

Would It Be Right to Make Vaccination Mandatory? Professor Imogen Goold 17th January 2023

Introduction

- Welcome to my second lecture in this series of three lectures on Medical Law and Ethics
- Today I want to talk about whether it would be right to make vaccination mandatory
- First a point about approach
 - I think the way some those who have concerns about vaccination are sometimes portrayed or spoken to is deeply problematic
 - We can disagree without denigrating
 - We can disagree without mocking
 - And you don't change anyone's mind by making fun of them or calling them stupid
 - So while I have my own view, and I am strongly in favour of vaccination, I'm also strongly in favour of listening to people who have different views in a way that is respectful
 - Therefore, if you are watching this because you have concerns about vaccination, please know that I will
 - Provide what I consider to be trustworthy information
 - Some of that information will recognise that vaccines do carry risks
 - Endeavour to consider all sides, while still taking a position in favour of vaccination
- And if helps to build trust in this, while I am in favour of vaccination, I have a relative who believes
 they may have suffered a vaccine injury that has had lasting effects on their quality of life
 - o So while I do favour them, I do also understand why some people may have concerns
- Second a point about scope
 - I don't intend this to be a lecture that delves into huge depth about each and every disease or every vaccine
 - There are too many
 - There's so much complex data
 - But if you DO want more information, a really good starting place for information is the Oxford Vaccine Knowledge Project
 - The link is here on the slide and in my transcript
 - https://vk.ovg.ox.ac.uk/vk/
 - And I have also included some sources of data from Public Health England, including access to data requested on the risks associated with vaccines via FOI requests
 - Public Health England vaccination data



- https://www.gov.uk/health-and-social-care/health-protection-immunisation
- Public Health FOI requests
- https://www.ons.gov.uk/aboutus/transparencyandgovernance/freedomofinformationfoi
- I also I don't intend this to be a lecture that rehashes debates that have been well covered elsewhere
 - Eg MMR and autism
- I DO intend this to be a lecture that tries to
 - Give a sense of the good things vaccines do
 - Recognise that people have understandable and possibly legitimate misgivings about
 - Vaccines generally
 - Some vaccines in particular
 - Explores why people refuse vaccination
 - And then considers the question of whether a mandatory approach of some kind is the right approach
- My goal is to offer
 - Some general information, and
 - Some ways of thinking about the question
- I'll try to give you some balance and some ways to help you shape your own view on whether or not we ought to make vaccination mandatory

Benefits of Vaccination Programmes

• We can see the benefits of vaccination from both past programmes and the impacts they had and the impacts of the current programmes

Major Successes of The Past

- Two major success stories over the 20th century are:
 - Smallpox
 - o Polio
- Spread person-to-person (saliva and droplets in breath)
- Incurable
- Fatality: 30%
- Survivors could be left with severe scarring
- Early efforts to control the disease involved variolation (infection with some of the virus itself under the skin)
- Edward Jenner developed his famous vaccine based on cowpox at the end of the 18th century
 - o Widespread use of the vaccine led to a dramatic decline in the disease
 - This shows decline in smallpox as a cause of death in London in the 19th century
 - Drops from 18% of deaths were caused by smallpox
 - To 2% or fewer
- Smallpox vaccination was made mandatory in parts of the US and in Britain in the mid-19th century
 - Vaccination Act 1853 → mandatory vaccination for infants up to age of 3 months



- o smallpox vaccination certificates required for travel.
- However, smallpox continued to cause many deaths around the world despite more vaccines being developed
 - o 20th century alone estimated that between 300-500 million people died
- In the 1950s World Health Organisation decided to launch a bold programme to end the scourge of smallpox
- Smallpox Eradication Programme 1959-1980
 - Launched by WHO
 - Involved
 - Political commitment
 - Supply of vaccines
 - Funding
 - local surveillance officers and health workers
 - widespread vaccination and then targeting approaches
- Many developed countries had eradicated it by the 1960s
- Intensified programme focused on developing world
- Smallpox declared eradicated: 1980
 - Declared May 1980 by the World Health Assembly
 - First disease to be eradicated

Second major success story is polio

- Spread via person to person contact
 - In saliva and faecal matter → can't survive long outside
- Incurable (ventilators, physical therapy, antibiotics)
- Causes: meningitis (1-5%), paralytic disease (0.1-0.5%)
- Can lead to temporary or permanent muscle paralysis
 - Can cause death by paralyzing the muscles used to breathe
- Fatality: 2-10% death rate for paralysed
 - 'Iron lungs' were used to help those paralysed to breathe, particularly when they became more widely available in the 1950s.
- Survivors could be left muscle pain, weakness ('post-polio syndrome')
 - Mary Berry: had polio when she was 13
 - Left her with permanent curvature of the spine and slightly misshapen hand
- Vaccines for polio were developed in the 1950s
 - Jonas Salk inactivated vaccine
 - o Albert Sabin live attenuated vaccine
- See the impact of the vaccine in the United States here
 - 1952 and 1953 experienced an outbreak
 - Over 3000 deaths in 1952
 - Around 1500 deaths in 1953
 - Vaccination commences 1955



- Death rates drop
- By 1960s less than 50 deaths per year and remains that way and is essentially no deaths from the 1980s onwards
- Many wealthy countries greatly reduced incidence of polio in this way
- However, polio remained in many other countries around the world
- Global Polio Eradication Initiative: 1988-present
 - Led WHO working with the US CDC, UNICEF and the Gates Foundation
- 1988: 350,000 cases
- 2000s: ~1000-2000 cases annually
- < 700 cases in 2021
- Estimated to have prevented 2.2 million cases

Really clear from this that vaccination programmes work to reduce the incidence of disease

- Locally
- Globally

These were big, world-wide diseases that had terrible impacts on health

What about what we do now, here, in the United Kingdom?

Let's look at what we do now and the impacts it has

Current Vaccination Schedule

- We vaccinate for many diseases in the United Kingdom
- From very early age
- The schedule of vaccines is complicated, but briefly this is what we do:

First we vaccinate in infancy:

Then a series of vaccines is given during childhood

- Some are boosters
- Some are vaccinations for other diseases

Vaccination schedule

Vaccines we give and the diseases against which they protect (between 2 and 16 years)

Hib/MenC

- Haemophilus influenzae type b (Hib)
- · Meningitis C

MMR (2 doses)

- Measles
- Mumps
- Rubella

Flu vaccine (yearly)

Further doses of MenB and pneumococcal vaccine

Covid vaccine

4-in-1 preschool boosterDiphtheria

- Polio
- Tetanus
- Whooping cough (pertussis)

HPV

human papillomavirus

MenACWY

Four strains of the meningococcal bacteria that cause meningitis and blood poisoning (septicaemia)

3-in-1 teenage booster

Pneumococcal infections





And then other vaccinations are given in adulthood

- Some you can seek out yourself (travel vaccinations)
- Many are offered by the public health service

Why These Diseases?

I don't want to go through the whole schedule, but I want to use examples from it to explain why we vaccinate as we currently do because it's important to break this down to ground our discussion of whether any or all of these vaccinations should be mandatory.

- Different reasons to vaccinate
- Different diseases
- Different goals
- Some vaccinations can achieve more than one of these goals

1. Protect The Vaccinated Individual From Non-Communicable Diseases

- Some vaccinations protect us from diseases that are *not* passed between people
- A good example is tetanus
- Tetanus is caused by bacteria getting into wounds
- The bacteria lives in soil, manure, dust
- You get it when an object that has the bacteria on it punctures the skin (eg an old nail) or it gets in through already broken skin (ie from dirt)
- Causes very painful muscle spasms which last for weeks
- They can be bad enough to break bones
- It can be treated with an injection, and muscle relaxants are used to calm the spasms
- The vaccination prevents it

2. Protect The Vaccinated Individual From Communicable Diseases

- Many diseases against which we vaccinate are communicable diseases spread between people
- By coughing, sharing bodily fluids and so on
- Vaccines can protect the vaccinated person from communicable diseases by:
 - Teaching their bodies how to react to the disease so it either doesn't develop or has less severe symptoms
- Sometimes this is to protect against the possibility of severe illness that can, sometimes, lead to death
 or disability
- A good example is meningococcal disease
- Rare but can be very severe
- Can cause meningitis and septicaemia
- Complications include:
 - Deafness
 - Nervous system problems
 - Amputation of limbs
 - o Brain damage
- 10-15% of people with meningococcal disease will die

It's also an example of a disease where vaccination has reduced cases



3. Protect Others From Contracting Communicable Diseases

- Vaccinating also helps prevent the spread of disease to other people
- This happens in a variety of ways
 - By reducing symptoms in the vaccinated person, they may be less likely to pass it on (eg by coughing)
 - o By preventing the disease in the vaccinated person so they don't have it to pass on
 - Hence the idea of achieving 'herd immunity' or at least high levels of vaccinated people in the community, so there are very few people to pass it on (as vaccinated people won't be affected and pass it on)
 - Via what's called 'ring vaccination'
 - Where contacts of a person with the disease are vaccinated, which isolates the disease in the infected person and it can't pass to the ring of vaccinated people around them
 - This was used to deal with isolated cases of smallpox by the WHO
- Crucially, not everyone can be vaccinated
 - Very young children
 - Those with conditions that mean they are likely to have adverse reactions
 - People with conditions that already weaken their immune systems
- These people are protected if others are vaccinated
- A good example is whooping cough (pertussis)
- Whooping cough can have very severe impacts on babies and young children
 - Before vaccination began, there were 1000s of cases each year and in some years, as many as 2000 deaths
 - Post introduction of vaccination, rates dropped to virtually no deaths each year.¹
- · Clearly, vaccination is protective
- But the problem is that very young babies cannot be vaccinated their first vaccination is at 8 weeks
 - Until then they are vulnerable
 - Fully vaccinated by 16 weeks
- Those babies are protected in two ways
 - 1. Very low prevalence of whooping cough due to high vaccination rate in the population (vaccination rate is around 94%)
 - So they're protected by the fact that not many children get whooping cough and it's not widespread
 - 2. Since 2012, was introduced for pregnant women
 - Ensures mothers don't pass it on
 - Important because either they may not have been vaccinated and because vaccination protection for whooping cough wanes with time
- Impact of the 2012 measures
 - o NHS reports:

¹ https://vk.ovg.ox.ac.uk/vk/pertussis-whooping-cough



 'Babies born to women vaccinated at least a week before birth had a 91% reduced risk of becoming ill with whooping cough in their first weeks of life, compared to babies whose mothers had not been vaccinated'²

4. Protect Others From The Impact Of Communicable Diseases

- There are some diseases which if caught by a person when they are pregnant can cause harm to the foetus they are carrying
- Chicken pox is one example
 - o Can be very harmful if contracted either early on in pregnancy or just before birth

Another is rubella

- o Rubella itself is usually a very mild disease, even in children
 - In rare cases can lead to encephalitis, pneumonia and bronchitis
 - But usually mild
- But if caught in pregnancy, rubella can cause what's called 'congenital rubella syndrome' in the foetus
- It is worst if caught in the first three months of pregnancy (when some people may not even know they are pregnant)
- The most common CRS symptoms are:
 - Hearing loss
 - Eye problems
 - Heart problems
- It can also cause miscarriage, stillbirth, neurological problems and many other issues in the unborn baby
- So preventing it is very much about protecting against harm to foetuses in utero ie future people
- And we can see that the impact of vaccination on incidences of CRS has been marked
- So vaccination in this case has prevented harm to others

These are the beneficial things vaccines do.

It seems they do a great deal of good.

And yet, people have reservations.

Why?

Let's look at these views now.

Then we'll think about the normative arguments about what we *should* do.

² https://www.nhs.uk/pregnancy/keeping-well/whooping-cough-vaccination/



Why Do People Refuse Vaccinations?

History

Resistance to vaccinations is not new

Very famous image in response to Jenner's cowpox-based vaccine

Suggesting, as a caricature, that the vaccine will produce the traits of cows in those who receive it.

- Vaccine protests throughout the 19th century
 - o United Kingdom and elsewhere
 - Anti vaccination leagues formed
 - Pressure to repeal the compulsory vaccination acts
 - Some didn't like Jenner's method
 - Some didn't believe the smallpox passed between people
 - Some felt it was an infringement of their liberty

Current views

- People refuse vaccinations for a range of reasons
- There is a lot of research on these reasons
- Many of them inter-relate to one another
- There are some key strands in these arguments that we can tease out
- First, we need to look at the claims about vaccinations that are made
 - These can be asserted facts about vaccinations
 - Or they can be facts about the diseases they aim to prevent
- Second, we need to look at the normative implications of these claims
 - That is, what these claims mean we ought to do or not do
 - o This has implications for
 - What we might say people's moral obligations are
 - And what we might say the law should require of us, or alternatively, what it should refrain from requiring

So what I mean is, to understand objections to making vaccination mandatory, it's a matter of first understanding why someone might not want a vaccination and then what they argue *normatively* as a result of that fact claim

So let's look at some of the reasons often given for not wanting a vaccination and the moral positions they lead people to take

- I can't pretend to do justice to the range or nuance of these arguments here
- And I can't and don't intend to respond in detail to the factual claims made within them.

1. Vaccines Are Not Risk-Free – They Can Be Harmful

- Arguments about risks associated with vaccines raise a number of concerns about how vaccines may be harming
- These include:
 - Vaccines contain dangerous substances that are harmful
 - Vaccines can cause disease in the vaccinated individual
 - Vaccines can cause disease in people who come into contact with the individual



- Vaccines cause dangerous side-effects
- Vaccines produce allergic reactions
- It is true that vaccines carry risks
- These can range from very mild side-effects to severe reactions and death
- For some people, vaccines have specific risks related to their health conditions
- Others are risks to everyone

Concerns are also raised about

- Long term risks that we don't know about
- Limits of scientific knowledge
- · Limits of safety trials
- · Then it is argued that
 - o Individuals should weigh these risks themselves
 - Refuse vaccination where the risk to themselves outweighs any benefits

Most of these risks are known. They are listed on public websites and easy to access.

It is true that vaccines are not 100%

So much so, that the Government runs a Vaccine Damage Payment Scheme

It is also true that vaccines are researched, tested and data collected about risks

- Vaccine development is highly regulated
 - Nationally
 - International standards and directives
- Vaccines go through four phases of testing after they are developed
 - Small initial trials
 - o Larger trials
 - o Review of trial data before licensing
 - Post-deployment ongoing monitoring
- Medicines and Healthcare products Regulatory Agency records adverse events
- It's also true that before a vaccine can be rolled out, the risks must be outweighed by the benefits
 - But if one is focused on the risks to oneself, this may not be relevant or sufficiently compelling
 - 2. The Diseases Against Which Vaccines Protect Are Not That Dangerous
- This is the claim that while some diseases may be harmful, others against which we vaccinate are not particularly bad
- So it might be said that rubella is not that dangerous a disease
 - It rarely leads to complications
 - The symptoms are mild
- This is a claim that's often made about measles
 - Many people have had measles and had only mild disease with no lasting implications
 - I'm one of those people
- Then it is argued that therefore, it's necessary to be vaccinated (the disease isn't too bad) or it's not worth the risk (it's not too bad when compared to the risks)



Now these are partly claims of fact (how severe is the disease) and normative claims (what it is right or reasonable to do given those risks)

In evaluating this argument, one would need to challenge two aspects:

- First the factual basis
- Second - the normative aspect later in more detail, but it's essentially that individuals have the right to choose which risks they run – challenge this as an ethical position
 - We'll come to this later

On the facts we can challenge by evaluating the data and thinking about risk

- So here, we could agree it's true rubella is largely mild BUT we could also say it's true that sometimes
 it causes severe disease
 - o We'd need the full picture which would tell us about the risks
 - How often is it severe?
 - How severe can it be
 - We could debate that
- We could do the same for measles
 - So we might do this in a number of ways.
- One is to look at the severity of the disease and the rates of severe disease
 - o Measles is often mild, if unpleasant
 - But we also have *lots* of data about what happens when measles is severe
 - Around 5% of cases of measles in children develop into pneumonia
 - 0.1% of cases in children develop into encephalitis which can cause deafness or intellectual disability
 - We know that measles can lead to death
 - Around 0.1% to 0.3% of cases of measles in children results in death
 - That's now. With good treatment

3. We Don't Need Vaccinations to Reduce Disease

But this is where we can see one of the concerns raised by those who are dubious about vaccination

- That we don't need vaccinations to reduce disease.
- Diseases can be treated (especially if they are not that bad)
- If we're healthy enough, we can resist them
- And also that some diseases declined without vaccination

This is a claim made about measles

• We can see a decline in death rates from measles:

We CAN see that even though the vaccine did reduce the incidence of measles, it was declining before the vaccine was introduced.

This leads some to argue that the vaccine isn't needed:

So if you already thought vaccines might carry risks, that disease could be reduced in other ways, this would be an additional reason to resist them

These kinds of arguments have some basis to them.

- Measles was declining before the vaccine and we can explain that
 - The 1940s and 1950s was a period of expansion in the development and use of antibiotics.



- Measles is a virus
- BUT one of the key ways in which measles leads to death is it can lead to bacterial pneumonia
 - THIS can be treated with antibiotics
 - o And this is what began to happen in the pre-vaccine period and explains the drop in death
- The drop in cases can be explained by improvements in sanitation and nutrition in this period that reduced the spread

None of this means that it can't be true that some of the diseases vaccines treat aren't serious.

And it can be true that all these factors, including the vaccine, reduce deaths.

But the MAIN thing that it means is that

- We need to have a discussion about facts and empirical claims
- · We need to interrogate evidence carefully
- So an example of the other side of this would be Covid vaccines we know that young children very rarely experience severe Covid
 - So there may well be fair claims to make about whether that disease is sufficiently severe relative to risks
 - In other contexts, the information on which these claims rest may not be good and so the normative position is not well supported

To consider such arguments, therefore, requires interrogating its factual basis *and then* the normative position it founds (as with the other claims and arguments).

4. Mistrust

- This is a different kind of concern about vaccines
- It interacts with the others
- People who raise this argument not only think vaccines are harmful, but they also believe that the information we are given by healthcare systems or governments is *wrong*
- They may assert it is wrong because:
 - It is misleading only one part of the picture is shown
 - o It is deliberately false
- Such beliefs may derive from
 - General mistrust of governments and health data
 - Specific mistrust of information about vaccines eg beliefs that we are being mislead to ensure we accept vaccines
 - Distrust of the healthcare system
 - This might arise from individual past experience
 - Or we know that some groups have a history of mistreatment in healthcare systems that leads to an ongoing mistrust
 - For example, the impact of the Tuskegee Syphilis study on African American people's trust of healthcare systems
- I don't intend to explore whether these beliefs are well-founded
- I do think it's right to recognise, however, that it is not the case that there is no foundation for distrust
 - Particularly amongst some groups, who have collectively been failed or mistreated as a group by some healthcare institutions and systems and so the historical basis of the belief is at the very least understandable



- Individuals may also have been failed, and their mistrust understandable
- And some individuals may continue to face racism or other problematic attitudes that understandably erode their trust in healthcare systems.
- But it's also important to notice that when we have only part of the picture, such perspectives are understandable
 - o The measles data is a good example of that
 - Taken in isolation, it absolutely does look dubious
 - More fully interrogated, it's explicable
 - 5. Moral objections to how vaccines are made

These are different claims about vaccines, but they are still factual claims

But they are claims with ethical importance to some people

Why Do We Need to Do Anything?

Given that there are many benefits to vaccination, but there are also people who refuse or are hesitant about them.

The benefits of vaccination are seemingly very clear.

So why would we even consider making vaccines compulsory? Or doing anything at all? What's the problem?

At times, we see drop off in vaccination rates.

We also see resistance to Covid vaccination, even during a pandemic.

When vaccinate rates decline:

- Some people who aren't vaccinated may be affected by disease
 - Vulnerable people
 - Very young children
- This is because
 - These unvaccinated people are vulnerable
 - There isn't sufficient vaccination to achieve protective levels (what's called 'herd immunity') where unvaccinated people are protected because most others are vaccinated and so they are not exposed to disease

We can see these effects at various times

- When concerns were raised about whooping cough vaccines
- Post the MMR/autism debate we see rising rates of measles
- This slide shows data was produced by Public Health Wales as part of its response to the recent outbreak of measles
 - o It shows the year of birth of the children affected by measles
 - As the report points out, the majority of those affected were born during the period when MMR
 uptake declined following concerns about an association with autism
 - This group has lower rates of vaccination than older and younger cohorts
- If we believe vaccines prevent disease we might want to increase vaccination to
 - Protect people from themselves
 - Protect people from others who may give them the disease (when they can't protect themselves)
- Vaccination programmes also



- Reduce healthcare costs
- o Have broad positive economic impacts (including financial security improvement)
- So there are good reasons to want to increase vaccination rates.
- The question is HOW

What Should We Do?

There are number of ways to approach the issue.

To work out what to do, there are a few things we need to think about.

One is what values and principles are at stake

- Individual autonomy
- Parental responsibility for children
- Beneficence and protecting vulnerable people
- Protecting people from themselves
 - We might think of it as paternalism
 - We might think it's an aspect of providing care for people
 - And it is an element of the public health system's role
- The relationship between the state and individuals

Another is to think about ethical frameworks via which we might think about it

- Respect for autonomy
 - Seeing autonomous decision-making as the key value that should be protected
 - The legal system in this country is very much committed to this view
 - But we can also instances where autonomy is overridden even for our own benefit
 - Seatbelt rules
 - Even taxation providing infrastructure for our benefit
- Utilitarianism
 - Doing what's best overall
 - This might be increasing community health even if it means overriding individual choice
 - Or we might think about which strategy is the most effective for increasing health overall
- Ideas about fairness
 - Whether it is fair to share the risks of preventing disease
 - What the implications of fairness are in the context of vaccination

And we might want to weave into this thinking considerations of

- Proportionality
- The right role of the law in relation to citizens
 - So just because people ought morally to do something may not mean that it would be right for the law to make them do it

So I'm going to approach this by:

- first examining the issue by *presuming* we should preserve autonomy if we can
 - o autonomy being considered a very important value



 then exploring an alternative approach proposed by Alberto Giubilini grounded in fairness considerations

Starting With Autonomy

This way into the issue starts with considering autonomy as the most important value

We should respect people's choices

Before we override individual autonomy, we need to consider whether it is justified

To determine this

we need to know what level of vaccination is sufficient

But even that begs the question: what is 'sufficient'

- do we mean 'herd immunity'?
- do we mean no deaths?
 - If not, is there an acceptable level of vaccine-preventable deaths that should be tolerated to strike a balance with autonomy
- do we mean eradication of the disease?

These are difficult questions

And to evaluate them, we need to think back to:

- The reasons we vaccinate
- Protecting people from harm by ensuring they are vaccinated
 - Preventing infection
 - o Preventing transmission
- Protecting vulnerable people

We can immediately see that the reasons attached to different vaccinations matter when we want to think about whether it is acceptable to override autonomy

- Different vaccines implicate different values
 - Those protective of the individual → the least good reason to override autonomy where that individual has a different view on risk
 - Unless we think being beneficent or paternalistic is the right approach
 - This would apply to tetanus
 - The protective of the vulnerable implicate other values
 - We may have stronger reasons to override autonomy
 - We may consider we all have obligations to those who cannot protect themselves.
 - Examples would be
 - Whooping cough
 - Rubella
 - With these, we vaccinate ourselves to protect them
 - We may also think we have obligations to those children to vaccinate them
 - This might legitimate placing demands on parents to accept vaccination
 - Diseases that can be more easily prevented / protected against / are less severe also have different implications
 - We arguably have more personal responsibility when the disease we pass on may harm others more



- Smallpox was an example
- Difficult to prevent as so contagious, and very severe in impact
- Conversely, diseases against which we can guard may have less claim
 - Eg human papillomavirus (HPV)
 - Only passed on through intimate skin to skin contact (eg sexual relations)
 - Can reduce risk of passing it on via regular screening
 - Only passed on between sexually active teens and adults

1. Ways To Increase Vaccination Uptake

Another strand to this thinking is what strategies we can use to increase vaccinations.

Some require mandatory vaccinations, many don't.

This where before we decide to override autonomy, we need to remind ourselves of the reasons *why* people resist or refuse vaccination.

If we can address those reasons through other means, mandatory vaccination becomes unneccesary

Starting with Fairness

- Alberto Giubilini
- · Argument for mandatory vaccination grounded in fairness concerns

The Free Rider problem

- Public goods are ones in which we can all share and it's not possible to exclude anyone from their benefits
 - o Roads are a good example
- People 'free-ride' when they take the benefits of those collectively produced goods but do not pay for them
 - In the context of vaccination, this means they do not themselves get vaccinated
 - This means they don't put in the effort
 - o They also avoid any risks
- Free riding isn't necessarily that bad per se
 - It may just irritate us
 - Although it's also unfair
 - It is particularly unfair if those *least* able to bear the risks are the ones who must take them
 - Those with less healthcare
 - Those more likely to be exposed to the disease risk
 - And studies show it is in some contexts exactly what happens
 - o Correlations between affluence and refusal of vaccinations for children
- It is also bad if many people make the decision to free-ride
 - If they do (which if they are self-interested and believe enough people will vaccinate so that they are still protected) it may be that vaccination levels drop so low that in fact protection is insufficient
 - This IS what happens when people make individual decisions about risk
 - They may not realise they are free-riding



- They may not be doing so deliberately
- So it might not be about free-riding per se, but just how

Giubilini's argument is set out very clearly in his book: *The Ethics of Vaccination* (which can be accessed here: https://link.springer.com/book/10.1007/978-3-030-02068-2)

Other considerations

- Exemptions
- Ameliorate the impact of mandatory vaccinations with comprehensive conscientious objection schemes

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