

Paying people for getting vaccinated? A favorable solution for both vaccine-hesitant persons and the public

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Abstract

Assume a pandemic in which, despite all efforts of vaccine persuasion, too many people are hesitant toward vaccination for a laissez-faire regime to reach herd immunity on a strictly voluntary basis. Then, basically four policy options are available—(a) moral appeals, (b) legal obligation, (c) monetary fines, and (d) monetary rewards. In this article, we demonstrate that the prevalent vaccination debate chooses the wrong starting point in discussing these options. Rather than asking how vaccine hesitancy can be overcome as a (bothersome) hindrance toward reaching herd immunity, we ask how one can reach herd immunity in due time while minimizing the (subjectively perceived) offense to the dignity of vaccine-hesitant citizens. This change in perspective favors paying people for getting vaccinated instead of sanctioning them for not doing so. With respect to the COVID-19 crisis, we show that a payment strategy is both feasible and advisable. This may be an important insight not only in the short term, but also with respect to future pandemics that are likely to come.

KEYWORDS

Coase theorem, COVID-19, pandemic ethics, vaccination ethics, vaccination hesitancy, vaccination payment

1 | INTRODUCTION

At the time of writing (March 2021), regarding the United States and many other Western nations, more people are willing to receive one of the approved COVID-19 vaccines than there are vaccines available. This situation, however, is expected to change soon; in light of an increasing supply of (new) vaccines and a significant part of the population resistant or just hesitant to get vaccinated, there will be enough vaccines available in the near future but perhaps not enough vaccination-ready people to reach herd immunity. What is today primarily a distribution problem¹ is therefore likely to become an incentive problem of allocation.

This incentive problem will differ in severity in different countries. In most cases, a majority of the population believes that the COVID-19 vaccines are effective and safe (enough). Their self-interest in receiving the vaccine—namely in protecting themselves and others from contracting the virus—corresponds to the public interest in achieving herd immunity in due time.² In contrast, those resisting or just hesitant about receiving the vaccine are facing, from *their* subjective point of view, an inherent conflict between their self-interest in refraining from the vaccine—for instance owing to concerns about possible non-intended side effects—and the public interest in getting them vaccinated.

¹Giubilini, A., Savulescu, J., & Wilkinson, D. (2021). Queue questions: Ethics of COVID-19 vaccine prioritization. *Bioethics*, 35(4), 348–355.

²Omer, S. B., Yildirim, I., & Forman, H. P. (2020). Herd immunity and implications for SARS-CoV-2 control. *Journal of American Medical Association*, 324(20), 2095–2096.

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Provided public vaccine *persuasion* has already taken place and reached its limits, we sketch and analyze the following four prominent options for solving the incentive problem: (a) the option of “moral appeals,” which aims at increasing the number of vaccinated people by calling on communitarian values, personal virtues, moral duties, and solidarity; (b) the “mandatory” option, which legally obliges individuals to become vaccinated; (c) the “charging” option, which seeks to internalize the *negative* external effects stemming from rejecting the vaccine by awarding a penalty; and (d) the “payment” option, which inverts this perspective and offers a reward to internalize the *positive* external effects of contributing to herd immunity via getting vaccinated. In comparison, we demonstrate that only the payment solution is able to implement the public interest while at the same time making vaccine-hesitant persons better off from their subjective points of view. We hold this to be a strong argument that the payment option is morally superior to the relevant alternatives. With this argument, we want to initiate and facilitate a fruitful *general* discussion about the normative attractiveness of alternative means to reach herd immunity in times of a pandemic.

Before proceeding, it is worth noting that our line of argument rests on the following four assumptions.

First, we concentrate on *monetary* charges and incentives. This is not to disqualify non-monetary mechanisms that may increase the costs of rejecting or the rewards for embracing vaccination. The payment solution can indeed be supplemented or even replaced by non-monetary incentives, such as vouchers, lottery tickets, or bonus programs, just like the charging solution can be supplemented or even replaced by non-monetary sanctions—particularly if some of these sanctions happen to be better received in the public eye and more effective in encouraging vaccination. Our emphasis lies in the categorical distinction between rewarding people for getting vaccinated and sanctioning them for not doing so. Concentrating on monetary charges or payments is intended to help elucidate this distinction and its normative implications.

Second, we confine our analysis to high-income countries that not only are able to afford the production and purchase of vaccines, but also are capable of providing rewards to those citizens receiving or having received vaccination, even if this proves to be an expensive solution. While we think that some insights from our analysis could be applied to low- and middle-income countries, we are cautious to avoid overgeneralization because much more evidence regarding the cost/benefit analysis and the political context would be needed for a general transfer of conclusions.

Third, we presume, for the sake of argument, that the (going to be) approved COVID-19 vaccines are effective, safe, and overall suitable for reducing transmission. We also assume this to be public knowledge; that is, we assume credible information—based on prudent trials, extensive approval procedures, insights into the research behind the vaccines, the absence of whistle-blower warnings, and so forth—supporting the reasonable belief that, on average, one has to expect that the benefits of getting vaccinated are much higher than the costs.

Against this background, we make a fourth assumption that is of vital importance. We grant vaccine-hesitant persons the right to be

wrong. On the one hand, such an entitlement may be justified on normative grounds, as a respect for the dignity and moral autonomy of vaccine-hesitant persons: we simply take seriously what these citizens subjectively perceive to be their individual interests. On the other hand, this assumption may be justified on purely pragmatic grounds. As several empirical studies indicate, attitudes toward actually safe and effective vaccinations are becoming increasingly polarized,³ and public confidence is waning.⁴ This means that overcoming this resistance by—and even winning the support of—vaccine-hesitant persons is not only normatively desirable but may even be pragmatically *necessary* (as a “*conditio sine qua non*”) in order to reach herd immunity quickly.

2 | OVERVIEW: THE FOUR OPTIONS TO BE COMPARED

In this section, we reconstruct and analyze the four distinct options for getting more people vaccinated. Before addressing each solution separately, Figure 1 below provides an overview. It not only helps to distinguish among the four options. It also helps to draw attention to the fact that the paying solution is the only option that aims at improving—rather than diminishing—the well-being of vaccine-hesitant persons from their subjective point of view.

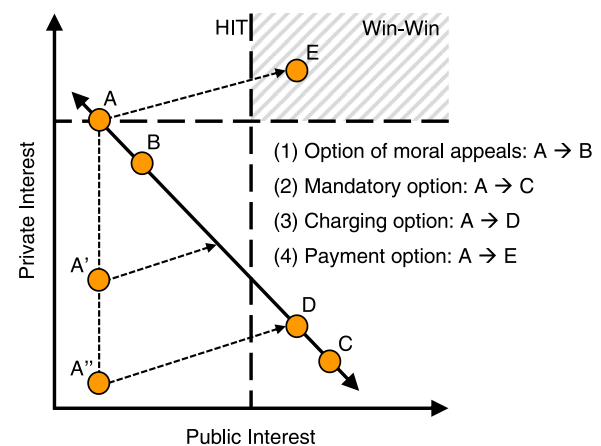


FIGURE 1 Reconstruction of the four options from the mindset of a vaccine-hesitant person—authors' own representation. HIT, herd immunity threshold

³Lee, C. H. J., & Sibley, C. G. (2020). Attitudes toward vaccinations are becoming more polarized in New Zealand: Findings from a longitudinal survey. *E Clinical Medicine*, 23, 100387.

⁴Dubé, E., Gagnon, D., Ouakki, M., Bettinger, J. A., Guay, M., Halperin, S., ... Canadian Immunization Research Network. (2016). Understanding vaccine hesitancy in Canada: Results of a consultation study by the Canadian Immunization Research Network. *PLoS One*, 11(6), e0156118; Rossen, I., Hurlstone, M. J., Dunlop, P. D., & Lawrence, C. (2019). Accepters, fence sitters, or rejecters: Moral profiles of vaccination attitudes. *Social Science & Medicine*, 224, 23–27.

The ordinate shows private interest as subjectively perceived by a group of vaccine-hesitant persons. The abscissa shows how such persons perceive the public interest under a high vaccination rate, given the herd immunity threshold (HIT). The negatively sloped tradeoff line, running through Points A and C, represents their subjective perception that calls to promote the public interest conflict with these persons' well-being. Free to choose, they would opt for Point A. This makes Point A the appropriate starting point for analyzing the four options for increasing the societal vaccination rate.

From a methodological point of view, the reconstruction and analysis of the four options are not designed to provide insights into the mindset of vaccine-hesitant persons. Instead, they are designed to reveal insights into changes of vaccine-hesitant persons' behavior under constant preferences and differing incentives/constraints. Considering this, the explanandum of this analysis is not the psychology of vaccine-hesitant persons but their behavioral response to changes in situational conditions.

2.1 | The option of moral appeals

The option of moral appeals aims at exerting discursive pressure on vaccine-hesitant persons toward vaccination by publicly calling on communitarian values, personal virtues, moral duties, and solidarity. Against this background, the revival of the slogan that “we're all in this together” reveals itself as a normative statement—it raises the moral obligation to take care of each other, on a local and, eventually, global level. The “caremongering” movements, in which citizens deliver supplies to elderly people and other vulnerable groups or organize virtual sports classes for people in quarantine, as well as the practice of social distancing and self-quarantining and contributions to charity are manifestations of solidarity. They are indeed morally desirable and a praiseworthy response to the pandemic.

The special characteristic of moral appeals is an emphasis on moral duties that systematically call on vaccine-hesitant persons to disregard their subjectively perceived self-interest in refraining from the vaccine for the sake of what is claimed to be the public interest. In this light, such persons can either dismiss the normative solicitations and give their self-interests precedence (reaching Point A) or cave in to the normative urge and give the public interest precedence (reaching Point B). In any case, the option of moral appeals takes the situational setting with its underlying conflict of interest as a given.

We now move from characterizing to evaluating the option of moral appeals. The first aspect we would like to emphasize is that asking vaccine-hesitant persons to systematically disregard what they perceive to be their self-interest (for the sake of what others regard as the public interest) is *morally* problematic. Specifically, it contradicts important strands in ethical theory. As a case in point, the foundation of Aristotelean virtues is in essence the individual's self-development toward a good—*eudaimōn* (εὐδαιμῶν)—life. Living according to moral virtues in light of solidarity might, by any measure, involve making significant sacrifices for others (and thus give others' interests precedence). In the long term, nonetheless, living up to

these virtues is required to be beneficial not only for society and the common good but also for the virtuous person. Against this background, provided the vaccine-hesitant person's tradeoff perception is taken seriously—as normatively significant—the option of moral appeals risks being a deficient virtue-ethical solution. Rather than enlightening or arguing that it is beneficial for vaccine-hesitant persons themselves to get the vaccine, this policy option urges them to sacrifice their perceived self-interest. Instead of convincing them by providing positive information, it exerts additional (normative) pressure on them to change their behavior.

Moreover, as a second aspect, whether the option of moral appeals is an effective solution to incentivize enough people to get vaccines is undoubtedly an empirical question. During the current COVID-19 pandemic, it is likely the case that moral appeals cannot incentivize enough people for herd immunity to be reached in due time. Moral appeals simply seem not to be effective enough. This may also hold in future pandemics. That is why in Figure 1 Point B is to the (far) left of the vertical HIT line.

2.2 | The mandatory option

The mandatory option aims at legally obliging vaccine-hesitant persons to get vaccinated. As there are compulsory laws for various vaccines, paternalistic legal intervention for using seat belts and prescription medicine, and prohibitions on energy-inefficient light bulbs to reduce negative (environmental) externalities, one might make a strong plea for a mandatory COVID-19 vaccination to protect both the vaccinated person individually and society at large.

Like the option of moral appeals, the mandatory option is based on a win-lose logic between vaccine-hesitant persons' perceived self-interest in refraining from the vaccine and the public interest in achieving herd immunity. Here as well, the situational setting with its underlying structure of subjective perceptions is taken as a given. In light of the perceived tradeoff, vaccine-hesitant persons are again called on to give the public interest precedence over their self-interest. What distinguishes the mandatory solution from moral appeals is that the individuals no longer have the option to give their self-interest precedence (reaching Point A). There is not much option under a mandatory law with its punitive mechanism other than to take the vaccine (reaching Point C). Consequently, one can expect the force of the mandatory solution to be stronger than the option of moral appeals.

Following Savulescu,⁵ it is possible to make a strong case for implementing a mandatory vaccine solution if the following four criteria are met.

1. There is a grave threat to public health [a strong negative externality].
2. The vaccine is safe and effective [and this is public knowledge].

⁵Savulescu, J. (2020). Good reasons to vaccinate: Mandatory or payment for risk? *Journal of Medical Ethics*, 47(2), 78–85.

3. Mandatory vaccination has a superior cost/benefit profile compared with other alternatives.
4. The level of coercion is proportionate.⁶

Like Savulescu, who regards the payment solution to be preferable to the mandatory solution, we argue that although the mandatory solution is in principle justifiable, it seems to lack a superior cost/benefits profile compared with other alternatives as addressed in his third criterion. Drawing on Figure 1, it becomes clear that what makes the mandatory solution inferior from a moral point of view is that it fails to transcend and overcome the perceived tradeoff between vaccine-hesitant persons' self-interest and the public interest. It does not take the subjective well-being of vaccine-hesitant persons seriously, overriding via legal order their right to choose freely their preferred kind of behavior.

2.3 | The charging option

The charging option puts a "price tag" on choosing to refrain from taking the vaccine. People who resist vaccination are then confronted with a negative sanction. Notable instances are Australia's "No Jab No Play" and "No Jab No Pay" legislation that withholds access to childcare and family assistance payment from parents who refrain from fully vaccinating their children.⁷

While the mandatory option obliges vaccination,⁸ the charging option provides vaccine-hesitant persons the opportunity to refuse the vaccine by paying a price. As the price is supposed to internalize the negative externality costs that would be imposed on society in general, and in particular on the vulnerable who cannot get vaccinated owing to medical issues, vaccine resistance under a charging scheme is based on a quid pro quo form of compensation.

As Figure 1 indicates, the charging option puts vaccine-hesitant persons in a worse situation, reducing their position from A to A', before offering them the option to avoid payment by switching to vaccination. The higher the payment, the lower Point A', and the more vaccine-hesitant persons are willing to switch, thus moving the end result further to the right.

The logic is clear: whereas an exceptionally low charge (represented by Point A') would not make the vaccine-hesitant person considerably worse off by their choosing to refuse the vaccine (but would also fail to solve the incentive problem of allocation), an exceptionally high charge—in the literal sense of a "prohibitive" price—would render vaccination factually mandatory. This is why—making the argument as strong as possible—we have assumed a "reasonable" price that leads from Point A via A' to Point D.

The diagram also makes clear that the charging option is more effective than moral appeals and may be as effective as the

mandatory option in overshooting the vertical HIT line. However, the charging option joins the option of moral appeals and the mandatory option in failing to overcome the underlying tradeoff logic from the mindset of vaccine-hesitant persons. All three options share the important characteristic of *not* proposing a vaccination policy that is favorable for *both* vaccine-hesitant persons and the general public. In a nutshell, they do not take the self-interest of vaccine-hesitant persons seriously. Instead of convincing them and winning them over, the charging option joins the other two punitive options in using (different forms of) pressure, in fact reducing vaccine-hesitant persons' freedom of choice as well as their subjectively perceived well-being.

2.4 | The payment option

While the charging option aims at pricing a *negative* externality, the payment option is based on a fundamental change in perspective and aims at pricing a *positive* externality. The charging option assumes that vaccine-hesitant persons *harm* other people by delaying or even preventing herd immunity, and it therefore attempts to make this willful default more costly. In sharp contrast, the payment option assumes that if vaccine-hesitant persons overcome their hesitation and get vaccinated, they *help* in reaching herd immunity. In this interpretation, switching from inaction to action is socially beneficial and therefore should be encouraged by financial rewards. This is why the payment option aims at reaching herd immunity by providing all people—including vaccine-hesitant citizens—with a financial incentive to get vaccinated, in effect handing them a certain amount of money for their individual contribution to reaching herd immunity.⁹

Why should the financial reward be paid out to all citizens? Why not specifically target only vaccine-hesitant persons? While such a policy might be cheaper in reducing the overall sum of money that is handed out to citizens, it also has two detrimental effects that make targeting inadvisable. First, it might frustrate people who would be willing to get vaccinated even without a financial reward. Second, it might even invite them to engage in strategic behavior in the form of public preference falsification. To avoid these problems, we restrict our discussion to a universal payment—a certain amount of money that is paid out to all citizens if they decide to get vaccinated.

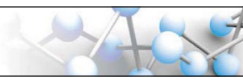
Since the payment option respects the vaccine-hesitant person's right to freely choose whether or not they get vaccinated, the financial reward must be high enough to motivate a sufficient number of vaccine-hesitant persons such that a result such as Point E in Figure 1 is reached—that is, a result clearly to the right of the vertical

⁶Ibid: 1.

⁷Li, A., & Toll, M. (2021). Removing conscientious objection: The impact of "No Jab No Pay" and "No Jab No Play" vaccine policies in Australia. *Preventive Medicine*, 145, 106406.

⁸The extreme version would be imprisoning people for not being willing to get vaccinated and then vaccinating them anyway.

⁹It is worth considering policies that work with relieved restrictions once a vaccination can be verified, such as the idea of "immunity passports" (Brown, R. C. H., Kelly, D., Wilkinson, D., & Savulescu, J. (2021). The scientific and ethical feasibility of immunity passports. *Lancet Infectious Diseases*, 21(3), e58–e63. However, framing them as "rewards"—(Loewenstein, G., & Cryder, C. (2020, Dec 14). Why paying people to be vaccinated could backfire. *New York Times*. Retrieved from <https://www.nytimes.com/2020/12/14/upshot/covid-vaccine-payment.html>)—is grossly misleading. Worsening first the welfare of vaccine-hesitant persons to make them, provided they get vaccinated, better off is at its core a negative sanction that falls into the same category as the "charging" option.



HIT line. The nature of this problem is similar to that faced by the charging option, namely choosing a financial negative sanction that is strong enough to reach a point such as D. In both cases, we assume that this problem can be solved by a combination of empirical investigations with trial and error in order to establish the amount of money that is required—either as a fine or as a reward—to reach herd immunity in due time.

3 | COMPARING THE FOUR OPTIONS

Since moral appeals are unlikely to be effective, it suffices to evaluate whether any of the other three options is clearly preferable. We begin by comparing the mandatory with the charging option. In this regard, we would like to analyze three essential aspects.

As several scholars maintain, while making vaccination mandatory or non-vaccination costly might indeed increase the overall number of vaccinated people, such policies might also backfire and fuel anti-vaccine attitudes.¹⁰ First, a minor payment charge could be (mis)understood as signaling certain risks regarding the vaccine. This might lead to the result that very few people are willing to get vaccinated. In Figure 1, this scenario is captured by the positively sloping line that starts at point A'. However, this problem can easily be overcome by choosing an appropriately higher price, as illustrated by the positively sloping line that starts at Point A" and ends at Point D. Therefore, we conclude that while the mandatory option is beyond doubt more effective than the charging option, the latter can be made as effective as necessary to reach herd immunity. Given this result, it might be seen as an advantage that the charging option is using less compelling force than the mandatory option in the sense that it still provides a safety valve for vaccine-hesitant persons who are willing to pay the price, whereas the mandatory option subjects all citizens universally without exception.

Second, it is safe to assume that vaccine-hesitant persons do not perceive punitive policy regimes such as the mandatory or charging options as fair and efficient ways to manage negative externalities but rather as illegitimate (ab)uses of state power that drastically restrain individual liberties and even disseize citizens of their fundamental human rights.¹¹ Rossen et al., for instance, caution that punitive sanctions might undermine trust or even trigger moral outrage, precisely because vaccination “fence sitters” and foremost “rejecters” display high sensitivity to liberty-related concerns.¹² This might end up in lobbying efforts aimed at preventing punitive regimes

ex ante or even in militant resistance against punitive regimes ex post. We hold that this is a disadvantage that is held equally by the two punitive approaches.

Third, charging people increases their costs of “rational irrationality.”¹³ It requires time and effort to acquire information about the benefits and risks of vaccines in general and about the COVID-19 vaccines in particular and to express beliefs (and actually believe them) that differ from those of one's peer group. Without any charge, persons who refrain from the vaccine for whatever reason do not have to compensate for the negative externalities they pose to society. Charging those who refuse a vaccine places a bet on their beliefs. It makes the practice of (wrongful) virtue signaling more costly. As a result, the attached costs to irrationality encourage more people to change their mind, namely to correct their wrong beliefs and then actually agree to get the vaccine. This is a major advantage of the charging option. However, as a possible downside, it might also create new opportunities for virtue signaling. That is, vaccine-rejecting persons who pay the financial sanction, meaning they have “skin in the game,” will find it easier to prove their sincere anti-vaccination attitudes under a charging scheme than otherwise since they now have easy access to a costly signal. Of course, the same holds even more strongly for the mandatory option since imprisonment can be interpreted as martyrdom.

Summing up, we hold that the charging option is clearly superior to the mandatory option since it uses less legal force to reach a comparable outcome.

We now want to include the payment option in the broader picture. Under the regime of a positive financial reward, vaccine-hesitant persons are still formally allowed to refrain from taking the vaccine. What therefore distinguishes the payment option from moral appeals as well as from the mandatory and charging options is that it transcends the vaccine-hesitant person's tradeoff logic. Instead of taking their perception of a fundamental conflict between private interest and public interest as given, the payment option actively changes the situational setting and its underlying incentive structure—by offering vaccine-hesitant persons the option to gain money for receiving the vaccine, it shifts the win-lose mindset toward a win-win mindset. In terms of Figure 1, the decisive point is that a movement to the right is combined not with a downward movement but with an upward movement. The payment option aims not at *reducing* the subjectively perceived welfare of vaccine-hesitant persons but at *increasing* it, thus bringing harmony to the conflict of private and public interest. Instead of accepting the tradeoff mindset and then using some kind of pressure to change people's behavior within this given conceptual framework (as they perceive it), the distinguishing characteristic of the payment option is to change the rules of the game such that vaccine-hesitant persons are incentivized to voluntarily change their behavior, for example by reaching Point E in the win-win region of Figure 1.

¹⁰Beard, F. H., Leask, J., & McIntyre, P. B. (2017). No Jab, No Pay and vaccine refusal in Australia: The jury is out. *Medical Journal of Australia*, 206(9), 381–383; Helps, C., Leask, J., & Barclay, L. (2018). “It just forces hardship”: Impacts of government financial penalties on non-vaccinating parents. *Journal of Public Health Policy*, 39(2), 156–169; Widdus, R., & Larson, H. (2018). Vaccine mandates, public trust, and vaccine confidence: Understanding perceptions is important. *Journal of Public Health Policy*, 39(2), 170–172; Omer, S. B., Betsch, C., & Leask, J. (2019). Mandate vaccination with care. *Nature*, 571, 469–472.

¹¹Helps, C., Leask, J., Barclay, L., & Carter, S. (2019). Understanding non-vaccinating parents' views to inform and improve clinical encounters: A qualitative study in an Australian community. *BMJ Open*, 9(5), e026299.

¹²Rossen et al., op. cit. note 4.

¹³Caplan, B. (2007). *The myth of the rational voter: Why democracies choose bad policies*. Princeton, NJ: Princeton University Press.

We would like to further elaborate why we hold this to be a point of importance. We do so by comparing the payment option with the charging option. Remember, the latter solution internalizes *negative* externalities by charging people for refusing the vaccine, whereas the payment solution internalizes *positive* externalities by rewarding people for receiving the vaccine. By inverting the usual perspective, the payment option embodies an important insight from Coase's seminal paper on "The Problem of Social Cost."¹⁴

According to Coase, the traditional interpretation of external costs (in his time) was to identify them with a distinction between a perpetrator on one side and a victim on the other. Against this background, he argued that, in reality, the problem of social cost—the problem of a conflict—was not caused single-handedly by one party, but instead—as a problem of scarcity—it was in fact caused by the two conflicting parties. He wrote:

The traditional approach has tended to obscure the nature of the choice that has to be made. The question is commonly thought of as one in which A inflicts harm on B and what has to be decided is: how should we restrain A? But this is wrong. We are dealing with a problem of a reciprocal nature. To avoid the harm to B would inflict harm on A. The real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A? The problem is to avoid the more serious harm.¹⁵

Applied to the question at hand, Coase's insight into the reciprocal nature of the problem—calling into question the popular albeit superficial interpretation of one-way causality—makes it clear that one should not only ask whether vaccine-hesitant persons should be allowed to harm the public by refraining from the vaccine but also whether the public should be allowed to harm vaccine-hesitant persons by forcing them against their free will. While the former question promotes charging vaccine-hesitant persons for not taking the vaccine, the latter question promotes paying vaccine-hesitant persons for overcoming their hesitation.

With regard to the criterion of legitimacy, it is a comparative advantage of the paying option that it takes vaccine-hesitant persons seriously and respects their right to their own point of view, even if it turns out to be the right to be wrong in their opinion. In contrast to punitive options, the paying option honors vaccine-hesitant persons as sovereign citizens and grants them minority rights even if the majority—including the authors of this article—hold the minority view to be factually mistaken.

This legitimacy criterion gains importance in times of a pandemic. On the one hand, public policy is tempted to dismiss the serious and legitimate concerns of vaccine-hesitant persons as irrational or based on cognitive biases. On the other hand, public policy is much more likely to make erroneous vaccination assessments given high(er)

uncertainty. Following Haire et al., "The combination of a large-scale safety problem [...] and a coercive policy may seriously damage trust in the integrity of the medical system in general and the public health system in particular."¹⁶ Considering this, the possibility of unintended and unexpected adverse effects toward vaccination favors rewarding over punitive options because the former keep the patient's informed consent at the center.

Regarding the criterion of equity, there is a further important advantage of the payment option in comparison to charging. As the willingness to pay a charge is not only dependent on the marginal utility of refraining from vaccination but also on the marginal utility of disposable income, the charging option exerts more pressure on poor citizens, for whom the charge may be a great financial burden, while it may be felt as a negligible financial fee to rich citizens. In sharp contrast, the payment solution is more attractive for poor citizens. It does not make them worse off, but better off. It provides them an additional option that they may take if it appears, from their subjective point of view, to be preferable to their relevant alternative(s).

Having clarified that, we would like to further emphasize that the paying option provides a comparatively stronger incentive for learning—that is, for correcting false beliefs regarding the benefits and costs of vaccines. While punitive approaches may trigger a response of defiance, it is much more likely that the financial reward encourages better information gathering and information processing, which makes it more costly to stick to the initially chosen level of rational irrationality, at the level of both individuals and collective sub-cultures.

These three comparative advantages, with regard to legitimacy, equity and learning, are not just a matter of principle. They also have practical implications. In contrast to punitive approaches, the payment option is much more conducive to correcting false beliefs and much less likely to be perceived by vaccine-hesitant persons as a fundamental offense to their human dignity. It is also much less likely to trigger massive resistance, for example in the form of legal disputes. Punitive approaches invite vaccine-hesitant persons to defend themselves by bringing the issue to court, thereby slowing down the process of vaccination. In contrast, the payment option is much less susceptible to such delays and in fact speeds up the process of vaccination. If the aim is to reach herd immunity as soon as possible, this procedural advantage might prove to be a rather important point.

In its essence, a favorable characteristic of the payment solution is that not all people need to get vaccinated, given a HIT under 100%. Rewarding people provides an incentive for self-selection. Politicians are spared from balancing out the relative importance of vaccination concerns based on religious beliefs, serious side effects, existing health problems, etc. Instead, the incentive for self-selection enables vaccine-hesitant persons as well as vaccine refusers to settle such "negotiations" among themselves, for themselves. With the payment option, they remain subjects, whereas the punitive options treat them as objects of paternalism.

¹⁴Coase, R. H. (1960). The problem of social cost. *Journal of Law & Economics*, 3, 1–44.

¹⁵Ibid: 2.

¹⁶Haire, B., Komesaroff, P., Leontini, R., & MacIntyre, C. R. (2018). Raising rates of childhood vaccination: The trade-off between coercion and trust. *Journal of Bioethical Inquiry*, 15(2), 199–209.

TABLE 1 Comparative evaluation of the four options—authors' own representation

	Moral appeals	Mandatory	Charging	Payment
Result in Figure 1	B	C	D	E
Effective?	No	Yes	Yes	Yes
Logic	Win-lose	Win-lose	Win-lose	Win-win
Legitimate?	Questionable	Questionable	Questionable	Clearly yes
Equity concerns?	Possibly	Possibly	Certainly	No (quite the opposite)
Incentive for belief correction?	No	No	Weak	Strong
Quick?	No	Maybe not (due to legal disputes)	Maybe not (due to legal disputes)	Yes
Interim evaluation	-	+	++	+++
Expensive?	No	No	No (positive fiscal revenue)	Yes

In sum, the payment option has only one comparative disadvantage (cf. Table 1 for an overview)—it is rather expensive with regard to fiscal expenditure. This negative feature explains why modern societies, for instance, do not pay their citizens for correct parking but instead fine them for incorrect parking, or why they do not pay them for legal behavior but instead sue them for illegal behavior. The upshot is that—absent an encompassing cost/benefit analysis—it is impossible to formulate an a priori judgment that the distinct advantages of the payment option always trump the relevant alternatives. Instead, one has to look at the specific circumstances. This is why we now turn to the current COVID-19 pandemic.

4 | APPLICATION TO THE CURRENT COVID-19 PANDEMIC

Litan advocates the payment option for dealing with the current pandemic.¹⁷ In his proposal, he argues that the United States should pay each citizen around \$1000 for getting vaccinated. This amount is supposed to be split into \$200 once the vaccine has been taken and \$800 once society has reached the threshold for herd immunity. In line with our characterization, Litan recommends a one-time payment to vaccinated persons, independently of whether some citizens would have taken the vaccine anyway without a monetary incentive.¹⁸

¹⁷Litan, R. (2020, Dec 17). If necessary, the U.S. should pay people to get a COVID-19 vaccine. *Brookings*. Retrieved from <https://www.brookings.edu/blog/fixgov/2020/12/17/if-necessary-the-u-s-should-pay-people-to-get-a-covid-19-vaccine/>

¹⁸Litan's plea for such a payment option is currently backed up by Serra-Garcia and Szech, who find in their empirical study that a compensation of at least \$100 can significantly increase COVID-10 vaccine demand, bearing in mind that a low compensation of \$20 can reduce the demand (Serra-Garcia, M., & Szech, N. (2021). Choice architecture and incentives increase COVID-19 vaccine intentions and test demand. *SSRN Electronic Journal*. Retrieved from <https://doi.org/10.2139/ssrn.3818182>). Also, a study by Robertson et al. revealed that a \$1000 payment incentive generated a 7.6% increase in COVID-19 vaccine uptake (Robertson, C., Scheitrum, D., Schaefer, A., Malone, T., McFadden, B. R., Messer, K. D., &

In general, it is a rather costly policy to pay people for doing the right thing. However, the immense economic fallout due to the COVID-19 pandemic requires policy makers to consider “whatever it takes” strategies and to revise common or even sacrosanct measures that aim at overcoming vaccine hesitancy. With respect to the United States, the billions of dollars needed to pay people for getting vaccinated are by far outweighed by the trillions of dollars lost in prolonging the economic malaise.

So, what speaks in favor of this particular payment solution? First, it is a prudent investment to set the payment amount high enough that it might even incentivize more people to get vaccinated than needed to reach herd immunity. On the one hand, such a reward would overcompensate possible crowding-out effects of peoples' intrinsic motivation to get vaccinated. On the other, it would also provide relief for (or at least would not harm) the relatively poor already struggling with the pandemic. Second, the costs of failing to reach herd immunity make it a prudent investment to pay not only vaccine-hesitant persons but every person for getting vaccinated. All things considered, the immense costs stemming from missing the HIT owing to an incentive problem of vaccination allocation make it feasible—and, as we argued, even strongly advisable—to accept the substantive costs of a payment strategy.

5 | CONCLUSION

Not vaccines, but vaccinations save lives, and this is what makes vaccination hesitancy a problem. Overcoming vaccine hesitancy in a pandemic is thus a pivotal driver for reaching herd immunity in due time. Against this background, we distinguished and analyzed four prominent options, namely the “moral appeal,” “mandatory,” “charging,” and “payment” options. They all aim at increasing the number

Ferraro, P. J. (2021). Paying Americans to take the vaccine—Would it help or backfire? *Journal of Law and the Biosciences*, 8(2), 1–19.

of vaccinated persons. We demonstrate that, in comparison, the payment option outweighs the alternative options in nearly every regard. There is only one exception—paying people to get vaccinated is expensive since it requires substantial fiscal expenditure. What makes the payment option categorically different, morally advisable, and overall superior in comparison to the relevant alternatives is that it aims not at *reducing* the subjectively perceived welfare of vaccine-hesitant persons but at *increasing* it. By doing so, it achieves making *both* vaccine-hesitant persons *and* the public better off.

Our analysis provides a paradigmatic change of perspective. In a pandemic, the medical profession tends to view vaccine-hesitant persons as a hindrance to quickly reaching herd immunity. Hence, it asks how to overcome this (bothersome) hindrance as soon and as reliably as possible. From both an economic and an ethical perspective, we hold that the rather pertinent question to ask is how we can reach herd immunity in due time while minimizing the (subjectively perceived) offense to the dignity of vaccine-hesitant citizens. Whereas the former question favors punitive approaches, the latter favors paying people for overcoming their hesitancy.

May the majority force a minority to act against their own individual will (even if the latter happens to be objectively questionable) when there exist comparatively less invasive methods that would lead to the same result? Our answer is a clear no: with respect to the current COVID-19 crisis, the payment option—being the minimally invasive option—is feasible and advisable. This may be an important insight not only in the short term but also with respect to future pandemics that are likely to come.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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