Author's reply: Vaccinating healthcare workers: ethics and strategic behaviour

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To the editor:

In the debate about vaccinating healthcare workers (HCWs) against influenza, the ethical argument stresses HCWs' social responsibility to be vaccinated against influenza to protect their patients. In his letter to the editor, Heath Kelly [1] highlights that this argument may be over-used, given that Cochrane reviews show that there is insufficient evidence that influenza vaccination in HCWs protects patients in hospitals from laboratory-confirmed influenza [2]. Besides this, it is argued that the ethical argument only holds for HCWs who are in contact with patients.

Analysing the vaccination decision that HCWs face as a social dilemma situation, as suggested in my original article [3], does not necessarily deliver the justification to put ethical pressure on HCWs. In short, due to indirect effects, vaccinations create positive externalities for other members of a society, because they reduce transmission. As vaccination itself can be costly in terms of time, effort, and potential side-effects, a rational strategy at the individual level may be to 'free-ride', i.e. omit vaccination and thus avoid the costs associated with vaccination while enjoying the benefits of herd immunity. This choice may, however, compromise the collective benefit, because herd immunity cannot be reached when too much free-riding takes place [3,4]. Thus, this analysis suggests that if there is an indirect effect of vaccination, this aspect will influence the individual decision. There is an increasing amount of evidence, that this is actually the case, i.e. that individuals are more inclined to get vaccinated if this benefits others – providing that their own costs are low, e.g. [3,5].

One crucial point in the analysis is the size of the indirect effect. The externalities of the individual decision vary according to the effectiveness of the vaccine. For influenza, theoretical vaccination coverage of 80% is required to establish herd immunity in the general population [6]. This may not be sufficient in hospital settings, where coverage may have to be higher instead. In fact, there is research suggesting that if 100% of HCW in nursing homes are vaccinated against influenza, the

infections are reduced by 60% [7]. Thus, it is possible that for hospital situations vaccine coverage of HCWs higher than 80% or even up to 100% would be needed to attain positive effects.

One can consider two possible scenarios: If 100% coverage is necessary for herd immunity, free-riding is theoretically not possible. Nobody can opt-out without putting patients at risk. In such situations, ethical pressure seems necessary to ensure that full coverage is reached so as to provide the maximum possible protection of patients. To interrupt transmission chains, even HCW without direct contact to patients need to be immunised, assuming that such HCWs have contact with HCWs who directly work with patients. If a lower coverage of e.g. 80% is sufficient, however, 20% can free-ride without imposing a threat to herd immunity. In this situation social motives are likely to play a role: those who are either pro-socially oriented or whose social motives are activated should be more likely to get vaccinated [8]. Appeals to pro-sociality may also be effective here to reach an 80% uptake [9]. In order to examine if these different situations will impact behaviour and if pressure vs appeals will be suitable to reach the thresholds, controlled behavioural experiments should examine if awareness of the herd immunity threshold has an impact on HCWs' influenza vaccine uptake.

Differential treatment of HCWs with and without direct patient contact may pose additional problems. In economics, it is a well-known finding that free-riders in public goods dilemmas can nearly completely destroy cooperation [10] – it seems, that not only diseases are contagious, but that free-riding is contagious, too. Thus, those who do not contribute to the public good seem to undermine the trust in others' cooperation. From this point of view, it seems also advisable that there should be universal recommendations for HCWs rather than only for those who are in contact with patients – if evidence suggests that vaccinating HCWs is beneficial [11].

Conflict of interest

None declared.

Authors' contributions

CB wrote the letter.

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