To what extent do lay people and healthcare providers differ in the allocation of scarce medical resources in the context of the COVID-19 pandemic?

Cristina Campbell-Hewson[1], Simmy Grover[1], Adrian Furnham[2]
and Alastair McClelland[1]

[1]Department of Experimental Psychology, University College London, London, UK
[2]Norwegian Business School (BI), Nydalsveien, Oslo, Norway

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Abstract

Studying the most ethical way to allocate scarce medical resources has been of interest within the last year, due to shortages associated with the COVID-19 pandemic. This study aimed to establish differences between what healthcare providers (HCP) and laypeople consider to be the most ethical way to prioritise the distribution of scarce resources. HCP ($n = 100$) and laypeople ($n = 102$) were asked to rank ethical principles from most to least ethical for the allocation of ICU beds in a COVID-19 outbreak, COVID-19 vaccinations and organ transplantation, and the rankings from each scenario across the two groups were compared. Results indicated that HCPs preferred utilitarian principles informed by medical knowledge, such as 'prognosis', whereas laypeople preferred, less situation-specific, prioritarian principles, such as 'sickest first', replicating pre-pandemic findings. Laypeople showed increased in-group agreement when ranking principles, potentially due to the collective experience of the pandemic. Demographic variables such as older age, identifying as BAME and greater experience with COVID-19 were also associated with a preference for 'prognosis'.

Introduction

Shortages of resources occur in all fields of medicine and in even the most developed countries (Krütli, et al., 2016). When demand for treatment, diagnosis or preventative healthcare exceeds what is available, healthcare providers (HCPs) must decide how to allocate the available resources. Decisions of this kind are often inevitable because of shortages in the aftermath of natural disasters. For example, in 2005, Louisiana aid workers experienced severe shortages of oxygen, gloves, ventilators and gowns due to destruction and supply problems caused by Hurricane Katrina (Klein, et al., 2008). Shortages may also occur during infectious disease outbreaks, as seen in countries affected by outbreaks of Ebola, H1N1, SARS and MERS. The HIV/AIDS pandemic has been ongoing for over 40 years and remains associated with and complicated by a shortage of antiretroviral drugs in sub-Saharan Africa (Rennie, 2013).

In the case of shortages, HCPs often have to make difficult decisions regarding who should be prioritised in resource allocation, and who should not. Ethicists and psychologists have extensively discussed which guidelines are most ethical for directing the allocation of scarce medical resources. As a result, there is a growing literature on the allocation of scarce medical resources (Selvaraj, et al., 2019).

Persad et al. (2009), summarised these themes in seven key principles, which are presented in Table 1.

Table 1. *Allocation principles and their descriptions.*

Allocation Principle	Description
Prognosis	Prioritises those with the best chance and duration of survival.
Sickest first	Prioritises those who are the most ill or in need of immediate medical attention.
Waiting list	Prioritises the individuals who have been waiting longest for the resource.
Youngest first	Prioritises the youngest.
Instrumental value	Prioritises those who are essential workers (e.g., frontline HCPs and scientists working on vaccines).
Lottery	Random allocation: everyone has an equal chance of getting the resource.
Reciprocity	Prioritises those who have provided services (e.g., trialled a vaccine) previously.

Note. Adapted from Krütli et al. (2016) , p. 5

According to Persad et al. (2009) none is sufficient alone but can be used in conjunction with other criteria – while others should always be excluded from the decision-making process; for example, 'waiting list' can be corrupted by wealthy individuals using bribery to get further up a list or onto multiple lists and should not be used. In addition, Persad et al. argued that 'sickest first' should also be excluded, as it is not always an accurate portrayal of someone's needs, and may lead to prioritising those with little chance of survival at the expense of individuals who would recover with a speedy intervention, but instead deteriorate over time. It is therefore noteworthy that both Krütli et al. (2016) and Grover et al. (2020) found that lay participants ranked 'sickest first' and 'waiting list' as the two most ethical allocation principles.

This issue is further complicated as past research has shown that perceptions of a principle's ethicality differ substantially depending on a person's individual and group characteristics. For example, general practitioners have been shown to rate 'prognosis' as being

more ethical than individuals without a medical background (Krütli, et al., 2016). It is likely that this is because in order to assess a patient's prognosis, an individual would need to have a strong medical background. Research has shown that people who do not have medical training have a weak understanding of what 'prognosis' refers to and struggle to visualise what an individual's prognosis would be (Damman, et al., 2017). Consequently, laypeople feel less comfortable choosing 'prognosis' as the most ethical principle, as they may not fully understand who would be prioritised under this principle. Instead, laypeople's preferences seem less influenced by the specific medical concerns of a shortage, so they tend to prefer principles such as 'sickest first' and 'waiting list'(categorised as 'prioritarianism' by Persad et al., 2009). Prioritarianism is the principle that "It matters more to benefit people, the worse off they are", Nielsen (2022, p. 236). In contrast, 'prognosis' (and 'save the most lives'), are characterised by Persad et al. as maximizing total benefits and are therefore seen as being utilitarian principles (see Tännsjö, 2015 for a comparison between utilitarianism and prioritarianism).

Laypeople tend to show consistency in their individual preferences regardless of the shortage scenarios, wheareas HCPs' individual preferences tend to vary depending on the nature of the shortage. Furthermore, for a given scenario, laypeople show less agreement with each other, whereas HCPs tend to show high agreement with other HCPs. This is likely to be a result of HCPs receiving standardised medical training, with the result that they are incultured by a similar approach towards deciding the most ethical principle for the resource allocation.

However, research to date has focused on hypothetical situations that the participants are unlikely to have experienced before, such as an influenza pandemic (Krütli et al., 2016). Since early 2020, the COVID-19 pandemic has consistently caused medical resource shortages globally for even the most basic items. The disease COVID-19, caused by the SARS-CoV-2

virus, is a respiratory syndrome that spreads primarily through the exhalation and inhalation of virus particles (Li, et al., 2020).

Due to the nature of the disease and its spread, there has consistently been widespread shortages of gloves, gowns, surgical and respirator masks, testing supplies and equipment and ventilators since the emergence of the pandemic (FDA, 2021). This lack of necessary equipment and personnel has forced many HCPs to make extremely difficult decisions regarding who is most in need of the resource. At the start of the pandemic, hospitals in Lombardy, Italy, were forced to institute a policy where patients under 75 would be prioritised for ventilators and oxygen was to be rationed (Craxì, et al., 2020; Rosenbaum, 2020). A year later, many hospitals across the world have had to make similar critical decisions. The discovery and approval of COVID-19 vaccines provides a route away from the pressure on inpatient treatment, but also presents another ethical dilemma. There are not enough vaccines for everyone in need, so it is necessary to decide who should be prioritised for vaccination until more doses are available.

There has been some attempt to help HCPs make decisions that are as ethical as possible when prioritising patients for a scarce resource, such as an ICU bed. Guidelines were published in the New England Journal of Medicine in May of 2020, recommending the prioritisation of young people and maximising the amount of lives saved, with a secondary focus on quality of life (Emanuel, et al., 2020). The public found these recommendations to be controversial, particularly the suggestion that if individuals on a ventilator are not improving, they should be removed and the ventilator reallocated (Symons, 2020).

Conflict is problematic in a public health crisis, as disagreement between official recommendations and lay opinion often leads to a loss of trust, followed by increased noncompliance with public health measures (Blair, et al., 2017). To gain this understanding, it

is necessary to ascertain the similarities and differences in preferences held by HCPs and laypeople.

This study aims to establish the similarities and differences between HCPs' and laypeoples' rankings of ethical principles for the allocation of ICU beds and vaccines in the context of the COVID-19 pandemic. The Krütli et al. (2016) study pre-dates the COVID-19 pandemic by several years, and it is of interest to examine whether or not experience of the pandemic has influenced the ordering of ethical principles in HCPs and lay individuals across different scenarios. Further, the scarce resource of donor organs for transplantation will be introduced as a control scenario (also used by Krütli et al), in order to investigate the influence of the COVID-19 pandemic as a whole on allocation judgement. This is to compare and contrast findings with research conducted on organ transplantation before the COVID-19 pandemic, to see if ethical principle preferences have changed for medical procedures that are not directly related to COVID-19. Demographic data will also be used to isolate any relationships between ranking of ethical principles and variables such as age, gender, ethnicity and personal COVID-19 experience. Based on the extant literature, four hypotheses were tested: H1: Laypeople will prefer criteria based on prioritarian principles (e.g., 'sickest first'. H2: HCPs will prefer criteria based on the utilitarian principles and informed by medical knowledge (e.g., 'prognosis'). H3: HCPs will show more consistency within scenarios than laypeople. H4: Laypeople will show more consistency across scenarios than HCPs. One research question was posed; RQ: Would demographic factors (in particular age and ethnic status) influence the choice of the most favoured criteria, as both the old and BAME individuals appeared to have be particularly vulnerable during the COVID-19 pandemic?

Method

Participants

There were 202 participants in the study. One hundred participants were recruited for the HCP group via opportunity sampling, by an email with a link to the study sent around the two hospitals. The sample was made up of HCPs from two large British hospitals. Participants were aged between 25 and 65 ($M = 37.48$, $SD = 8.93$) and there were 42 males and 58 females. Ten participants considered themselves BAME. One hundred and two participants were recruited for the laypeople group via volunteer sampling using Prolific software (www.prolific.com) and were paid £1.25 for their time, reflecting a £7.50 hourly rate. Participants were aged between 18 and 65 ($M = 35.04$, $SD = 12.30$) and there were 28 males and 74 females. Ten participants considered themselves BAME.

Materials and Procedure

Participants read an information form and gave consent prior to the beginning of the study. They were then given three scenarios where there was a shortage of a medical resource: a shortage of ICU beds in a COVID-19 outbreak, the first shipment of COVID-19 vaccines and kidneys for organ transplantation (see Appendix). They were asked to rank order the seven allocation principles from the most ethical to the least ethical. The order of the scenarios and the order of principles was randomised in each trial to control for order bias. Following this, participants entered demographic information regarding their age, gender, whether they would identify as Black, Asian or minority ethnic (BAME) and self-reported impact of COVID-19 in their area as measured by a five-point Likert scale. Ethics approval was sought and obtained from the UCL Experimental Psychology Department Ethics Committee (EP/2018/007) and all participants gave their informed consent to take part. The data were collected during December

2020 and January 2021, i.e., at the start of the UK vaccine rollout (which began on the 8th December 2020). The study was not preregistered.

Results

1. **ICU Beds**

The Kendall's coefficient of concordance values indicated that both groups showed significant within-group agreement, though there was stronger agreement in the HCP group, $W = .682$, $\chi^2(6) = 409.35$, $p < .001$, compared to the laypeople group, $W = .548$, $\chi^2(6) = 335.53$, $p < .001$. However, the groups did differ from one another in their ranking of ethical principles. The mean rank of each principle can be seen below in Table 2. In the HCP group, 'prognosis' had a substantially lower mean rank compared to other ethical principles. This suggests HCPs viewed 'prognosis' as the most influential principle when allocating ICU beds. Conversely, Laypeople gave 'prognosis' a higher rank, with 'sickest first' having the lowest mean rank.

Table 2. *Mean rank given to each principle in the ICU bed scenario.*

Ethical Principle	HCPs		Laypeople	
	M (*SD*)	95% CI	*M* (*SD*)	95% CI
Prognosis	1.34 (0.77)	1.73 – 2.13	2.38 (1.41)	2.10 – 2.66
Sickest First	2.27 (0.98)	2.07 – 2.47	1.56 (1.02)	1.36 – 1.76
Youngest First	3.18 (1.22)	2.94 – 3.42	4.45 (1.59)	4.14 – 4.76
Waiting List	4.87 (1.18)	4.64 – 5.10	3.79 (1.39)	3.52 – 4.07
Instrumental Value	4.51 (1.41)	4.23 – 4.79	4.36 (1.43)	4.08 – 4.64
Lottery	6.06 (1.12)	5.84 – 6.28	6.20 (1.23)	5.96 – 6.44
Reciprocity	5.76 (1.14)	5.53 – 5.99	5.25 (1.31)	5.00 – 5.51

The frequencies of each principle being ranked first in each group are presented below in Table 3. 'Prognosis' and 'sickest first' accounted for 94% of the first ranked principles in

within the HCP participants, and 95% within the Lay participants. However, inspection of Table 3 reveals a very different pattern of responding between the two groups; 'prognosis' being more strongly favoured by the HCPs and 'sickest first' by the lay participants.

Table 3. *Number of times each principle was ranked most ethical in the ICU bed scenario.*

Ethical Principle	HCPs	Laypeople
Prognosis	76	27
Sickest First	18	70
Youngest First	5	2
Waiting List	0	1
Instrumental Value	1	2
Lottery	0	0
Reciprocity	0	0

A series of binary logistic regressions were conducted to ascertain if any demographic factors influenced individuals' ranking of the 'prognosis' and 'sickest first' principles for the ICU bed scenario. As expected, those in the HCP group were significantly more likely to rank 'prognosis' as their first choice, $B = -2.17$, $SE = .32$, $p < .001$, and those in the laypeople group were significantly more likely to rank 'sickest first' as their first choice, $B = 2.30$, $SE = .34$, $p < .001$. Additionally, as age increased, participants were more likely to select 'prognosis' as their first choice, $B = .034$, $SE = .015$, $p = .020$. Finally, COVID-19 impact was a significant predictor for both principles. As COVID-19 impact increased, participants were more likely to select 'prognosis' as their first choice, $B = .843$, $SE = .187$, $p < .001$, and as COVID-19 impact decreased, participants were more likely to select 'sickest first' as their first choice, $B = 2.30$, $SE = .72$, $p < .001$.

2. Vaccines

The Kendall's coefficient of concordance values showed a significant - and almost identical - degree of agreement within the HCP group, $W = .404$, $\chi^2(6) = 242.42$, $p < .001$, and the laypeople group, $W = .403$, $\chi^2(6) = 246.71$, $p < .001$.

The two groups showed some similarities in their rankings. The mean rank of each principle is shown below in Table 4. Inspection of Table 4 reveals that 'sickest first' and 'prognosis' were given the lowest and second-lowest rank respectively in both the HCP group and the laypeople group. However, the HCP group believed that 'instrumental value' was a more ethical principle than the Laypeople group, and the laypeople group found 'waiting list' to be more ethical compared to the HCP group.

Table 4. *Mean rank given to each principle in the vaccine scenario.*

Ethical Principle	HCPs		Laypeople	
	M (*SD*)	95% CI	*M* (*SD*)	95% CI
Prognosis	2.90 (1.62)	2.58 – 3.22	2.92 (1.36)	2.65 – 3.19
Sickest First	2.21 (1.55)	1.90 – 2.52	2.11 (1.76)	1.76 – 2.45
Youngest First	5.14 (1.61)	4.82 – 5.46	5.60 (1.33)	5.34 – 5.86
Waiting List	4.74 (1.30)	4.48 – 5.00	3.80 (1.45)	3.52 – 4.09
Instrumental Value	2.60 (1.62)	2.27 – 2.91	3.19 (1.74)	2.84 – 3.53
Lottery	5.49 (1.40)	5.21 – 5.77	5.67 (1.65)	5.34 – 5.99
Reciprocity	4.92 (1.71)	4.58 – 5.26	4.72 (1.52)	4.42 – 5.01

The frequencies of each principle being ranked first in each group are presented in Table 5. Inspection of the table reveals a similar pattern of responding with both groups; 'sickest first' was the principle rated as most ethical by both groups – but especially within the laypeople group, with over half the participants choosing it as being the most ethical principle. Within both groups, 'instrumental value' was the next most popular principle followed by

'prognosis' – with both of these principles being chosen as being most ethical more frequently in the HCP group than in the laypeople group.

Table 5. *Number of times each principle was ranked most ethical in the vaccine scenario.*

Ethical Principle	HCPs	Laypeople
Prognosis	19	13
Sickest First	46	57
Youngest First	1	0
Waiting List	4	3
Instrumental Value	30	23
Lottery	1	4
Reciprocity	3	2

A series of binary logistic regressions were run to see if any demographic factors influenced individuals' ranking of 'sickest first' and 'instrumental value' for the vaccination scenario. These regressions indicated that participants who identified themselves as BAME were less likely to rank 'sickest first' as most ethical, $B = -.988$, $SE = .492$, $p = .045$. Additionally, as participant age increased, participants were more likely to rank 'instrumental value' as most ethical, $B = .032$, $SE = .015$, $p = .037$.

3. Organ Transplantation

Kendall's coefficient of concordance showed significant within-group agreement in both groups, though there was slightly stronger agreement in the HCP group, $W = .637$, $\chi^2(6) = 382.47$, $p < .001$, compared to the laypeople group, $W = .559$, $\chi^2(6) = 342.14$, $p < .001$.

The mean ranks given to all principles are shown below in Table 6. Inspection of Table 6 revealed that in the HCP group, 'prognosis' was viewed as being most ethical with the lowest

mean rank, closely followed by 'sickest first'. In the laypeople group, 'sickest first' was given the lowest mean rank and was thought to be most ethical by a substantial margin.

Table 6. *Mean rank given to each principle in the organ transplantation scenario.*

Ethical Principle	HCPs		Laypeople	
	M (*SD*)	95% CI	*M* (*SD*)	95% CI
Prognosis	1.93 (1.02)	1.73 – 2.13	2.75 (1.37)	2.48 – 3.02
Sickest First	1.99 (1.08)	1.78 – 2.20	1.86 (1.28)	1.61 – 2.11
Youngest First	3.82 (1.40)	3.54 – 4.10	4.03 (1.59)	3.72 – 4.34
Waiting List	3.19 (1.31)	2.93 – 3.45	2.69 (1.30)	2.43 – 2.94
Instrumental Value	5.28 (1.39)	5.01 – 5.41	5.09 (1.14)	4.87 – 5.32
Lottery	5.98 (1.08)	5.77 – 6.19	6.12 (1.26)	5.88 – 6.38
Reciprocity	5.81 (1.14)	5.58 – 6.04	5.44 (1.35)	5.18 – 5.71

The frequency of principles being ranked first is shown in Table 7, and reveals that within the HCP group, 'prognosis' and 'sickest first' were most frequently (and equally) chosen as the most ethical principles. In the laypeople group, 'sickest first' was most frequently chosen as the most ethical principle, followed by 'prognosis'.

Table 7. *Number of times each principle was ranked most ethical in the organ donation scenario.*

Ethical Principle	HCPs	Laypeople
Prognosis	42	24
Sickest First	42	55
Youngest First	4	5
Waiting List	8	17
Instrumental Value	4	0
Lottery	0	0
Reciprocity	0	1

A series of binary logistic regressions were run to see if any demographic factors influenced individuals' ranking of 'sickest first' and 'prognosis' for the organ transplantation scenario. These regressions showed that, as expected, those in the HCP group were more likely to choose 'prognosis' as being most ethical than those in the laypeople group, $B = -.856$, $SE = .337$ $p < .001$. Additionally, the more affected a participant was by COVID-19, the more likely they were to rate 'prognosis' as the most ethical principal, $B = .376$, $SE = .723$, $p = .037$.

Discussion

Hypothesis 1 stated that laypeople would prefer criteria based on prioritarian principles (Nielsen, 2022; Persad et al., 2009), such as sickest first and this was supported by the data. The laypeople group gave 'sickest first' the lowest mean rank and ranked it as being the most ethical principle for all three scenarios. Additionally, the laypeople gave 'waiting list' the second lowest mean rank in the organ transplantation scenario. These results matched our predictions indicated that these principles are more acceptable to individuals without medical training (Buckwalter & Peterson, 2020). However, as noted by Persad et al. (2009) they both have practical and ethical flaws that are apparent to those with expertise in medical ethics. However, although 'sickest first' was unpopular amongst HCPs in the ICU bed scenario, it was perhaps surprising equal first with 'prognosis' in the organ donation scenario and the most popular principle in the vaccine scenario. These findings are similar to those seen in studies that were conducted prior to the COVID-19 pandemic and indicate that the general public still favours principles based on prioritarianism for the allocation of scarce medical resources rather than utilitarianism.

Hypothesis 2, that HCPs will prefer criteria based on medical knowledge, such as 'prognosis' was also partially supported. HCPs gave 'prognosis' the lowest mean rank and

chose it as the most ethical principle for both the organ donation and ICU bed scenarios. This is the method of allocation recommended in clinical settings and is the principle that was favoured by HCPs in previous research (Kent, et al., 2020). In the vaccination scenario, 'sickest first' was rated as being the most ethical followed by 'instrumental value', which are the principles followed in the UK's current rollout of COVID-19 vaccines (Baraniuk, 2021). The principles employed in this study were the same as those used in the Krütli et al. (2016) paper so that direct comparisons could be made, but some principles may not have been applicable to the vaccine scenario.

Vaccination is pre-emptive and less focused on an individual's current condition, so principles such as 'sickest first' or 'prognosis' may be less relevant to vaccination. Accordingly, it is likely that 'sickest first' was often interpreted by participants as 'most vulnerable' or 'most at risk' as there was no ethical principle that had vulnerability or risk implications. Therefore, even though HCPs were not predicted to select 'sickest first' for vaccination, it is probable that this choice was made basis on their expertise.

Hypothesis 3, that HCPs will show more consistency within scenarios than laypeople, received only weak support. Both groups showed significant in-group agreement in all three scenarios, with HCPs showing slightly higher agreement in the ICU bed and organ transplantation scenarios. However, these differences were smaller than had been expected and in-group agreement in the vaccination scenario was almost identical. Previous research has found that laypeople tend to show less agreement with one another when allocating scarce medical resources compared to HCPs (Grover, et al., 2020). A possible explanation is that during the COVID-19 pandemic, laypeople have had the shared experience of public health measures and received information from similar sources, such as the government and the NHS. The UK authorities have run high profile campaigns to mitigate the damaging consequences of misinformation for individuals and public health (Aghagoli, et al., 2020). Consequently, this

may have increased in-group agreement on the ranking of ethical principles among laypeople, as their decisions were influenced by similar information and experiences. This implies that for laypeople, the decision-making processes associated with scarce medical resources may have been affected and altered by the COVID-19 pandemic.

Hypothesis 4, that laypeople will show more consistency across scenarios than HCPs, received some support. Laypeople were consistent in their ranking of 'sickest first' as the most ethical principle for every scenario. This mirrors previous findings that laypeople show a strong preference for 'sickest first' regardless of the resource, whereas HCPs vary their choices based on the nature of the shortage (Krütli, et al., 2016) – as was the case in the present study. However, there was a noticeable number of laypeople ranking 'instrumental value' in the vaccination scenario, and 'waiting list' in the organ transplantation scenario, as being the most ethical principle. This suggests that although laypeople generally seem to prefer allocation principles based on prioritarianism regardless of the shortage situation, they are capable of altering their preferences depending on the nature of the resource shortage (e.g., favouring 'instrumental value' in the vaccination scenario).

Some of the current findings were consistent with the results obtained in previous studies on scarce medical resource allocation. Both HCPs and the laypeople group consistently considered 'lottery' and 'reciprocity' to be unethical, with lottery having the highest mean rank in all three scenarios. Although it may appear counterintuitive (due to its emphasis on equal chances for all), both laypeople and HCPs consider 'lottery' to be unethical as it does not take into account the areas of highest need – and can result in scarce resources being directed to individuals that do not really need them (Scheunemann & White, 2011).

In addition to the rank measures, logistic regressions provided further insights into the decision-making processes underlying resource allocation across both groups. Older individuals and those more affected by COVID-19 were more likely to rate 'prognosis' as being

more ethical than 'sickest first' in the ICU bed scenario. For the vaccination scenario, individuals who identified as BAME were less likely to choose 'sickest first', and older individuals were more likely to choose 'instrumental value' as being more ethical than 'sickest first'. Finally, HCPs were more likely to choose 'prognosis' compared to laypeople for the organ donation scenario. The general pattern was that in both groups, older individuals and those at higher risk, such as BAME individuals, were more likely to choose prognosis and less likely to choose sickest first as the most ethical principle. Further, these individuals were all more likely to have had either more experience of COVID-19 or to have been more severely impacted by COVID-19. This indicates that an individual's group membership influences the decisions they make. It also supports the assumption that increased experience or elevated personal risk will result in a preference for principles that align with the preferences of HCPs, such as 'prognosis'. The development of flexible, targeted guidelines for medical resource shortages is essential for managing a public health crisis and these measures are more likely to be successful when supported and understood by the general public (Tabari, et al., 2020).

In conclusion, the findings from this study indicate that HCPs generally consider principles that require medical expertise, such as 'prognosis' to be the most ethical (although this depends on the particular medical shortage), but in contrast, laypeople generally consider allocation principles base on prioritarianism, such as 'sickest first' to be most ethical. Although there was a slightly stronger relationship between HCP's group agreement than laypeople's group agreement, in-group agreement was significant in every scenario for both HCPs and lay partipants. This suggests that the shared experience of the COVID-19 pandemic within the UK may have lead to more similarities in decisions made by individuals regarding scarce resource allocation – but such a conclusion must be treated with caution given that the samples recruited for this study may not be representative of the UK population. Finally, HCPs are more sensitive to the characteristics of a shortage when deciding which principle to use in allocating the

resource in comparison to laypeople. These results indicate that though there are some discrepancies between the opinions of HCPs and laypeople when it comes to the allocation of scarce medical resources, it should still be possible to create clear public health guidelines that take into account the views of the general public.

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Appendix

Sometimes, situations arise in healthcare where there are not enough available resources to be able to give a resource to everyone who may benefit from it. In these situations, decisions have to be made about who is most in need, and therefore who should take priority for receiving the limited resource.

Situation A: ICU beds

Following a severe COVID-19 outbreak in London, 150 patients require admission to the hospital's intensive care unit. However, there are only 70 beds available. The hospital's consultants must therefore decide which 70 patients out of the 150 are allocated a bed.

In your opinion, how should the consultants decide which patients are admitted?

Situation B: Vaccines

A vaccine for COVID-19 has made it through the last round of trials and has proven to be safe and effective. The UK has a population of 66.5 million people, but the government currently only has access to 2 million doses of the vaccine. Therefore, a team of scientists must decide who will receive the first batch of vaccinations, until more are made available.

In your opinion, how should the scientists decide who should receive the vaccine first?

Situation C: Organ donation

A medium-sized hospital receives 50 kidneys per year from donors. However, there are currently 150 patients on the waiting list, who are eligible for kidney transplants. A team of consultants at the hospital must decide who should receive one of the 50 kidneys. For simplicity, you should assume that the kidney would be tolerated equally in all 150 patients.

In your opinion, how should the consultants decide which patients should receive a kidney transplant?