

Why One Should Do One's Bit: Thinking about Free Riding in the Context of Public Health Ethics

Mariëtte van den Hoven*, Ethics Institute, Utrecht University

*Corresponding author: Mariëtte van den Hoven, Ethics Institute, Utrecht University, Janskerkhof 13A, 3512 BL Utrecht, The Netherlands.
Email: m.a.vandenhoven@uu.nl

Vaccination programmes against infectious diseases aim to protect individuals from serious illness but also offer collective protection once a sufficient number of people have been immunized. This so-called 'herd immunity' is important for individuals who, for health reasons, cannot be immunized or who respond less well to vaccines. For these individuals, it is pivotal that others establish group protection. However, herd immunity can be compromised when people deliberately decide not to be immunized and benefit from the herd's protection. These agents are often referred to as free riders: their omissions are deemed to be unfair to those who do contribute to the collective's health. This article addresses the unfairness of such 'free riding'. An argument by Garrett Cullity is examined, which asserts that the unfairness of moral free riding lies neither in one's intentions, nor in one's reluctance to embrace a public good. This argument offers a strong basis for justifiably arguing that free riding is unfair. However, it is then argued that other considerations also need to be taken into account before simply holding free riding against non-compliers.

Introduction

The aim of public health policies is to increase the health of the population. Vaccination programmes are considered the most effective health intervention after clean water and sewage disposal (Ball *et al.*, 1998). In most western countries vaccination rates against infectious diseases are high; as a result many infectious diseases have been banned from societies. Besides individual protection against specific diseases, vaccine programmes also aim to create so-called 'herd immunity', which can be realized once a sufficient number of people have been immunized. The herd's immunity also protects those who have not been vaccinated. Despite these benefits, some groups refrain from vaccination schemes. In the Netherlands, for example, there is a relatively stable Christian orthodox group that rejects immunization offers due to religious reasons. These non-vaccinators form a kind of vertical 'Bible belt' across the country, from the southwest to the east; this region has a significantly lower immunization rate than elsewhere in the Netherlands (Figure 1). Recently, an increase of non-vaccinators has been observed for which non-religious motives are offered; *free riding* is considered as a motive for the decision not

to comply (Hershey *et al.*, 1994). Similarly, Meszaros *et al.* found that 28% of non-vaccinators (against 18% of vaccinators) indicated that they would be less likely to vaccinate their children, if most other children were vaccinated; and 94% of respondents indicated that if all children were vaccinated they would not vaccinate their own child (Meszaros *et al.*, 1996). This article addresses the argument of free riding.

First an argument by Garrett Cullity is examined, which asserts that the unfairness of moral free riding lies neither in one's intentions, nor in one's reluctance to embrace a public good. If this is correct, than free riding no longer depends on a person's voluntary decision. Even in cases where a public good is involuntarily shared, not contributing one's fair share is a case of free riding. Can the argument be used against non-vaccinators? I will mainly focus on decisions parents make on behalf of their children and consider three types of free riders, namely parents who aim to avoid side effects of immunization, Christian orthodox parents and anthroposophist parents. I will show that Cullity's principle applies to all types. Before we start using the argument of free riding to mandate their contribution, some considerations are offered to moderate this conclusion.

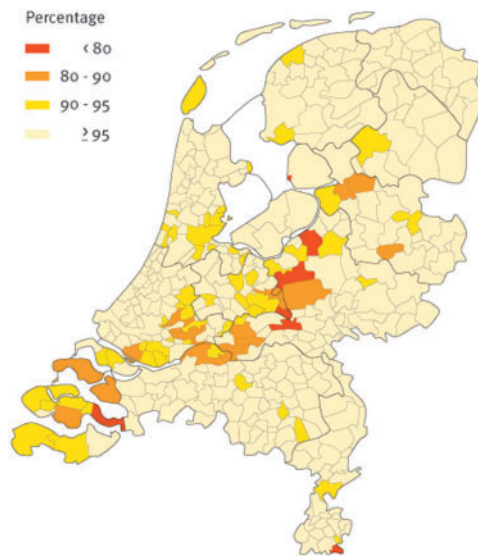


Figure 1. Immunization rates for diptheria, whooping cough, tetanus and polio in the Netherlands, 2011. Vaccination coverage for the first measles-mumps-rubella vaccination in birth cohort 2008 (determined at the age of two years), by municipality, the Netherlands, 2011.

Free riding the public good

In general, free riding means taking advantage of the efforts others have made to establish some collective good without actually contributing oneself. This is considered to be unfair and morally unjustifiable. A classic, and literal, example is using public transportation without paying the fare. The notion is often used in the contexts of economics, political science and psychology, to refer to the negative effects that such behaviour produces. But what makes such acts of free riding unfair? Before we turn to this question, two remarks are in order. First, one can only free ride on a public good that has already been established and is freely available. Secondly, free riding is usually thought to encompass intentionality: agents must intend to take advantage of the system.

Now the question becomes: Is deliberate non-compliance to a vaccination scheme an instance of free riding? Frequently, public health professionals assume that it is. But is this stance morally justifiable? Usually vaccination policies are justified not only by pointing to the individual protection immunization offers, but also by pointing to the added benefit of herd immunity. Establishing and maintaining the herd's immunity is especially important for safeguarding the health of individuals who are not immune, e.g. for those who experience vaccine failure, who have a

compromised immune system, or who have not (yet) received vaccines. (van den Hoven and Verweij, 2003). Herd immunity is thus beneficial for all members of the group, even for those who refuse to be immunized. Thus an option to free ride becomes available. Hershey notes: '(...) some people may perceive herd immunity as an opportunity to realize the gains of an immunization program without accepting the personal risks. In choosing not to be vaccinated, these individuals take a 'free ride' on the vaccination decisions made by others.' (Hershey *et al.*, 1994: 178)

The possibility of free riding is sometimes used to plea for mandatory immunization policies, in an attempt to block the option altogether (Stiglitz, 1988: 120). Are people correct in their stance to free riding? Parents who decide not to immunize their children need not immediately fear infectious outbreaks; the collective protection ensured by high immunization rates still guards their children's health. As Mentzel points out, it can be quite rational to abstain from a vaccination scheme: non-participation could actually be the best option for promoting the child's well being, since vaccinations can produce negative side effects. Yet, at the same time, these parents confront public disapproval of this choice. They are unfair, when they choose to benefit their children most. Mentzel offers us an argument why these parents can be blamed. He argues that they do not take into account a 'what if everyone did that?' test (Mentzel, 1995: 114). The test requires us to take an impartial perspective and ask what would happen if everyone were to decide not to comply due to the protection offered by others. The outcome of the thought experiment is that free riding would become impossible, because collective protection would cease to exist. In a Scanlonian contractualist argument, free riding would be rejected based on the idea that we can only accept principles that no one can reasonably reject (Allhoff, 2005). The dilemma parents seem to face is whether to make the rational and prudent choice to take all measures to prevent harm to their children and to promote their well being, or to accept immunization in order to be fair to others. If they persist in abstaining from vaccination, would it be justifiable to accuse them of free riding?

In the literature on free riding, Cullity is one of the few authors who explicitly address the moral unfairness of free riding. In what follows Cullity's argument is examined. He asserts that the unfairness of free riding lies neither in one's intentions, nor in one's reluctance to embrace a public good. This offers a strong basis for justifiably arguing that non-participation in vaccination programmes is free riding, plain and simple.

The unfairness of free riding

People can only free ride a publicly available good. In most of the literature, Cullity states, some subset of the following seven features of a public good arise:

- (1) *Jointness in supply*: if a public good is available to one member of the group for which it is public, then it is available to every other member at no cost to that other member;
- (2) *Non-excludability*: if anyone is enjoying it, no one else (in the group for which it is public) can be prevented from doing so without excessive cost to the would-be excluders;
- (3) *Jointness in consumption*: one person's consumption of the good does not diminish the amount available for consumption by anyone else;
- (4) *Non-rivalness*: one person's enjoyment of the good does not diminish the benefits available to anyone else from its enjoyment;
- (5) *Compulsoriness*: if anyone receives the good, no one else can avoid doing so without excessive cost;
- (6) *Equality*: if anyone receives the good, everyone receives the same amount; and
- (7) *Indivisibility*: there can be more than one consumer of the good and each consumes the total output (Cullity, 1995: 3–4).

A public good available to all is clean air: we cannot deny people access to it, nor will individuals be harmed if others enjoy it as well. Herd immunity can also be seen as a public good (Dawson, 2007). First, according to Dawson, the condition of non-excludability applies to herd immunity, for no one can be denied the benefits of group protection. Secondly, herd immunity is an indivisible good; all have an equal benefit that is the result of collective action. The good cannot be split up among individuals. Notice that collective action in this case often requires immunization rates above 90% are necessary (Verweij and van den Hoven, 2005). In the context of our discussion, it is also important to note that not all vaccines aim at establishing herd immunity. For example, the tetanus vaccine cannot aim to establish herd immunity, since tetanus cannot be passed on from person to person. Vaccines against polio, on the other hand, can aim at establishing herd immunity (next to individual immunity), since it is a contagious disease.

The availability of a public good creates a situation in which one has the option of free riding. But what *exactly* makes free riding unfair? After all, it is not that less of the good will be available for other group members, or that

the good is jeopardized if only a marginal number will free ride. Garrett Cullity attempts to formulate an answer to that question, by addressing the conditions that make an agent accountable for a free ride. For this, he formulated an Extended Principle of Fairness:

‘If a person receives benefits from a scheme that satisfies the following conditions, it is unfair for her not to meet the requirements it makes of her in respect of her enjoyment of those benefits: (i) the practice of participation in the scheme represents a net benefit for her; (ii) it is not the case that practically everyone would be made worse off by the practice of participation in the recognition as obligatory of those further requirements that must in fairness be regarded as obligatory if the requirements are regarded as obligatory; (iii) She is not raising a legitimate moral objection to the scheme’ (Cullity, 1995: 18–19).

The first condition of the principle concerns the benefits for a particular agent. Even though one could suffer some costs as a result of participation, overall the agent will have a net benefit. The second condition is rather complex. It starts from the question whether the requirements on individual agents would be fair if they were expected to contribute to the collective. Cullity highlights that the notion ‘practically everyone’ is important, for there will always be individuals who will be worse off as a result of some scheme. The way I interpret the condition is that the central question is if it would be fair to practically everyone to require contribution. Partly this will depend on the fair distribution of the cost of the requirement. The third condition states that the scheme cannot be morally objected to in any plausible manner. Hence, it becomes relevant whether I embrace the good or find it valuable. This latter observation is important if we discuss free riding the herd's immunity later on.

Cullity points out that the argument applies both to voluntary and non-voluntary schemes of participation. Thus, claims of free riding do not depend on the intentions of individuals. This contradicts the general assumption that people intentionally choose to take a free ride. The following example illustrates this. Cullity refers to it as the Recalcitrant Fisherman. A lake is seriously polluted and the catch is affected. All of the fishermen agree to take measures to clean the lake, except one. He refuses to contribute but will undeniably profit from their activities and the increase of healthy fish. The fisherman says ‘I have not chosen to receive these benefits, nor have I misled you into conferring them on me. I am simply going on as I always have done. If you do not want to benefit me find another lake’ (Cullity,

1995: 11). According to Cullity, the Extended Principle of Fairness applies: he has a net benefit, the demands are fairly distributed among the fishermen, and he cannot raise a legitimate moral objection to the scheme; hence his behaviour is unfair and he is a free rider. Notice that the Recalcitrant Fisherman does not embrace the goal, and the increase in fish stock is not his choosing. To be sure, no one is forcing him to join the intervention; and he can freely choose to opt out of the endeavour. Yet, he *will* benefit from the good once it is established. Cullity argues that the unfairness of the Fisherman's refusal lies not in reluctance to contribute but in his refusal to pay for the benefits.

Another example shows the irrelevance of an individual's intentions. If I am used to tasting products before I buy them, because I live in a country where this is a custom, it is still reasonable for a shopkeeper to charge me in countries where such habits do not exist. I may not have been aware of different customs, nor did I intentionally take advantage of a scheme, but still it will be reasonable to say that I am free riding if I do not pay for the goods I consumed. Cullity argues that this is because we have a choice to consume products, and once I have learnt about different customs, I can choose to comply.

Non-compliance with immunization schemes

Can the Extended Principle of Fairness be applied to vaccination schemes? We have already concluded that herd immunity is a public good which is freely available to all. Following the conditions of the principle, herd immunity must lead to a net benefit, generalization of the vaccination scheme must not make everyone practically worse off, and no legitimate moral objections must be raised against the scheme. Starting with the first condition: is there a net benefit? Infectious diseases can have detrimental effects on the health of individuals and populations. Illness due to infection can be quite serious, even if the prevalence of serious effects is low. Banning infectious diseases from societies and decreasing possible outbreaks is what vaccination policies aim for. High immunization rates offer protection to all against infection. Thus, a benefit is available for everyone, regardless of whether they have been immunized. Secondly, generalization of the scheme puts fair requirements on individuals; the immunization schedule builds up immunity from childhood onwards, and most side effects of vaccines are mild. Demanding the contribution of all to achieve collective protection is a fair

requirement: not practically everyone would be made worse off by the requirements of the practice of vaccination. The only question left is whether we can raise a legitimate moral objection to the scheme. Such objections need to address the wrongness of the scheme, for example if it would be cruel to people. It is difficult to see what objections could be raised against immunization policies. Thus it seems justified to consider non-compliance to immunization offers as free riding. It is irrelevant if individuals want to benefit from herd immunity or not; *the fact that they do*, along with the fulfilment of the three conditions of Cullity's principle, implies that it is wrong not to contribute to the goods they receive.

But what if you face the dilemma between a benefit for your own child's well being and accepting a generalized scheme that will offer collective protection? As mentioned previously, some argue that it is rational to forego vaccination in order to prevent possible negative side effects associated with them. This argument, however, does not weaken the conclusion that Cullity's principle applies and these parents are free riders. Others will argue that different ideas exist on what the net benefit consists of. Consider the perspective of compliant parents; they will be convinced that immunizing their children is in their best interest and offers a net benefit. Compliant parents will therefore not choose differently than to immunize (Veatch, 1987). Non-compliant parents on the other hand see the prevention of side effects in their children as a net benefit. If both have different ideas about what a net benefit is, will this not weaken the accusation of free riding? This conclusion seems too hasty, as non-complying parents need the context of herd immunity to be able to avoid side effects. Moreover, most side effects of immunization are mild, while banning infectious diseases from society leads to greater health of the population. It could therefore be argued that non-compliant parents misconceive what is their net benefit. They take advantage of the collective protection to opt out. It seems that we have a clear case of free riding after all.

Surely, this argument will only hold for those that are intentionally taking advantage of the system? Religious parents cite reasons for their refusal based on God's will, e.g. that God does not allow us to 'master' your own health by accepting an immunization offer (Maas, 1988). Would the argument of free riding apply to them as well? Firstly, do they have a net benefit? It is unconvincing to argue that they do not embrace the goal of immunization as the case of the Recalcitrant Fisherman showed the irrelevance of embracing the goal. Orthodox families benefit from herd immunity:

they need not fear sudden outbreaks of infectious diseases for their children. The second condition also applies, even though religious parents might consider themselves worse off as a result of a generalization of the scheme. Yet, since not *practically everyone* is worse off, the requirements of the scheme are still not unfair, even if these particular parents consider themselves worse off by immunization. Thirdly, could they raise a legitimate moral objection? It is difficult to see what the objection would consist of, unless they view vaccines as poisonous or satanic. Thus, condition three also holds. Argued this way, it seems that Christian orthodox families are also free riding. The argument is not yet convincing. Given the different perspective they have on health and illness and the irrelevance of being protected against infectious diseases, they can plausibly argue that their net benefit lies in living a religious good life—not in profiting from the system. From this perspective, an argument that derives from religion trumps a net benefit on their health. From a societal perspective we can accept that for some freedom of religion is more important than participating in a public health intervention. Moreover, it must be noticed that in the Bible belt, herd immunity is less beneficial than it is elsewhere in the Netherlands. Due to the geographical closeness of most orthodox religious families that refrain from immunization, herd immunity is not guaranteed in villages where they live. For example, outbreaks of polio mainly occur in these geographical areas and religious families suffer most from the consequences. This could weaken the claim that they free ride herd immunity, because their net benefit is actually lower than for others in the Netherlands.

Let us finally look at a third type of non-compliance. From an anthroposophist life view, vaccines are rejected as artificial intruders in an immune system. An immune system should be able to deal with illness on its own. Vaccination programmes are therefore often rejected from this life view. Are anthroposophist parents free riders of the system? For these parents, it is not fear for the wrath of God that motivates their refusal, but a different view on what benefits the health of their children most. Following Cullity's conditions it seems that the net benefit of herd immunity cannot be denied and no legitimate moral objection could be raised against immunization schemes. It is not necessary that one embraces the good; if the three conditions are met, it is sufficient to say that it is a case of free riding. It is unfair not to contribute to herd immunity while taking the benefit, even if the benefit (like the Recalcitrant Fisherman) is not chosen. We could object to this conclusion, claiming that anthroposophy

is also a religious perspective, and that freedom of religion is important. Yet, an important difference here is that anthroposophist parents do not deny the importance of health or preventive interventions per se as is the case with Christian orthodox families; they simply have a different opinion on what will benefit an individual's health most. It is therefore more difficult to see how anthroposophist parents can reject the net benefit of herd immunity.

Cullity's argument proves to be quite strict and includes more acts of free riding than we are initially inclined to think. It also includes those situations where people involuntarily take advantage of a scheme, even if they do not choose to do so. Parents who deliberately refrain from immunization and benefit from the collective's health are acting unfair, irrespective of the religious motives that they offer. This conclusion is quite straightforward and could have important implications for public health interventions. Could immunization policies be enforced? Would it be justifiable to use his argument of free riding to back up such policies? In the next section some considerations are offered to take into account before accusing persons of free riding.

A more moderate stance

The Extended Principle of Fairness accommodates those situations that we intuitively consider as free riding. Based on the unfairness of free riding, it seems an obvious next step to focus on an argument for mandatory immunization. I will offer three reasons to use a more moderate strategy towards non-compliant parents. Firstly, Dawson argues that it is counterintuitive to be morally obligated to contribute to a public good, and be exposed to risks, if this does not add any extra benefit (Dawson, 2007: 171). As long as herd immunity exists 'it appears unreasonable to suggest that any harm will occur to third parties as a result of my inaction' (Dawson, 2007: 176). The idea that we should always equalize the burdens in order to share benefits can become absurd; we can think of analogies where this certainly should not even be considered as morally right. This argument is referred to as the 'no additional benefit argument'. It applies in cases where herd immunity exists and where the collective protection it offers is not threatened by free riders. Dawson therefore argues that even though the choices of non-complying parents are unfair to those who do comply, it is unreasonable to obligate vaccine uptake when herd immunity already exists.

Secondly, as stated before, herd immunity often requires high immunization rates, e.g. above 90%. A herd is not static; populations change due to natural causes and migration. It is difficult to decide who needs to be included in a herd in a globalizing world. Infectious diseases do not stop where borders on a map end, nor do people. Even in relatively stable environments, like nursing homes, it has proven difficult to prevent epidemic outbreaks of influenza (Verweij and van den Hoven, 2005). Thus, collective protection requires high immunization rates which depend on high vaccine uptake rates. This might have the appearance of a plea for mandatory immunization. Yet, in countries where immunization is not obligatory, high immunization rates are also established. Therefore, it seems that public trust is relevant in implementing successful immunization programmes (Salmon *et al.*, 2006). Discussions on the safety of pertussis vaccination in the eighties in Europe, Japan and the US (Ball *et al.*, 1998), the MMR vaccination in the UK in the nineties (Wood-Harper, 2005), and recently the HPV vaccination in the Netherlands (Rondy *et al.*, 2010) all show that immunization rates can drop due to a lack of trust in the safety of the vaccine. Hence, the number of people willing to comply with a vaccination request is not as stable as one might initially think. This distrust even threatens herd immunity, as was the case with MMR vaccination in the UK. Uptake of the HPV vaccine, first introduced in the Netherlands in 2009, was considered to be low (~70%). It will not help to accuse non-compliers of free riding, if herd immunity is delicate; especially not when parents see it as a dilemma between choosing between their child's well being, and not being fair to others. Therefore, it seems that using the argument against free riding is but one of the strategies for negotiating and debating with non-compliant parents in order to get them to participate in immunization schemes.

The second remark then gives way to a third remark: we need to take the arguments that non-vaccinators give seriously. Empirical data about possible serious side effects, the safety of a vaccine, and the serious consequences of an infectious disease are highly relevant in debates on immunization. The debate seems to repeat itself throughout history, because the introduction of smallpox vaccination a century ago raised the same type of debate on health risks and safety as recent debate on HPV vaccination. Even if modern vaccines are much safer than, e.g., the first small pox vaccines were, debate on safety and risks continues. For example, in 1998, Wakefield suggested that there was a correlation between MMR vaccine and autism. The impact of the

article is still present, even if the claim seems to find no empirical support (Wakefield *et al.*, 1998). Can these fears of parents outweigh expert medical knowledge (Sorrel, 2007)? In practice, paediatricians look for ways of balancing community interest in public health with what parents think is in the best interest of their child (Ball *et al.*, 1998; Diekema, 2005). In sum, it seems reasonable to look into the motives that parents offer for their refusal to immunize their children. This does not automatically mean their motives for not immunizing their children are justifiable, but it pays serious attention to the fears, ideas and views that parents have and that go against public health interventions. Even if these fears and opinions are incorrect or irrational in some sense, the fact that people offer these arguments is sufficient ground to address them. This has consequences waging an argument of free riding against these parents. It pleads for a discussion about motives; to persuade them, instead of accusing them of free riding and polarize the debate as a result.

Conclusions

Free riding is frequently used as an argument against non-compliers to an immunization offer. In this article it is examined whether this claim is justifiable. Using Cullity's Extended Principle of Fairness, the conclusion is that free riding applies to more cases than we are intuitively inclined to think. The unfairness of free riding lies not in the deliberate choice of agents to enjoy a benefit, but in their unwillingness to pay for that good, regardless of whether the agent embraces the good as a worthwhile goal. Thus, parents who refuse immunization are all acting unfairly: even those anthroposophist and Christian orthodox families. They are justifiably accused of free riding. Yet at the same time we could wonder whether it would be a good strategy to simply confront them with this conclusion. Three considerations were put forward that also need to be taken into account. The 'no additional benefit argument' shows that a moral duty is weakened if one's contribution does not add any additional benefit to the public good. Secondly, public trust is important in striving for high immunization rates. Thirdly, the motives that parents offer, even if these are irrational and unjustified cannot simply be ignored. In practice, many paediatricians address these issues, and have open discussions with parents both about free riding and their motives for refusing immunization for their children. Even if the argument of free riding is justified, strategies to discuss motives for immunization with parents openly may be

more successful in addressing their moral responsibilities than simply accusing them of free riding.

Acknowledgements

The author would like to thank the anonymous reviewers of the journal for their constructive comments. Also thanks to Candice Cornelis, who corrected the manuscript in such a short amount of time.

References

- Allhoff, F. (2005). Free Riding and Research Ethics. *The American Journal of Bio-ethics*, **5**, 50–51.
- Ball, L. K. *et al.* (1998). Risky Business: Challenges in Vaccine Risk Communication. *Pediatrics*, **101**, 453–458.
- Cullity, G. (1995). Moral Free Riding. *Philosophy and Public Affairs*, **1**, 3–34.
- Dawson, A. (2007). Herd Protection as a Public Good: Vaccination and Our Obligations to Others. In Dawson, A. and Verweij, M. (eds), *Ethics, Prevention and Public Health*. Oxford: Clarendon Press, pp. 160–177.
- Diekema, D. S. (2005). Responding to Parental Refusals of Immunization of Children. *Pediatrics*, **115**, 1428–1431.
- Hershey, J. C. *et al.* (1994). The Roles of Altruism, Free Riding and Bandwagoning in Vaccination Decisions. *Organizational Behaviour and Human Decision Processes*, **59**, 177–187.
- Maas, P. F. (1988). Reeks Parlementaria deel 8. *Polio & Parlement*. Den Haag: SDU.
- Mentzel, P. T. (1995). Paper Four: Non-Compliance: Fair or Free Riding. *Health Care Analysis*, **3**, 113–115.
- Meszaros, J. R. *et al.* (1996). Cognitive Processes and the Decisions of Some Parents to Forego Pertussis Vaccination for their Children. *Journal of Clinical Epidemiology*, **49**, 697–703.
- Postema, G. (1998). Public Practical Reason: An Archeology. In D'Agostina *et al.* (eds), *Public Reason, The International Research Library of Philosophy 21*, Aldershot: Ashgate, pp. 425–468.
- Rondy, M. *et al.* (2010). Determinants for Vaccine Uptake in the Netherlands: A Multilevel Study. *Vaccine*, **28**, 2070–2075.
- Salmon, D. A. *et al.* (2006). Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present and Future. *The Lancet*, **367**, 436–442.
- Sorrell, T. (2007). Parental Choice and Expert Knowledge in the Debate about MMR and Autism. In Dawson, A. and Verweij, M. (eds), *Ethics, Prevention and Public Health*. Oxford: Clarendon Press, pp. 95–110.
- Stiglitz, J. E. (1988). *Economics of the Public Sector*. 2nd edn. New York: Norton.
- van den Hoven, M. A. and Verweij, M. F. (2003). Should We Promote Influenza Vaccination of Health Care Workers in Nursing Homes? Some Ethical Arguments in Favor of Immunization. *Age & Ageing*, **32**, 487–489.
- Veatch, R. M. (1987). The Ethics of Promoting Herd Immunity. *Family & Community Health*, **10**, 44–53.
- Verweij, M. F. and van den Hoven, M. A. (2005). Influenza Vaccination in Dutch Nursing Homes: Is Tacit Consent Morally Justified? *Medicine, Health Care and Philosophy*, **8**, 89–95.
- Wakefield, A. J. *et al.* (1998). Ileal-Lymphoid-Nodular Hyperplasia. Non-Specific Colitis, and Pervasive Developmental Disorder in Children. *Lancet*, **351**, 637–641.
- Wood-Harper, J. (2005). Informing Education Policy on MMR: Balancing Individual Freedoms and Collective Responsibilities for the Promotion of Public Health. *Nursing Ethics*, **12**, 43–58.