



The ethics of disease eradication

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ABSTRACT

This paper provides an examination of the ethics of disease eradication policies. It examines three arguments that have been advanced for thinking that eradication is in some way ethically exceptional as a policy goal. These are (1) global eradication has symbolic importance, (2) disease eradication is a global public good and (3) disease eradication is a form of rescue. It argues that none of these provides a good reason to think that individuals have special duties to facilitate eradication campaigns, or that public health authorities have special permissions to pursue them. But the fact that these arguments fail does not entail that global disease eradication is ethically problematic, or that it should not be undertaken. Global eradication of a disease, if successful, is a way of providing an enormous health benefit that stretches far into the future. There is no need to reach for the idea that there is a special duty to eradicate disease; the same considerations that are in play in ordinary public health policy – of reducing the burden of disease equitably and efficiently – suffice to make global disease eradication a compelling goal where doing so is feasible.

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1. Introduction

Global eradication of disease has fired the imagination since the introduction of vaccination, a possibility that Jefferson brilliantly expressed in his letter to Jenner: ‘Medicine has never before produced any single improvement of such utility. . . Future nations will know by history only that the loathsome smallpox has existed and by you has been extirpated’ [1]. Whilst it was over 170 years before Jefferson’s dream was realised, smallpox was indeed globally eradicated by the end of the 1970s, and remains an iconic achievement of the twentieth century.

In general, to eradicate a disease is to reduce to zero the incidence of the disease through deliberate efforts [2]. To eradicate a disease globally is to remove the disease threat from the whole world, permanently: in a recent consensus definition, “the worldwide absence of a specific disease *agent* in nature as a result of deliberate control efforts that may be discontinued where the agent is judged no longer to present a significant risk from extrinsic sources (e.g. smallpox)” [3].

This paper is concerned with the ethics of global disease eradication. No one could reasonably deny that the global eradication of smallpox, which had been a major cause of morbidity and mortality for thousands of years, was a good thing. To this extent, the ethics of eradication is straightforward. However, it is important to

counterbalance this ethical commonplace with the recognition that there were a number of failed and expensive eradication campaigns in the twentieth century, including yellow fever, yaws and malaria [4]. In some cases – like yellow fever – the disease should probably not have been a candidate for eradication attempts in the first place, as it has an animal reservoir. In other cases, the failure may more accurately reflect the intrinsic difficulty of globally eradicating a disease, even where it is correctly judged to be technically feasible to do so. Factors responsible for this high level of difficulty include the degree of international coordination and cooperation over a prolonged period that are required for successful global eradication campaigns, the challenges of ensuring that enough individuals continue to be vaccinated to maintain herd protection everywhere in the often long period between the disease being eradicated locally and being eradicated globally, and the continual risk that cases will be exported back into territories that were previously free of the disease as a result of war or political instability [5]. The long endgame of the polio eradication campaign provides a vivid example. The World Health Assembly committed to the eradication of polio in 1988, with eradication originally scheduled to be completed by the year 2000. Recent instability has seen an increase in the number of countries exporting wild poliovirus, a WHO declaration of a Public Health Emergency of International Concern, and doubts about the achievability of the most recent target date of 2018.

Eradication campaigns differ markedly from standard medical treatments, and even from standard vaccination campaigns, in the way that their burdens and benefits are distributed. In standard

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contexts of medical treatment, the expectation is that the recipient of the treatment will be its main beneficiary; to give just one example, the International Code of Medical Ethics states that “a physician shall act in the patient’s best interest when providing medical care” [6]. In standard vaccination campaigns, the expectation that the individual person vaccinated is the main beneficiary remains, but such campaigns also aim to create spillover benefits to others from herd protection.

As a global eradication campaign moves closer to success, less and less of the expected benefits of a vaccination will accrue to the person vaccinated, and more and more to the world at large through the elimination of the health threat from the environment. As the number of cases of the disease approaches zero, the expected benefit to individuals who are vaccinated may become less than the expected costs, if the vaccine itself poses at least a minimal risk [7]. It is sobering to realise that there were between 200 and 300 deaths in childhood as a result of complications such as encephalitis following smallpox vaccination in the US between 1948 and 1965, but only one US death from smallpox in this period [8]. Whilst the risks of the oral polio vaccine are much smaller than those from the smallpox vaccine, they are far from infinitesimal. It is thus not immediately clear that a global vaccine-based eradication campaign could be successfully completed if all healthcare professionals took literally the demand that each intervention they provide should be in the best interest of each patient considered as an individual.

Even if it will be against the self-interest of some individuals to be vaccinated, this does not entail that eradication campaigns are unethical. Eradication campaigns are large-scale policy interventions. No one expects that an ethically acceptable government policy must be conducive to the best interests of each person considered as an individual [9]. Indeed, government policies frequently allow suffering and death to occur in the pursuit of broader social goals, without these policies being thought to be automatically unethical on this basis. For example, road traffic accidents are a major cause of morbidity and mortality in every country. It would be possible to significantly reduce the number of deaths by greatly reducing speed limits – but both governments and the vast majority of their citizens take the view that doing so would be disproportionate given the economic benefits of fast road transportation, and the importance of personal liberty. To the extent that eradication campaigns are compared to ordinary medical practice they may look ethically problematic, but to the extent that they are compared to public policy contexts such as transport they may seem relatively unproblematic.

Which is the right frame to bring to the ethical consideration of eradication policies? This article provides an initial answer, by examining whether there is anything that is ethically exceptional about eradication [10]. If there is, we should expect eradication policies to be subject to *sui generis* ethical considerations; if there is not, we should expect standard approaches to the ethics of public health policy to be sufficient. I begin by examining three arguments that have been put forward for thinking that eradication is in some way special as a policy goal. These are (1) that global eradication has symbolic importance; (2) disease eradication is a global public good, and (3) disease eradication is a form of rescue. I argue that none of these arguments succeeds in showing that eradication is *sui generis* as a policy goal. None of these arguments provides a reason for thinking that public health authorities have special duties to pursue eradication campaigns, or that individuals have special duties to facilitate them. I then argue that the fact that these arguments fail does not entail that global disease eradication is ethically problematic, or that it should not be undertaken. Global eradication of a disease, if successful, is a way of providing an enormous health benefit that stretches far into the future. There is no need to reach for the idea that there is a special duty to eradicate disease; the

same considerations that are in play in ordinary public health policy – of reducing the burden of disease equitably and efficiently – suffice to make global disease eradication a compelling goal where doing so is feasible.

2. The symbolic value argument

Eradication is often thought to have an important symbolic value. The tangible goal of eradicating polio has energised donors – such as members of the Rotary Club – for many years. Margaret Chan, the Director General of the WHO, put it thus in a speech to the Rotary International Convention in 2008, ‘We have to prove the power of public health. The international community has so very few opportunities to improve this world in genuine and lasting ways. Polio eradication is one’ [11].

It is sometimes argued that this symbolic value makes eradication an ethically special case – and hence that eradication policies should be pursued over and above the actual health benefits they provide. Certainly, as we explore in more detail later, eradication policies need to stay the course, and large-scale success stories like smallpox help to make the goal seem achievable. But this is merely to say that eradication requires a firm long-term commitment if it is to be successful, rather than to take the symbolic value of eradication to be a reason to undertake such a policy in the first place. The symbolic value of eradication does not create ethical duties by itself. Even if it is agreed that eradication has a high symbolic value for many individuals, this does not provide a reason for thinking that anyone has an additional ethical duty to facilitate eradication campaigns by agreeing to be vaccinated, or that governments have an additional permission to do things that would otherwise constitute a violation of someone’s rights, such as enforcing vaccination.

If the person to be vaccinated agrees that disease eradication has high symbolic value, then it seems plausible to suppose that she would be willing to take the steps necessary in her own conduct to facilitate disease eradication, and to allow others to interfere with her life for this purpose. But the operative moral principle here is informed consent, and the symbolic value of eradication plays only a derivative role. If someone does not think that disease eradication has an important symbolic value, it is difficult to see how the fact that it had symbolic reason *for others* could either generate a moral duty for her to subject herself to risk, or a permission for others to coerce her in order to preserve this symbolic value.

When symbolic values are weighed in the balance against things that have intrinsic value, then the merely symbolically valuable must give way. We can see this clearly if we take something that uncontroversially has only a symbolic value, such as the US flag. Suppose that a factory in China that makes US flags for the export market catches fire by accident. Passers-by, who do not personally endorse the symbolic value of the US flag, would have no duty to endanger themselves to prevent the flags from being immolated. A committed US patriot might conceivably believe that he had a reason to rescue the flags, but even in this case, it would be ethically indefensible to choose to rescue the flags instead of rescuing a human being [12].

3. The global public goods argument

Barrett argues that global eradication of disease is a key example of a global public good – a good that is both non-excludable and non-rival: ‘Once provided, no country can be prevented from enjoying a global public good, nor can any country’s enjoyment of the good impinge on the consumption opportunities of other countries. When provision succeeds, global public goods make people everywhere better off’ [13].

In other contexts where public goods need to be provided it is usually taken for granted that communities may legitimately require their members to contribute to the provision of these goods regardless of whether so doing is in the best interests of each person considered as an individual. Obvious examples would include jury service or paying one's taxes. So it might be thought that the mere fact that eradication is a global public good is sufficient to show that there are special ethical duties to undertake disease eradication policies.

However, this claim looks dubious. First, obligations to do one's fair share towards providing a public good are usually articulated in the context of an ongoing understanding of political community, in which each person has already benefited from social cooperation. It is considerably more challenging to establish that there is a global community of a type that is sufficient to ground obligations on individuals to ensure the provision of global public goods.

Second, even leaving this difficulty on one side, it is unclear that the status of disease eradication as a public good sets it apart from policies of disease control. Risk reductions in general would plausibly appear to be public goods, as they are usually nonrival and non-excludable. If so, the global public goods argument does nothing to support policies of risk elimination (eradication) over risk reduction (control). If the global public goods theorist wishes to maintain that eradication alone, and not mere risk reduction is a global public good, then she needs to explain why.

In the above quotation, Barrett suggests that it is the *universality* of the benefit that is key, and it is this that allows Barrett to say that "people everywhere are better off" as a result of the global public good. However, it is unclear in what sense people everywhere benefit from the eradication of a disease such as guinea worm. The most obvious answer is that there is a current health threat that would be removed from the environment, and so everyone would be benefited by living in a safer environment. However, the degree to which the environment is made safer, and the ways in which it is made safer, and for whom need to be specified. In this case it is unclear in what way citizens of a country that did not in any case have guinea worm (for instance the UK) would be benefited by global eradication of the disease. Or if this is a benefit, then it is unclear that it is a large and significant benefit for those individuals.

In addition, it would be puzzling to claim that a *risk reduction* for a particular disease is not a global public good, but an elimination of that risk is. All human beings will die at some point or other. So even if one particular disease is eradicated, it will still be the case that everyone will die of some disease or other. So whilst it might be possible to conceptualise the elimination of a threat to health as a global public good, it is unclear why we should think of the reduction of a particular risk to health to zero to be specially significant, where there are still many risks to health in the environment. In either case, the appeal to eradication as a global public good does little to justify either the claim that individuals have special duties to facilitate eradication campaigns, or that public health authorities have special permissions to pursue them.

4. Is eradication a form of rescue?

Claudia Emerson argues that the duty to rescue provides the main reason to adopt plans to eradicate disease:

The duty to rescue obliges one to rescue someone in distress provided one has the ability to do so, and doing so does not require excessive sacrifice. . . Consider the case of polio, where it is projected that the failure to complete eradication will result in 4 million children contracting paralytic polio over the next twenty years. . . Failure to eradicate in this case is synonymous with a failure to rescue, given that we have the means to save those 4 million children from the harm of polio [14].

It is important to distinguish between obligations of rescue and more general obligations of beneficence. Common sense morality takes obligations of rescue to be much more stringent than those of beneficence. Rescue cases involve identifiable individuals who are in peril *now*. Saving miners who are now trapped underground would be a rescue, but upgrading pit machinery to reduce the risk that accidents will happen in the future would be beneficence, but not rescue.

The chief ethical debate in this area is if the claims of those now in peril really are more pressing than those of unidentifiable individuals who may get into peril at some point in the indeterminate future. Whilst some ethicists, such as Singer [15] argue that obligations of beneficence are just as stringent as those of rescue, they do so on the basis of a moral argument, rather than – as Emerson appears to do – simply re-categorising a case of beneficence as one of rescue. If we followed Emerson's usage, and allowed reducing risk to unidentifiable people over the long term to count as rescuing them, then it seems that more or less anything would count as a rescue. Most ordinary public health activity, such as routine immunisation, or health and safety inspections of restaurants, would count as rescuing those unidentifiable individuals who would then not contract disease.

It would seem better to acknowledge that the eradication campaign does not *rescue* the people who do not get polio in the future. Rather it permanently removes a health risk of a certain kind from their environment, and so makes it the case that no one will in the future have to be rescued from this health risk. This is an important benefit, and as the next section explores, is the ground for a more successful argument in favour of eradication policies.

5. Eradication as ordinary health policy

Malaria currently creates a burden of disease of over 82 million DALYs per year [16]. If an effective vaccine becomes available, and a successful eradication campaign then reduced to zero the burden of disease from malaria for the remainder of human existence, this would provide an extraordinarily large health benefit [17]. Whilst we have found no special reason to opt for eradication policies just as such, eradicating disease is clearly one way of meeting more general desiderata of public health policy – reducing the burden of disease equitably and efficiently. Eradication policies will sometimes have a more favourable balance of burdens and benefits than other competing health interventions – and in such cases they should be chosen.

Standard cost effectiveness tools struggle to accurately account for the benefits of ordinary national vaccination campaigns [18]. Accounting for the benefits of eradication campaigns is significantly more difficult. In what follows, I shall aim to sketch some of these additional problems, and argue that they should not stand in the way of eradication campaigns.

The first difficulty relates to uncertainty. It is extremely difficult to globally eradicate a disease. Only one such attempt has so far succeeded in humans, so it would be unrealistic to think that any given eradication campaign could be guaranteed success. Where an eradication campaign fails it can fail more or less gracefully. It can fail gracefully where, despite not leading to global eradication of a disease, it leads to a significant and sustained reduction in prevalence of the disease, or it can fail less gracefully, leaving no sustained reduction in the prevalence of the disease, and a trail of negative associations that makes it more difficult to mount eradication campaigns in the future. Constructing a model for the prospective cost effectiveness of eradication campaigns is thus very challenging, though progress is being made here [19].

Second, there are both ethical and cost effectiveness reasons for thinking that eradication campaigns should aim to go big and go

fast [20]. If an eradication campaign lingers around for a long time in the “last mile”, the cost per QALY for preventing each additional case will go up exponentially. The same precautions still need to be taken, and all the surveillance, but the number of people who are actually suffering from the disease will be very small. It is at this point that vaccine refusal is more likely to become a problem – as individuals may not unreasonably question whether they themselves stand to benefit from the vaccination. Where policymakers take the view that eradication should continue to be pursued only where the cost-per-QALY for each individual case remains within tolerable bounds, then they are likely to give up before the job has finished – meaning that there will be continued flare-ups of the disease, with the net result that the disease will never be eradicated [21].

Third, and most difficult, there is a deep question about how to weigh even *successful* eradication campaigns in the balance against other uses of healthcare resources. Disease eradication brings its true benefits only over the long term, whilst healthcare spending tends to focus on short to medium-term benefits. If we assume that it is equally as important to save a life in fifty or a hundred years’ time as it is to save one now, then it would seem that we should devote a very great proportion of our current healthcare resources to eradication campaigns. As Murray [22] put this point in setting out the initial framework for the Global Burden of disease report:

if health benefits are not discounted, then we may conclude that 100% of resources should be invested in any disease eradication plans with finite costs as this will eliminate infinite streams of DALYs which will outweigh all other health investments that do not result in eradication.

Murray drew the conclusion that in order to avoid this paradox, future health benefits should be subject to a discount rate. This conclusion seems surprising: if the expected total health benefits of eradicating a disease such as malaria really were vastly greater than, say improving control of diabetes, would not this be a strong argument in favour of eradication?

Whilst the terrain here is complex, there seems to be no good reason to apply large discount rates to future health benefits, even if there are good reasons for significantly discounting other future goods [23]. It is standard in economics to apply a discount rate to commodities, because the price of most commodities falls over time relative to the return we could get on an investment at a bank. This discounting model assumes that the increased amount of commodities that could be bought in the future with the money invested has the same value for wellbeing as the smaller bundle we can buy now. However health gains and avoidance of death would seem to contribute a constant amount to wellbeing whenever they occur. So these reasons for discounting commodities do not imply that future health should be discounted [24].

Economists also argue in favour of a discount rate on the grounds of uncertainty. There is a chance that the disease will no longer be a problem in the future and if so, it would be a waste of resources to spend money now on eradicating it, rather than treating another health condition. There is also a chance that there will not be any human beings around to still gain the benefit of the disease’s being eradicated – in which case expending the time and effort now to complete the last mile of the disease’s eradication would turn out to have been futile. Notice that this time discounting is due to epistemic uncertainty, and not to any intrinsic lesser importance of lives in the future. Because of this, it seems implausible to think that this discount rate should be large, as “even a 1% discount rate implies that there is a 50% chance that the world will end in 69.7 years” [25].

It is possible to claim that lives in the future are intrinsically less important than those now – quite separate from the thoughts about uncertainty. Within the economics and philosophy literature, this is

known as pure time discounting: discounting the value of benefits and harms in the future solely for the reason that they are in the future. Most philosophers have followed Ramsey’s lead in thinking that pure discounting “is ethically indefensible and arises merely from the weakness of the imagination” [26]. The reason for thinking this is simple: there seems to be no reason to think that the mere fact that suffering or death is proximal in time provides a reason to prioritise it, any more than there is a reason to think that suffering or death is proximal in space does. It is interesting to note that the latest version of the Global Burden of Disease Report [27] no longer features time discounting of health improvements.

The philosopher Derek Parfit [28] provides a powerful way of conceptualising what is at stake here. Suppose we are thinking about three scenarios for the future of malaria.

1. Status quo.
2. A malaria control campaign reduces the current burden of malaria by 99%.
3. An eradication campaign globally eradicates malaria.

It is obvious that, other things being equal, 3 is better than 2, and 2 is better than 1. But how much better is the successful eradication campaign than the control campaign, which merely reduces the burden of its disease to 1% of its current level? Many people would assume that the successful eradication campaign is only marginally better than the successful control measures. But this is to ignore the fact that if we simply reduce the current burden of malaria by 99%, then malaria will (absent some further attempt at eradication, or dramatic change to the environment) continue to cause illness and death for the rest of human history. The likely benefits of the eradication campaign are thus huge in comparison to the control campaign.

6. Conclusion

I have suggested that the main arguments for thinking that eradication is an ethically exceptional goal are weak. But my aim has not been to oppose eradication as a policy goal, but to give a better explanation of why it is compelling. I think that the main reason for advocating eradication (in cases where it is feasible to do so) is none other than the future health benefits that it provides. There is no good reason to discount future health benefits for reasons other than those of uncertainty; and discounts as a result of uncertainty should be relatively small. And once we recognise this, then the sheer scale of the health benefits that eradication offers gives us a good reason to attempt it in cases where it is judged feasible.

Conflicts of interest

I confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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