The carrot or the stick? Ethics of incentives and disincentives for vaccination in a pandemic

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Abstract

We review the possibilities for and ethics of the use incentives and disincentives to increase vaccination uptake. We argue that disincentives (or mandatory vaccination), such as fines, restriction of movement or education and withholding of benefits can be justified depending on four factors: the gravity of the public health emergency, the safety and effectiveness of vaccines, the comparative expected utility of mandatory measures compared to other alternatives, and the proportionality of costs imposed. We provide a decision algorithm for the ethical use of incentives. Incentives face problems of undue inducement and exploitation. We propose a novel Payment Model which would include economic costing of time, pain, risk of adverse events, including death, and compensation. If education, encouragement and facilitation fail to achieve herd immunity quickly enough, payment for vaccination maybe the fairest way to facilitate uptake of vaccination.

Text

The COVID-19 pandemic has given rise to the fastest development and roll-out of novel vaccines in human history. Initial clinical trials suggested that these vaccines were well tolerated and had a high degree of efficacy,[1,2,3] These results have since been corroborated by real world data.[4,5]

However, the vaccines have been associated with rare serious adverse events. Many countries suspended the use of the AstraZeneca vaccine due to rare cases of fatal blood clots and thrombocytopenia. There have also been concerns about an association between the mRNA vaccines and myocarditis/pericarditis.[6] The UK Joint Committee on Vaccination and Immunisation has recently recommended that vaccines not be offered to under 18s until more safety data is obtained.

Many countries have seen high vaccine uptake. As of the middle of June, approximately 45% of the UK and US population are fully vaccinated. However, in Australia, Japan and Malaysia less than 5% of the population are fully vaccinated.[7] Somewhere between 70-90% of the population need to be vaccinated to achieve herd immunity.[8]

Vaccine hesitancy is a significant obstacle and varies widely between countries.[9] A UK study suggests hesitancy of 18% across the population,[10] whilst a US study suggests a level of 22.1%.[11] However, vaccine hesitancy differs significantly between demographic sub-groups. There has been particular concern about vaccine hesitancy in health care workers, with some NHS data suggesting lower rates of covid-19 vaccination in ethnic minority health care workers.[13]

A number of strategies have been deployed, including community engagement work, tailored communication at hesitant populations from trusted sources, and improving flexible access to vaccination.[13] However, as viral variants emerge, some countries are considering other strategies: disincentives or incentives.

[Table 1 – Examples of Disincentives and Incentives Currently Employed For Vaccination]

Disincentives to Vaccine Refusal (Mandatory Vaccination)

It is a basic tenet of liberal societies that State restriction of liberty (coercion) is only justified to prevent "harm to others". Harm to self is never a sufficient justification.[14]

Vaccination generally offers a benefit and protection to those vaccinated. But it also affects others. Two key ethical features of pandemics are that people carrying an infection, even if asymptomatic, may pose a lethal threat to others, and secondly that large numbers of people falling ill simultaneously may overburden health systems, preventing others from accessing health care.

It is on the basis that an individual may harm others that coercive measures are ethically justified in a pandemic. These can include lockdown, quarantine, isolation, mask mandates, testing and mandatory vaccination.

For vaccination, a variety of coercive measures could be deployed, ranging from requirements to attend education sessions, to withholding of benefits and fines, imprisonment and in the extreme, compulsion (involuntary vaccination).[15]

[Figure 1. The Nuffield Council Intervention Ladder]

In choosing between different approaches, one commonly cited principle of public health ethics is that the "least restrictive alternative" should be used. However, there are two problems with this principle as stated: (1) the public health goal may be vague (e.g. herd immunity, but achieved over what period); (2) greater restriction of liberty may provide greater public health benefits.

A four step decision aid has been proposed to unpack these decisions.[16]

[Figure 2. Algorithm for Mandatory Vaccination]

Does the COVID pandemic satisfy these 4 criteria which must be met to justify mandatory vaccination? This raises difficult ethical issues.

Take proportionality first. Does the benefit achieved by the restriction outweigh the harms to the individual?

The principle of proportionality involves ethical value judgements. It can clearly be satisfied when vaccination poses small risks, and thus represents a duty of easy rescue: a person should be prepared to take on a small risk to personal health for a large collective benefit.[17]

But when the risks are greater, vaccination may not represent an easy rescue. We must then return to ethical judgements about which values take precedence. Some ethical approaches take a simple, but very demanding approach here. Utilitarians would require any level of sacrifice provided the sum of those sacrifices is smaller than the collective benefits. However, other theories might instead claim that no amount of public health benefit could be sufficient to outweigh certain rights.

Safety raises other complex value judgements. For older people, vaccination is not just an easy rescue, rather it is a benefit to them. It is good for the individual, and the collective. As we go down the age groups, the benefit to the individual becomes smaller, until for children, it is

questionable whether it is in their best interests. Moreover, this is a new virus and these are new vaccines, whose long term safety profile is not clear.

Until better information becomes available about safety, it is difficult to justify mandatory vaccination for all age groups. It would be easier to justify in those over 50, or over 65 where it is clearly in both the public interest and their interests (particularly if they have not been previously infected and acquired natural immunity or have some medical contraindication to vaccination) or in care workers who have special obligations.

Incentives for Vaccination Uptake

A second approach to increasing vaccination rates is to incentivise vaccination – see Table 1.

There are three ethical concerns raised against incentives. The first is that they will be coercive.[18] However, strictly speaking the offer of payment cannot itself be coercive. "Coercion" involves limiting, not expanding, a person's options. Coercive threats (like "your money or your life") remove an existing desirable option. But if a person is free to refuse the offer without any penalty (as applies to vaccine payments), the offer can't be coercive.

What some people refer to as 'coercion', is more properly "undue inducement", where a person's judgement is compromised because of the size of an incentive. They don't weigh the risks and benefits properly, and their decision to undergo the vaccine may not be sufficiently autonomous.

A final problem, opposite to the ones above, occurs if the payment is too small: exploitation. Exploitation occurs because of background injustice making a person vulnerable. If a person is poor, they might accept a payment only because of their poverty. This is a problem of justice, rather than autonomy. There are two ways to prevent exploitation: we could correct background injustice (in many circumstances that may be impractical in the short term) or we could pay people a fair and minimum price for the risks and labour involved.

If vaccination is not in an individual's interests (but is in others' interests) or if this is uncertain, it is better to consider vaccination as paid labour, where the individual is doing work for others. A 'payment model' of vaccination requires that the individual be paid for time, pain and discomfort, likely side effects and risk of death. There should also be a compensation scheme for serious uncommon harms.

What would be a fair level of payment for being vaccinated? Because the risk of death is very low, a minimum wage for vaccination is also likely to be quite low. See Fig 2 for an algorithm for incentives for vaccination. One challenge is that the appropriate minimum price may vary – since the risk/benefit will also vary across the population. But paying people different amounts for being vaccinated is probably unlikely to be politically acceptable. Accordingly, the price may be fixed according to the level of the highest risk (to lowest benefit) segment of the population.

[Figure 3. Incentives vs Disincentives for Vaccination]

Assuming it is neither too low (and hence exploitative) nor too high (undue inducement), the kind and extent of payment justified depends on what would work.

Do Incentives Work?

Of course, if an incentive scheme involves significant costs or harms without being effective in increasing vaccine uptake, then it cannot be justified. Would incentive schemes increase COVID-19 vaccination rates or undermine solidarity? Outside the pandemic context, financial incentives have been found to be amongst the interventions that were most likely to positively affect vaccine uptake,[19] Evidence of the effectiveness of incentives schemes in the context of hepatitis B and influenza suggest that financial incentives could be helpful in promoting adherence to COVID-19 vaccines.[20]

However, a recent systematic review identified incentive-based interventions as amongst the least successful measures in increasing vaccine uptake.[21] Moreover, it is not clear that effectiveness in other contexts will transfer straightforwardly to the use of incentives to increase uptake of a novel vaccine in a global pandemic. One survey study with 1349 participants suggested that payments of up to €200 did not increase willingness to receive a COVID-19 vaccine.[22] However, Germany has moved to paid system of plasma donation to increase rates and address shortage, with success.[23] The UK must import blood products from the US, where donors are paid, because it runs a purely altruistic system.[24]

Ultimately, the evidence regarding the effectiveness of vaccine payment schemes is somewhat limited, and the evidence that is available is mixed. Time will tell.

One concern is the affordability of such a scheme. But the costs of COVID are astronomical. And many countries are already providing "economic stimulus packages." For example, Australia provided 1-2 X $750 payments to certain benefit holders (pensioners, students, job seekers etc) The two payments will cost an estimated $8.8 billion.[25] That would have paid for a lottery where people had about a 1/200 chance of winning $100,000, or around $500 each to vaccinate about 20 million people. And the money would still stimulate the economy. Win-win.

Vaccine Passports: Incentive or Disincentive?

We have described the "carrot and stick" alternatives to reducing vaccine hesitancy. But what about vaccine passports (VPs)?

VPs allow those who have been vaccinated to enjoy greater freedom of movement, for example, travel or association, such as going to pubs or restaurants.[26] Israel and Denmark have introduced VP schemes.

VPs are sometimes described as an 'incentive' to be vaccinated or as a 'disincentive' to vaccine refusal. Partly this is simply a question of framing. However, whether it is accurate depends also on how we understand the ethics of pandemic restrictions. The only justification for overriding an individual's right to freedom of movement in the name of public health is that they pose a risk to other people, i.e. of transmitting the virus. If vaccines reduce transmission to a low level, then vaccine passports may be morally required, since it will no longer be justifiable to restrict a vaccinated individual's liberty.[26] That is independent of any question about the impact of VP on vaccine uptake.

If vaccination is only partly effective in reducing transmission, some justification for restricting the liberty of vaccinated individuals will remain – but VPs could still function as an incentive.

And if lockdown is not justified independently (perhaps because rates of infection/mortality are low in a particular country), restrictions of liberty could function as a disincentive to vaccine refusal.

Vaccine passports would be unethical if the vaccine posed unreasonable risks or the restriction of liberty was unnecessary to deal with the public health threat. They would also be unethical if they only allowed freedom of movement to people who were vaccinated but not to others who posed a low risk of transmission, for example, if natural immunity reduced transmission to a similar degree.

Conclusion

The general ethical problem for vaccination is that it can be in each person's self-interest for everyone else to be vaccinated, but for them personally to forgo the risks of vaccination. This is a classic tragedy of the commons (or 'free-riding') problem. It is part of what causes climate change and antimicrobial resistance. It is a social co-ordination problem. For vaccination, this problem is particularly apparent where there are relatively high levels of vaccination, or low incidence of infection. It may thus make it difficult to achieve herd immunity.

The main way humans have effectively dealt with such co-ordination problems (e.g. driving) is through regulation and laws that align self-interest with the socially desired outcome. It may be that achieving herd immunity requires incentives or disincentives. Mandatory vaccination may be ethical in some subgroups or in some circumstances (e.g. healthcare workers), but is more problematic on a whole population basis. To achieve high population levels of vaccine uptake, a payment for risk model, with a minimum fair level of incentive set in proportion to the risks and burdens incurred (along with compensation for injury) may be the fairest approach if education, encouragement and facilitation fail.

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Author Contributions

JS drafted the paper. JP and DW revised the paper including for substantial intellectual content. All authors participated in revision and approved the final version of the manuscript.

Competing Interests statement

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Figures

Figure 1. The Nuffield Council Intervention Ladder

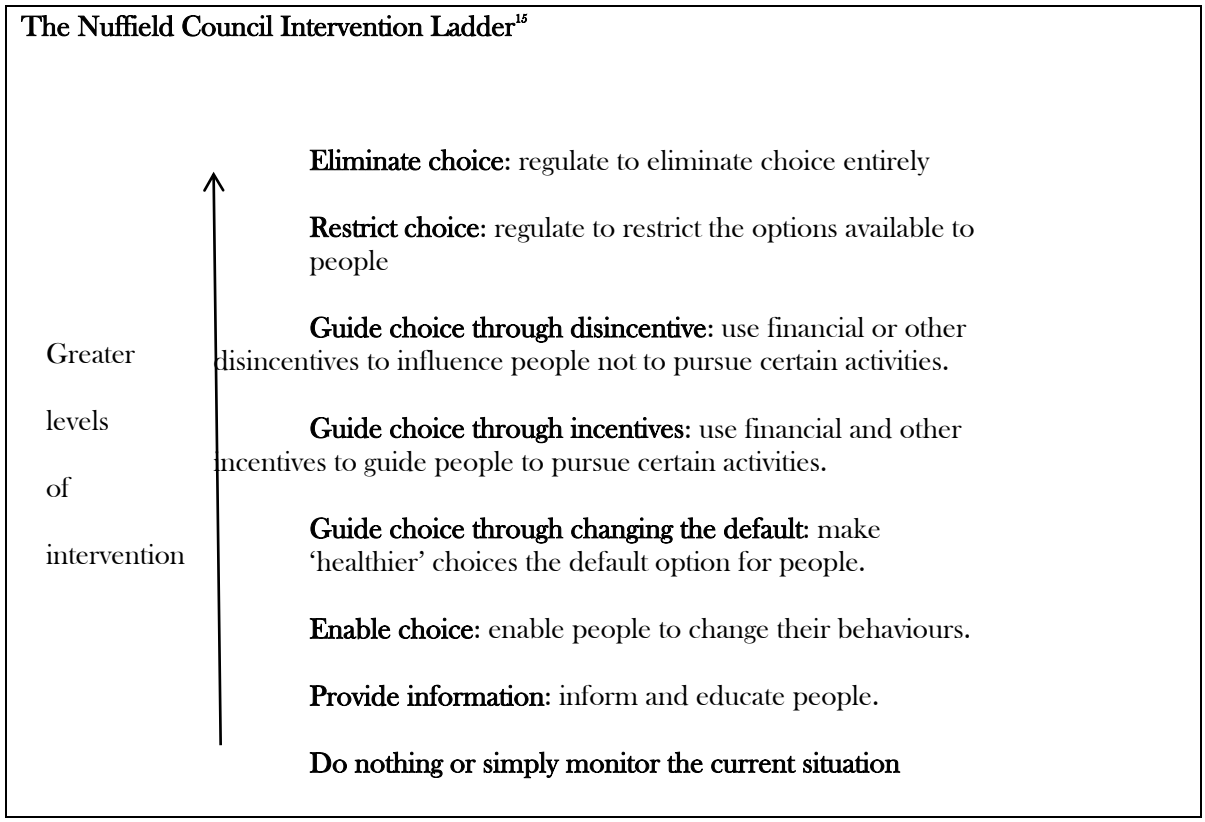

Figure 2. Algorithm for Mandatory Vaccination

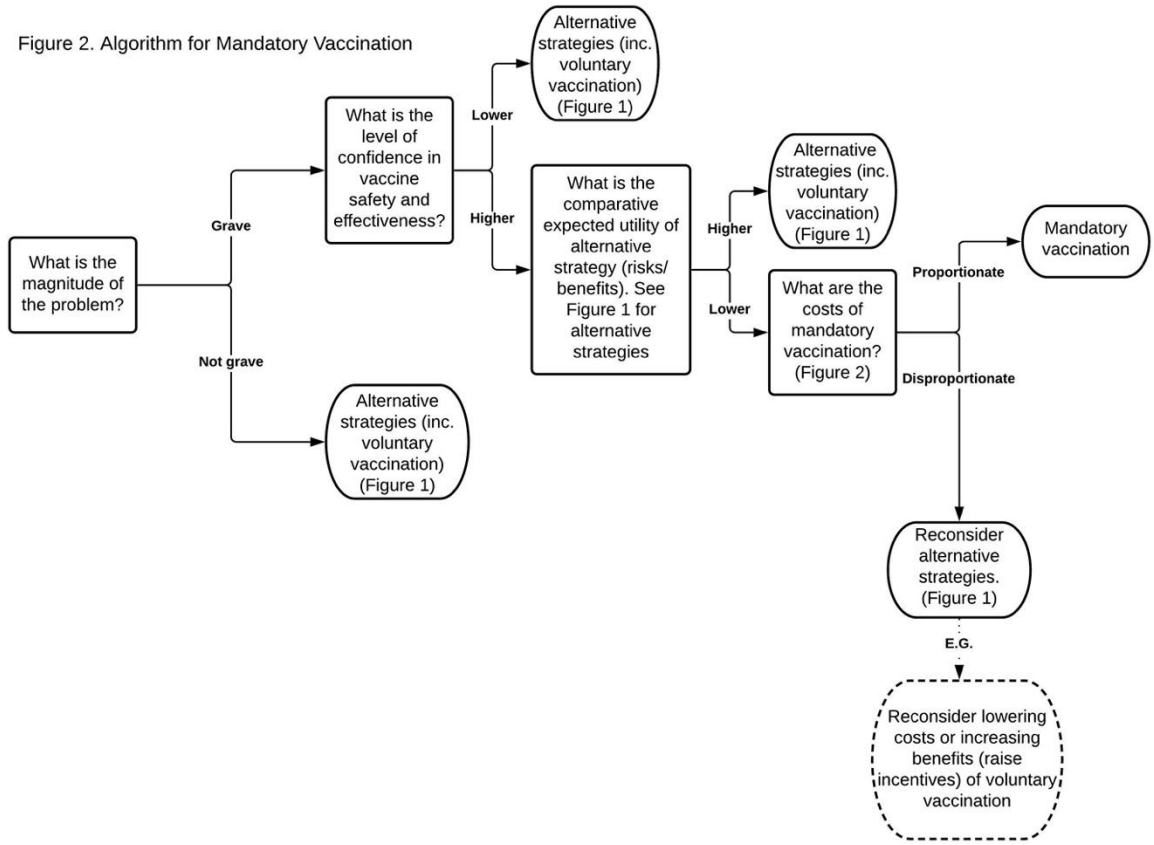

Figure 3. Incentives vs Disincentives for Vaccination

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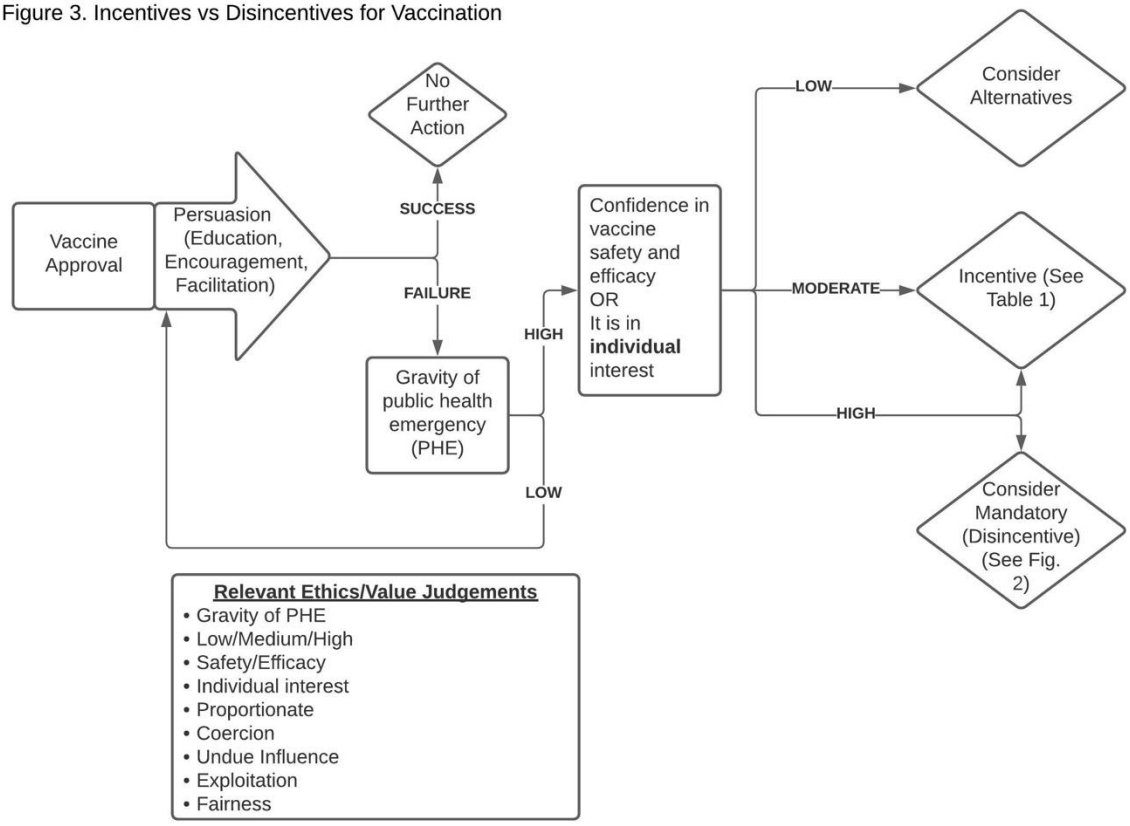

Tables

Table 1 – Examples of Disincentives and Incentives Currently Employed For Vaccination

Examples of Disincentives for COVID Vaccine Refusal		**Examples of Incentives for COVID Vaccination**
Fines Individuals who refuse vaccination may be made liable to fines (e.g. Indonesia) • Non-COVID example: €2500 fine for parents who fail to vaccinate children against measles in Germany		**Financial Payment** Citizens receive a lump sum in return for being *vaccinated* (e.g. Serbia paid citizens the equivalent of €25 to undergo vaccination)
Withholding State Benefits Individuals who refuse vaccination may have state benefits withheld or suspended (e.g. Indonesia) • Non-COVID example: Australian No Jab, No Pay scheme		**Lottery** Vaccinated individuals are entered into a cash lottery for a substantial cash prize (e.g. Ohio and Kentucky)
Vaccination as a Condition of Access to Publicly Accessible Social Goods Unvaccinated individuals may not be permitted to access certain goods such as education (e.g. vaccination as a condition of entry to campus in some US colleges) • Non-COVID example: immunization as a condition of public school enrolment in various US states		**Investments** Individuals may be offered savings bonds if they get vaccinated (e.g. West Virgina,16-35 year olds are offered a $US100 savings bonds if they get vaccinated).
Vaccination as a condition of employment Individuals may be prevented from entering or continuing in a professional role if they have not been vaccinated (e.g.. older adult care home staff in England, service staff in Moscow) • Non-COVID example: Hepatitis B vaccination in healthcare workers		**Payment in Kind** Vaccinated individuals are offered a non-financial payment (e.g. free beer in Conneticut, guns in West Virginia)