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Vaccination of health care workers against influenza: Is it time to think about a mandatory policy in Europe?

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ABSTRACT

Nosocomial influenza outbreaks and the transmission of influenza to health care workers (HCWs) have been well described. However, vaccine coverage among HCWs still remains low. After three decades of official recommendations that all HCWs be vaccinated against influenza, vaccination rates generally remain below 30% in Europe.

Experiences in the USA have shown that mandatory policies achieve a compliance rate of nearly 100%. However, the discussion about mandatory vaccination policies for HCWs has not advanced very far in Europe. This article therefore discusses the question whether it is time to consider mandatory vaccination policies for HCWs in Europe. We further elaborate under which conditions mandatory vaccination polices would be ethically justified and how far these conditions are met in the case of influenza vaccination of HCWs.

From a methodological perspective, it would be desirable to have further high-quality RCTs with a lower risk of bias that investigate the effectiveness of HCWs influenza vaccination. From a policy perspective, however, we have to decide whether we have already sufficient (albeit not perfect) evidence to justify mandatory influenza vaccination programs for HCWs.

We conclude: Given the available evidence concerning the benefits, burdens and risks of HCWs influenza vaccination and the limited effectiveness of voluntary policies, it is time to consider mandatory vaccination policies for HCWs in Europe.

1. Introduction

Seasonal influenza vaccination has been recommended for health care workers (HCWs) in almost all European countries for many years [1,2]. However, despite decades of efforts to encourage HCWs to be immunized against influenza, vaccination levels remain insufficient in Europe, with only about 4–40% coverage rates being achieved. The current low rate of influenza vaccination uptake among European HCWs shows no significant sign of improvement despite numerous measures to increase these rates (e.g., vaccination campaigns, education) and the recent H1N1 influenza pandemic [3,4].

Yet, influenza vaccination coverage of HCWs should be increased, given their important role in influenza transmission in health care settings [5]. A mathematical model predicts high influenza attack rates among hospital HCWs as well as a high daily hazard of infection for patients that is 16 times as high as in the community [6]. Not surprisingly, nosocomial influenza outbreaks occur in many countries and in almost all medical disciplines [4,5]. In a review of 12 nosocomial influenza outbreaks patient attack rates ranged from 3 to 50% on infectious wards and HCWs attack rates ranged from 11 to 59%. Median mortality among patients has been 16%, whereas in some patient populations (e.g., transplant or ICU patients) mortality rates of 33–60% have been described. In addition up to 70% of influenza infections in immunocompromised transplant or acute leukemia patients might have been nosocomial infections [5]. Unfortunately, unvaccinated HCWs seem to be the main source of nosocomial influenza [4]. For this reason, insufficient vaccination coverage rates threaten the health of both patients and HCWs [5]. Several empirical studies have shown that influenza vaccination of HCWs can reduce mortality and morbidity in elderly patients in long-term care facilities [7–11]. Most voluntary policies to increase vaccination rates among HCWs have not been very effective [3,4], which results in excess deaths that most likely could have been prevented with higher HCWs vaccination rates. This article therefore discusses the question whether it is time to consider mandatory vaccination policies for HCWs in Europe. Unlike in the US, European health care institutions have been rather

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reluctant to implement mandatory policies. Indeed, there is not even a real discussion about mandatory vaccination programs in European countries–there are only a few articles which deal with this subject [3,12–18]. Most of these studies demonstrate that the majority of HCWs support mandatory influenza vaccination; however, to the best of our knowledge, there are not any mandatory influenza vaccination policies for HCWs in Europe [1].

Whether mandatory vaccination programs are justified is fundamentally an ethical issue, as we have to balance the benefits and harm vis-à-vis the patients and residents on the one hand and the restriction of autonomy and the influenza vaccination associated benefits and burdens on behalf of the HCWs on the other hand. We will therefore first briefly outline under which conditions mandatory vaccination policies could be ethically justified and then discuss how far these conditions are met in the case of influenza vaccination of HCWs.

2. Have voluntary policies failed?

A mathematical model has shown a robust linear relationship between the number of HCWs vaccinated and the expected number of influenza virus infections among patients in a long-term nursing home. Approximately 60% of influenza virus infections among patients can be prevented if the HCWs vaccination rate increases from 0 to 1. The authors stated "*that vaccination of every additional HCWs protects an additional fraction of patients and [. . .] that increasing the HCWs vaccination rate from 80% to 90% is likely to be as important as increasing it from 10% to 20%*" [19]. A further mathematical model documented a similar or higher impact of hospital HCWs vaccination than that expected for the long-term care nursing home department [6]. It can therefore be concluded that influenza vaccination rates of 90% are required for an effective protection of the vulnerable populations [20]. However, despite numerous recommendations and decades of efforts to encourage HCWs to be immunized against influenza, coverage rates among HCWs remain far below the requested vaccination rates, and have remained in Europe (sometimes significantly) below 40%. Continued calls for "more education" for three decades were doomed to fail [20] as numerous articles can demonstrate [21–24]. For instance, results of American studies have shown that despite longstanding, multifaceted educational programs, misconception was common [25] and moreover the study participants believed that influenza is not as prevalent or severe as depicted in vaccine promotion educational materials [26].

3. When would mandatory influenza vaccinations of HCWs be ethically justified?

Whether mandatory influenza vaccinations for HCWs are ethically acceptable depends on several conditions [27]. First, influenza vaccinations should be effective in preventing influenza infections in general and especially in HCWs. Second, there must be sufficient empirical evidence that influenza vaccination of HCWs reduces mortality and morbidity in patients and nursing home residents. If these two questions are answered positively, there are good ethical reasons to promote influenza vaccination among HCWs. However, the goal of increasing vaccination rates among HCWs should be achieved with the least restrictive means. Therefore, the justification of mandatory policies depends on how well voluntary policies like information and education campaigns, etc. are able to achieve a sufficiently high vaccination rate. It has to be acknowledged that HCWs as health care professionals bear a special ethical obligation not to inflict harm on their patients or residents (principle of non-maleficence). In any case, mandatory vaccination policies should be based on a transparent and fair decision-making process. As in many other fields of medicine and public health, decisions have to be made under empirical uncertainty. The question therefore is whether we have *sufficient* – albeit not perfect – arguments to discuss and probably implement mandatory influenza vaccinations for HCWs in Europe.

4. Effectiveness and efficacy of seasonal influenza vaccines in healthy adults

Influenza vaccines are safe and have the potential to prevent significant annual morbidity and mortality [28]. As the majority of HCWs are in good health, the effectiveness of influenza vaccines should be comparable with generally healthy adults [29]. Previous studies have shown fewer cases of influenza infection, fewer cumulative days of influenza-like illness and absence from work after implementation of HCWs influenza vaccination programs [21,30]. According to the WHO "*there is scientific evidence for a protective effect of vaccinating HCWs against influenza infection*" [28].

In a double-blind, placebo-controlled trial of vaccination against influenza in healthy, working adults it could be shown that influenza vaccination decreased the frequency of upper respiratory illnesses by 25%, absenteeism from work due to upper respiratory illness by 43%, absenteeism due to all illnesses by 36%, and visits to general practitioners for upper respiratory illness by 44% [31]. Previous meta-analyses on seasonal influenza vaccination among adults showed a vaccine efficacy from 59% to 67% [32–36].

Technical measures with a comparable efficacy in reducing the risk of serious car accidents would certainly be implemented by the automotive industry. Yet, for influenza vaccination the effectiveness is rather seen as a failure and an argument against vaccination [37]. However, as other authors have pointed out: "*If an equally safe and effective vaccine to prevent HIV infection were available next month, would it take us decades to offer it to 60% of the at-risk population?*" [38].

Despite limited vaccine efficacy, influenza vaccination remains the single most effective intervention to prevent influenza and its transmission [39].

5. The benefits of HCWs' influenza vaccination for patients and residents

There are several studies that have analyzed the effectiveness of HCWs influenza vaccination in recent years. A cluster-randomized, controlled study by Carman et al. has shown that vaccination of HCWs was associated with a decreased mortality among patients in long-term care, without however, a corresponding reduction of non-fatal influenza infections [7].

Hayward et al. demonstrated in a cluster randomized controlled trial that influenza vaccination of HCWs can prevent deaths, use of health services, and influenza-like illness in residents during periods of moderate influenza activity. In other words, they found that the mortality rate was 5% lower and residents' risk of influenza-like illness was 9% lower in intervention homes than in control homes (both weight-adjusted). In addition, the number of general practitioner consultations and hospital admissions were significantly lower in the intervention homes [8].

Lemaitre et al. conducted a cluster-randomized trial in nursing homes. While a significant difference in mortality could not be demonstrated between the two groups in their primary, univariate analysis, their multivariate analysis revealed a significant 20% decrease in all-cause mortality in intervention homes. Furthermore, they found a statistically significant correlation between staff vaccination coverage and all-cause mortality in residents. In addition, the rates of influenza-like illnesses were significantly lower (31% less) in residents of intervention homes. The authors