritization [28]. Again, no reference to ensuring social utility was made.

However, the two COVID-19 vaccination documents do not refer to clinical appropriateness but mention a long list of ethical principles, including human well-being, equal respect, global equity, national equity, reciprocity, and legitimacy. The aforementioned principles represent the sole explicit “ethical considerations” mentioned in the texts. Again, how were these apparently conflicting principles criteria acquired? How do they relate to the egalitarian perspective underlying the Italian health system? How do these principles “provide the basis for” prioritization?

Even though not explicitly said, the above six principles are those that are considered to be relevant to vaccination distribution by WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination [29]. This document is aimed to offer guidance both globally on the allocation of COVID-19 vaccines among countries, and nationally on the prioritization of groups for vaccination within countries while supply is limited.

The WHO SAGE framework articulates the overall goal of COVID-19 vaccine deployment (i.e. “to contribute significantly to the equitable protection and promotion of human well-being among all people of the world” [29, p. 2]), and provides “six core principles that should guide distribution and twelve objectives that further specify the six principles” [29, p. 3].

As explicitly mentioned by the authors of the WHO SAGE document – “(...) the Values Framework needs to be complemented with information about specific characteristics of available vaccine or vaccines, the benefit-risk assessment for different population groups, the amount and pace of vaccine supply, and the current state of the epidemiology, clinical management, and economic and social impact of the pandemic. Hence, the final vaccination strategy will be defined by the characteristics of vaccine products as they become available” [29, p. 1]. In addition, “(...) priority groups will need to be further interpreted at a national level. This process should be led by national health experts/ National Immunization Technical Advisory Groups (NITAGs) in wide consultation with stakeholders” [29, p. 8].

These and other parts of the text may help to understand the rather general character of that framework, i.e., whose values need to be further specified and defined based on local contexts.

Moreover, the text may help to understand that the same priority list can be the result of different specifications of one or more of the general ethical principles, as in the case of UK and Germany [13].

In the light of these insights, the Italian plan for anti-COVID-19 vaccination seems to be characterized by limited presence of ethical reasoning. More precisely, we can say that it seems to fail to address the theme of clear definition of issues, integration of different perspectives, contextualization, and specification. Specification means adding clauses such as how, when, where, why, by whom, to whom something may, or may not be done [30,31]. In other words, Italian society can be considered as committed to a wide range of codified ethical principles; in order to decide what follows from such commitments in concrete situations, these principles need to be specified.

### 3.2. Ethics literature about the issue of vaccine distribution

As we have described above, limited presence of ethical reasoning as well lack of problem definitions, integration of perspectives, contextualization, and specification characterize the Italian plan for anti-COVID-19 vaccination. However, this seems to be a common issues for many vaccination plan documents. There is a number of studies that explore

this phenomenon [12,32] and we have experience with a similar critique of the Swedish and Spanish vaccination plans in which several changes have been made. On the other hand, there are some exceptions. One is the Norwegian priority setting report [33].

What is noteworthy is that aforementioned dimensions characterize not only vaccination plans, but also published literature that discusses ethical issues of vaccine distribution.

A recent critical review by Williams et al. [12] has specifically reflected on the ethical arguments that are used in literature to justify different approaches to prioritizing vaccine access during an influenza pandemic. The work reviewed 40 papers with the aim of identifying and analyzing the breadth of normative claims about who or what to prioritize.

From this analysis, it becomes clear that there is a variety of suggested populations that could potentially qualify for priority access (on the basis of their occupations, stage of life, health status, social status, etc.). However, the populations share a common characteristic: they are groups of people who are young, or ill, or worked in a particular job. Secondly, there is a wide spread of articulated aims underpinning pandemic vaccination programs, even though the most common goals are to optimize prevention of illness, or to save the most lives. Thirdly, most of the literature is broadly, either explicitly or implicitly, consequentialist, i.e., focus on the outcome of implementing the plans rather than on respecting duties or rights.

Beyond these descriptive considerations, there are at least three important notions that can be gathered from William et al's review.

Firstly, across the different papers the role of normative argumentation, which justifies what or who comes first in the case of priority access to pandemic vaccine, varies greatly. As noted by the authors – “there was a tendency in some of the literature for authors to list principles or values for consideration in vaccine rationing, without necessarily explaining how they might be used in practice in response to a particular scenario or even whether the listed values were complementary or even reconcilable with each other” [12, p. 4]. Hence, the normative assumptions and argumentations are not well accounted for.

Secondly, it is common for subpopulation to be referred to as “vulnerable” or “high risk”, and it is also common to employ the word “justice.” However, vulnerability, risk, or justice are general normative concepts, which remain quite vague if they are not specified.

Thirdly, the literature does not draw on how particular contexts (e.g. health care system, funding, population distribution, societal and cultural values, understanding about the right to health,) might call for different approaches for prioritization. Ignoring potential differences in health care systems, social experience and value systems can inadvertently contribute to the idea that it is possible to respond to the issue of prioritization as if “viewed from nowhere” [34]. As noted by Williams et al., this may raise significant questions about vaccine access: “For example, in some countries, whilst there may be no intention to prioritize an urban over a rural population, the realities of existing imperfect logistical systems may result in unequal distribution and thereby access. Other things being equal it is easier and quicker to deliver vaccine in urban areas, this then potentially aids the efficient use of vaccine. But rural populations may have less access to health care facilities, so we might see them as another vulnerable or at-risk group. Perhaps we have reason to think that rural populations are only likely to come into contact with the virus later in a pandemic? Such a claim will require us to have robust evidence to back it up. Otherwise, this is something that we should take into account in our planning. How do we establish a set of priorities for a pandemic vaccine that do not unintentionally contribute to unfairness in the population?” [12, p. 6].

## 4. Discussion

### 4.1. Facts and values: the validate approach and the Covid vaccines plans

The foregoing raises the question as to how empirical evidence

(scientific facts) and ethical commitments relate to each other. This is a particularly relevant question for HTA. The latter has been defined as “a multidisciplinary process that uses explicit methods to determine the value of a health technology at different points in its lifecycle. The purpose is to inform decision-making in order to promote an equitable, efficient, and high-quality health system” [17].

Current approaches to the conduct of HTA are usually confined to the systematic retrieval, critical appraisal and synthesis of clinical data drawn from relevant studies on the technology of interest, and frequently including the analysis of the economic impact (e.g. cost-effectiveness), whereas ethical, social and legal issues, including values related to the use of health technologies, are addressed independently and often at a late stage in HTA processes, or are not included.

The current HTA practices often do not sufficiently take into account that empirical evidence is not the sole, neutral arbiter of what matters, and that, moreover, such evidence derives its relevance from the ethical commitments that are part of different perspectives. Different stakeholders (patients, health care center managers, payers, health care professionals, policy makers, public, academics), may very well have different values (questions, views and concerns) regarding the health technologies at stake.

HTA is clearly a form of policy research [35] which goal it is to provide policy-makers with information on policy alternatives, and therefore it should be able to address policy relevant questions that are being raised by a specific health technology. Although this definition puts HTA in the realm of policy sciences, in its development HTA does and users seems to have – probably unintentionally – misunderstood the nature of the issues it addresses. For example, HTA agencies often emphasize the importance of their reports being based on “scientific facts”, avoiding entering into “ethical-social-political debates”. Under this perspective, value judgments are often considered external to HTA or separate from it and are addressed by experts (in ethics) and decision makers after the currently considered “real” HTA is finished.

As we have argued in the first part of this paper, a similar situation occurred with vaccination plans, where the different stakeholders seemingly have not adequately considered what the role of scientific knowledge should be. In fact, scientific knowledge is not alien to values and could be biased by considering certain perspectives, although the methods are applied with rigor and the results are consistent and robust. On this ground, VALIDATE aims to train and introduce the next generation of HTA experts to a novel, more integrative approach to HTA, where the safety, clinical, and cost-effectiveness of health technologies are thoroughly integrated with their wider ethical, legal and social implications and where all stakeholders are involved in a more meaningful way throughout the entire HTA process. In other words, VALIDATE helps to clarify the relationship between scientific facts and moral values or – which is the same – the role of empirical research and normative inquiry in policy making. In this sense, VALIDATE may provide valuable inputs to better address the topic of vaccination prioritization.

There are at least four key-messages that surface from the VALIDATE approach that can help to better address the topic of the present article:

- in the field of policy-making, judgments of specific solutions are always closely tied to specific problem definitions and, in turn, these two are closely tied to underlying background theories and normative commitments. These constitute so-called “interpretive frames”;
- wider exploration of policy problems and of their underlying assumptions should be conducted by scoping exercises;
- contextual factors influence policy-making, and should be taken into account;
- the key to resolving some ethical conflicts lies in developing alternative specifications of one or more of the general ethical principles.

Problem definitions, incorporation of different perspectives, contextual considerations and specification seem to be common critical aspects of some vaccination plan documents. On the other hand,

vaccines are health technologies. Therefore, an HTA perspective is an appropriate viewpoint to employ when addressing the issue of prioritization of COVID vaccines. However, to explore all the relations between HTA and drafting vaccination plan documents is beyond the scope of the present article. Instead, below we will briefly outline the sort of research activities that would be suggested by the VALIDATE approach: reconstruction of the various interpretive frames that are in use in the case of the COVID-19 vaccination programs, scoping (that is, defining relevant questions for research), identification of contextual factors that are relevant to the issue, and specification of ethical principles.

#### 4.2. Problem definition: interpretive frames

Technologies can be conceptualized as attempts to provide solutions for specific problems. Hence, a proposed technology makes sense in view of how the problem that is meant to be addressed and resolved is framed [36]. This, in turn, rests on a few assumptions regarding the causes of the problem and on (normative) considerations regarding what constitutes appropriate and acceptable approaches for its resolution. The following may serve as a concrete example: obesity can be framed as a problem that primarily results from poor lifestyle choices, or a problem that mainly results from an obesogenic environment. In the former case, education of the public is a logical solution, while in the latter, regulation of food and marketing industries would be a more promising direction to take.

Understanding the different views is essential when determining which types of information should be used or which type of considerations should be done in order to address policy relevant questions. To explore and understand these views, VALIDATE developed an approach – which is based on previous work by Fischer [37] – where *judgments of specific solutions* (e.g. is bariatric surgery an appropriate sort of treatment for persons with obesity/for obese people?) are closely linked to *how a problem is defined* (e.g. which problems are caused by obesity/which problems does obesity cause?), and where both, *judgments of solutions* and *problem definitions*, are informed by *background theories* (e.g. what sort of impact can be expected from implementing bariatric surgery?) and *normative preferences* (e.g. is it generally acceptable to try to normalize people?).

This set of judgment of solution, problem definition, background theory and normative preferences is referred to as an “action theory” or “interpretive frame”. An action theory can be considered a type of tacit knowledge: it remains mostly implicit, but it can be made explicit. This method can be called “reconstructing interpretive frames” [38].

The VALIDATE approach can be applied to COVID-19 vaccine decisions, and can help to better interpret the issue of prioritization. In this context, judgments of specific solutions (e.g. is it better to protect older people or people who can ensure social benefits or both?) are strictly connected to how a problem is defined (e.g. is it an issue of overcrowding of hospitals, high number of deaths in itself, or economic losses?), and both judgments of specific solutions and problem definitions are informed by background theories (e.g. what sort of impact can be expected by prioritizing older people or protecting people who can ensure social benefits?) and normative preference (e.g. what should be prioritized? Health or monetary gains?).

When taking a closer look, the aforementioned set of questions and analysis is absent or not explicitly framed in the Italian COVID-19 vaccination program: there is not a clear definition of the problem (why reduce mortality and morbidity?), no background theory defined (due to scientific uncertainty about the coronavirus behavior), nor an adequate investigation of social preferences (what matters to the public?).

#### 4.3. Scoping

Starting with the realization that there may be different views in society with respect to the use of health technologies, it becomes

fundamental to learn how to explore and address this pluralism of values. Such exploration can be done by conducting interviews with a variety of stakeholders, through document analysis, participatory observation (qualitative research), or a combination of them. HTA community calls this process “scoping”.

Scoping in the VALIDATE approach may be conceived as defining the issues at stake using a thorough analysis of a problem and its underlying assumptions from multiple perspectives: it explores whether alternative interpretive frames can be found, and, if so, what solutions and studies would be associated to them. Scoping is considered crucial by VALIDATE because a proposed solution makes sense against the background of a number of assumptions, and because diverging views may exist among stakeholders regarding the validity of those assumptions, possibly giving rise to a different preferred approach to the solution of the problem and a different set of criteria. In policy sciences, this reflects the notion of policy as “co-production”, acknowledging that the involvement of stakeholders is a prerequisite for the governance of public services such as healthcare [39].

However, an important issue to consider is that different stakeholders such as patients, the general public, providers, payers, industry, and policy makers, may have a wide range of social values and interests and could prioritize diverse outcomes according to their needs and preferences. Hence, finding the “least common multiple” is not an easy task. For example, in decisions on public funding of expensive cancer drugs, patients may argue that the best treatment should be made available, while other patients may argue that their treatment should not be displaced, and taxpayers may believe that it is important to make efficient use of public resources. This does not mean that scoping should be necessarily directed to find out who (or what) is right and who (or what) is wrong: rather, it may help participants to come to realize the complex nature of a certain issue in the first place.

At the same time, scoping exercises require an active and factual process of “social learning” among the various stakeholders, which raises issues both in terms of time constraints and of methods that can be used.

Scoping may be a beneficial step in the drafting of vaccination plans: it may help to understand the different perspectives in society with respect to the desirability of a certain aim, as well as to understand how society interprets justice in the context of vaccination. Under this perspective, vaccination plans should be the result of a process that includes and integrates the perspectives of different stakeholders (such as parliamentary representatives, representatives of civil society, patient associations, physicians, industry, etc.), rather than the mere “direct emanation” of technical-scientific organizations (like in the Italian case). In other words, the documents produced and given to the public audience should be more ethical-political rather than technical-scientific.

#### 4.4. Context

When conducting an HTA, you should also be aware that HTA is context-dependent. Whether the outcomes of an assessment should inform decisions at the national level, regional level, or at the level of a hospital, makes a difference when it comes to its objectives and research questions. In addition, the consequences of health technology are context-sensitive. The effects of health technology are influenced by the needs and demographics of a population, characteristics of a healthcare system, characteristics of the technology itself, the legal framework that guides its implementation, and cultural and social features of the situation in which it is used. These contextual factors all influence the conditions of use of health technology, and should be taken into account to increase validity of the outcomes of an assessment.

VALIDATE helps to show that the importance given to a certain technology within health care acquires its value within a particular context. Also this key-message may be particularly profitable for drafting vaccination plans, which – as we have noted – are currently characterized by poor awareness of context-dependency. It should be

considered that the same vaccination could be used under different circumstances, within different management schemes or standards, diverse patients, by different health professionals or caregivers and in different places/settings. In this sense, vaccination plans require context-based information. Examples of methods for how to facilitate the structured and comprehensive conceptualisation and assessment of context and implementation of complex interventions were explored in the INTEGRATE-HTA project [40], as suggested by VALIDATE. One is the Context and Implementation of Complex Interventions (CICI) framework [41], which addresses and graphically presents context, implementation and setting in an integrated way. Specifically, “the CICI framework comprises three dimensions—context, implementation and setting—which interact with one another and with the intervention dimension. Context comprises seven domains (i.e., geographical, epidemiological, socio-cultural, socioeconomic, ethical, legal, political); implementation consists of five domains (i.e., implementation theory, process, strategies, agents and outcomes); setting refers to the specific physical location, in which the intervention is put into practice” [41]. Tools to operationalise the CICI framework comprise a checklist, data extraction tools for qualitative and quantitative reviews and a consultation guide for applicability assessments.

#### 4.5. Specification

For critical analysis of ethical commitments, the VALIDATE approach suggests using a method such as specifying norms, as developed by Richardson [31]. Briefly, Richardson argues that, in order to resolve concrete ethical problems, starting from an initial set of ethical norms, we may try to apply the norms to the case, and if they conflict we may attempt to balance them intuitively. A third, more effective alternative is to specify the norms: “by a “model of how to resolve concrete ethical problems” I mean a schema of what it would be to bring norms to bear on a case so as to indicate clearly what ought to be done” [30, p. 280]. The task in such situations is to develop and explore alternative modes of specifying the relevant norms, such, that the conflict is resolved.

The HTA practitioner can use such type of methods in an attempt to critically analyze interpretive frames that are held by stakeholders in a constructive vein. That is, the intention would be to further develop and improve the interpretive frame of a stakeholder, by exploring whether it can be made more coherent, complete, or in line with available evidence.

This method may be particularly useful for drafting vaccination plans, which – as we have widely argued – are often characterized by very limited specification of moral principles. This may make ethical viewpoints more explicit, forging choices that are legitimate to the population.

## 5. Conclusions

Prioritization of COVID-19 vaccination is not primarily a “scientific matter”, but rather a political and value-laden decision. Hence, the introduction of (pandemic) vaccination programs should clearly be based on a combination of ethical considerations and technical-scientific data. The lack of such considerations or the non-explicit discussion of them may explain why many criticisms often emerge only after such plans are already implemented, as it seems to be the case of *Italy's Strategic Plan for anti-SARS-CoV-2/COVID-19 vaccination*.

VALIDATE helps to clarify the relationship between scientific facts and moral values or – which is the same – the role of empirical research and normative inquiry in policy making. The VALIDATE approach can be applied to COVID-19 vaccine decisions.

There are four dimensions that surface from the VALIDATE approach, which can help to better interpret the issue of prioritization: interpretative frames (judgment of solution, problem definition, background theory and normative preferences), incorporation of different

perspectives (such as those of patients, the general public, providers, payers, industry, policy makers, etc.), contextual considerations (which influence the conditions of use of a certain vaccine such as patients, decision level, socio-cultural aspects, kind of health system, etc.), and specification (exploring alternative modes of specifying relevant norms).

In turn, taking into account the aforementioned dimensions may be beneficial for different reasons: well defined programs, social learning among the various stakeholders, contextualization, and transparency may help to overcome the sense of paternalism that can be felt in the drafting of the vaccination plans, which can explain the aversion shown by many citizens. It may also help to foster a sense of trust in public health institutions and in vaccination, which is not a secondary issue in the current context.

## Declarations of Competing Interest

None.

## References

- [1] Williams J, Degeling C, McVernon J, Dawson A. How should we conduct pandemic vaccination? *Vaccine* 2021 Feb 5;39(6):994–9. <https://doi.org/10.1016/j.vaccine.2020.12.059>.
- [2] Huang HC, Singh B, Morton DP, Johnson GP, Clements B, Meyers LA. Equalizing access to pandemic influenza vaccines through optimal allocation to public health distribution points. *PLoS ONE* 2017 Aug 30;12(8):e0182720. <https://doi.org/10.1371/journal.pone.0182720>.
- [3] Privor-Dumm LA, Poland GA, Barratt J, Durrheim DN, M Deloria Knoll, Vasudevan P, Jit M, Bonvehí PE, P, Bonanni. International council on adult immunization. A global agenda for older adult immunization in the COVID-19 era: a roadmap for action. *Vaccine*. 2021 Aug 31;39(37):5240–50. <https://doi.org/10.1016/j.vaccine.2020.06.082>.
- [4] Tuite AR, Fisman DN, Kwong JC, Greer AL. Optimal pandemic influenza vaccine allocation strategies for the Canadian population. *PLoS ONE* 2010 May 6;5(5):e10520. <https://doi.org/10.1371/journal.pone.0010520>.
- [5] Littmann J. How high is a high risk? Prioritising high-risk individuals in an influenza pandemic. *Vaccine* 2014 Dec 12;32(52):7167–70. <https://doi.org/10.1016/j.vaccine.2014.10.020>.
- [6] Yang J, Zheng W, Shi H, Yan X, Dong K, You Q, Zhong G, Gong H, Chen Z, Jit M, Viboud C, Ajelli M, Yu H. Who should be prioritized for COVID-19 vaccination in China? A descriptive study. *BMC Med* 2021 Feb 10;19(1):45. <https://doi.org/10.1186/s12916-021-01923-8>.
- [7] Sharma P, Pardeshi G. COVID-19 vaccination in India: an ethical perspective. *Diabetes Metab Syndr* 2021;15(6):102314. <https://doi.org/10.1016/j.dsx.2021.102314>. Nov-Dec.
- [8] Levine H, Balicer RD, Laor D, Grotto I. Challenges and opportunities in the Israeli 2009 pandemic influenza vaccination program. *Hum Vaccin* 2011;7(10):1077–82. <https://doi.org/10.4161/hv.7.10.17627>.
- [9] Forman R, Shah S, Jeurissen P, Jit M, Mossialos E. COVID-19 vaccine challenges: what have we learned so far and what remains to be done? *Health Policy* 2021;125(5):553–67. <https://doi.org/10.1016/j.healthpol.2021.03.013>.
- [10] Letts J. Ethical challenges in planning for an influenza pandemic, 17. *N S W Public Health Bull*; 2006. p. 131–4. <https://doi.org/10.1071/nb06033>. Sep-Oct.
- [11] Forman R, Atun R, McKee M, Mossialos E. 12 Lessons learned from the management of the coronavirus pandemic. *Health Policy (New York)* 2020;124(6):577–80. <https://doi.org/10.1016/j.healthpol.2020.05.008>. Jun.
- [12] Williams JH, Dawson A. Prioritising access to pandemic influenza vaccine: a review of the ethics literature. *BMC Med Ethics* 2020;21(1):40. <https://doi.org/10.1186/s12910-020-00477-3>.
- [13] Giubilini A, Savulescu J, Wilkinson D. Queue questions: ethics of COVID-19 vaccine prioritization. *Bioethics* 2021;35(4):348–55. <https://doi.org/10.1111/bioe.12858>.
- [14] Refolo P, Sacchini D, Brereton L, Gerhardus A, Hofmann B, Lysdahl KB, et al. Why is it so difficult to integrate ethics in health technology assessment (HTA)? The epistemological viewpoint. *Eur Rev Med Pharmacol Sci* 2016;20(20):4202–8.
- [15] World Health Organization. Pandemic influenza preparedness framework for the sharing of influenza viruses and access to vaccines and other benefits. Geneva: World Health Organization; 2011.
- [16] Project website ‘Values in doing assessments of healthcare technologies’ (VALIDATE). Available at: <https://validatehta.eu> (last access: March 1 2022 ).
- [17] O'Rourke B., Oortwijn W., Schuller T. Announcing the New Definition of Health Technology Assessment. *Value Health*. 2020;23(6):824–5. doi:10.1016/j.jval.2020.05.001.
- [18] Ministero della Salute. 2020. Available at: <https://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2021&codLeg=78657&parte=1%20&serie=null> (last access: March 1 2022.).
- [19] Ministero della Salute. 2020. Available at: [https://www.salute.gov.it/portale/news/p3\\_2\\_1\\_1\\_1.jsp?lingua=italiano&menu=notizie&p=dalministro&id=5208](https://www.salute.gov.it/portale/news/p3_2_1_1_1.jsp?lingua=italiano&menu=notizie&p=dalministro&id=5208) (last access: March 1 2022.).

- [20] Refolo P, Sacchini D, Spagnolo AG. Priorità di accesso alla vaccinazione anti-SARS-CoV-2/COVID-19: questione di valori, non solo di fatti. *Medicina e Morale* 2021;70(1):25–34. <https://doi.org/10.4081/mem.2021.927>.
- [21] Rossi N. Il diritto di vaccinarsi. criteri di priorità e ruolo del parlamento. Available at: <https://www.questionegiustizia.it/articolo/il-diritto-di-vaccinarsi-criteri-di-priorita-e-ruolo-del-parlamento> (last access: March 1 2022 ,).
- [22] Pignataro M. Italy's vaccination campaign and the questions it's leaving behind. Available at: <https://lexatlas-c19.org/italys-vaccination-campaign-and-the-questions-that-its-leaving-behind/> (last access: March 1 2022 ,).
- [23] Agenzia Nazionale per i Servizi Sanitari Regionali. The vaccine and vaccination against COVID-19: the propensity of the Italian population to join the vaccination campaign. Available at: [https://www.agenas.gov.it/images/agenas/In%20primo%20piano/2021/vaccini\\_indagine/ENG\\_AGENAS\\_MeS\\_Report\\_Vaccine\\_and\\_vaccination\\_against\\_COVID-19.pdf](https://www.agenas.gov.it/images/agenas/In%20primo%20piano/2021/vaccini_indagine/ENG_AGENAS_MeS_Report_Vaccine_and_vaccination_against_COVID-19.pdf) (last access: March 1 2022 ,).
- [24] Ministero della Salute. 2020. Available at: <http://www.salute.gov.it/> (last access: March 1 2022 ,).
- [25] Ministero della Salute. Raccomandazioni ad interim sui gruppi target della vaccinazione anti-SARS-CoV-2/COVID-19. 2021. Available at, <https://www.trovanorme.salute.gov.it/norme/renderPdf.spring?seriegu=SG&datagu=24/03/2021&redaz=21A01802&artp=1&art=1&subart=1&subart1=10&vers=1&prog=002> . last access: March 1 2022,.
- [26] The local. Who is in Italy's covid-19 vaccine priority groups? Available at: <https://www.thelocal.it/20210209/who-is-in-italys-covid-19-vaccine-priority-groups/> (last access: March 1 2022 ,).
- [27] France G, Taroni F, Donatini A. The Italian health-care system. *Health Econ* 2005; 14(1):S187–202. <https://doi.org/10.1002/hec.1035>. SepSuppl.
- [28] Garattini L, Padula A. 'Appropriateness' in Italy: a 'magic word' in pharmaceuticals? *Appl Health Econ Health Policy* 2017;15(1):1–3. <https://doi.org/10.1007/s40258-016-0240-7>.
- [29] World Health Organization. WHO sage values framework for the allocation and prioritization of COVID-19 vaccination. 2020. Available at: <https://www.who.int/publications/i/item/who-sage-values-framework-for-the-allocation-and-prioritization-of-covid-19-vaccination> (last access: March 1 2022,).
- [30] Richardson HS. Specifying norms as a way to resolve concrete ethical problems. *Philos Public Aff* 1990;19(4):279–310.
- [31] Richardson HS. Practical reasoning about final ends. Cambridge: Cambridge University Press; 1997.
- [32] Berkman BE. Incorporating explicit ethical reasoning into pandemic influenza policies. *J Contemp Health Law Policy* 2009;26(1):1–19. Fall.
- [33] Feiring E, Førde R, Holm S, Norheim OF, Solberg B, Solberg CT, et al. Advice on priorities of corona vaccination groups in Norway. Oslo: Institute of Public Health; 2020. Report2020.
- [34] Nagel T. *The view from nowhere*. Oxford: Oxford University Press; 1986.
- [35] Banta HD, Luce BR. *Health care technology and its assessment: an international perspective*. New York, NY: Oxford University Press; 1993.
- [36] van Hulst M, D Yanow. From policy frames to framing. *Am Rev Publ Adm* 2016;46(1):92–112.
- [37] Fischer F. *Evaluating public policy*. Chicago: Nelson-Hall Publishers; 1995.
- [38] Grin J, van der Graaf H. Technology assessment as learning. *science. Technol Human Values* 1996;20(1):72–99.
- [39] Sorrentino M, Sicilia M, Howlett M. Understanding co-production as a new public governance tool. *J Pol Soc* 2018;37(3):277–93.
- [40] Cordis. EU research results. 2022. last access: March 1, <https://cordis.europa.eu/project/id/306141>.
- [41] Pfadenhauer LM, Gerhardus A, Mozygema K, Lysdahl KB, Booth A, Hofmann B, Wahlster P, Polus S, Burns J, Brereton L, Rehfues E. Making sense of complexity in context and implementation: the context and implementation of complex interventions (CICI) framework. *Implement Sci* 2017 Feb 15;12(1):21. <https://doi.org/10.1186/s13012-017-0552-5>.