



## Review

# Factors affecting the uptake of vaccination by the elderly in Western society



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## ABSTRACT

**Objective:** To present the results of a literature review on factors related to vaccine uptake by elderly persons.

**Methods:** A systematic literature search was performed using Medline, Embase, and SciSearch to collect all publications available on factors related to vaccine uptake from 1966 until October 2012 for West European and North American societies. In total, 1001 articles were identified and 60 were included in the review.

**Results:** We identified six main themes that influence the willingness to be vaccinated: 1) attitudes and beliefs regarding vaccination in general including positive and negative attitudes and beliefs; 2) perceived risk and severity including knowledge, perceived susceptibility and severity and personal experience; 3) vaccine characteristics including side-effects, effectiveness, content of the vaccine and knowledge; 4) advice and information including influence of the healthcare worker and relatives and the information source and format; 5) general health-related behavior including previous vaccinations, visiting GP or senior center and other preventive behaviors; and 6) accessibility and affordability including logistics, combinations of vaccines and costs.

**Conclusion:** The most important factors related to vaccine uptake are people's attitudes and beliefs regarding vaccination (especially their negative attitudes), recommendations of healthcare workers, side effects and effectiveness of the vaccine, and perceived susceptibility.

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## Introduction

The world is aging. It is estimated that the proportion of the world's population over 60 years of age will have doubled between 2000 and 2050. Rising from 11% to 22%, this reflects an increase from 605 million to 2 billion (World Health Organization (WHO), 2013). As a result of immunosenescence, co-morbidity, and general frailty, the elderly are increasingly susceptible to infectious diseases (Mathei et al., 2011). They are also more actively engaged in society, leading to a greater likelihood of disease transmission (de Boer, 2006). Consequently, infectious diseases will become ever more prevalent among the elderly.

Vaccination is one of the most successful interventions to prevent infectious diseases, as proven for children (WHO, 2014). People of 60 years or older are commonly offered vaccination against influenza but less so for other diseases (WHO, 2011; Eilers et al., 2013). As in any population, a high acceptance rate is crucial for the success of vaccination in the elderly. Their rates for influenza vaccination vary substantially across Europe, with most countries not meeting the WHO target of 75% (VENICE Consortium, 2011). To address this shortfall, it is important to know which psychosocial factors have most effect on vaccine uptake by the elderly. The psychosocial factors could be addressed and act upon with interventions. This topic has been the subject of several literature reviews, though only covering quantitative studies (Richardson and Michocki, 1994; Mieczkowski and Wilson, 2002; Ward and Draper, 2006; Kohlhammer et al., 2007; Baeyens et al., 2009). These reviews have identified lack of awareness and knowledge, fear of side-effects, low perceived effectiveness, low perceived susceptibility, logistic reasons as being important factors in the vaccination uptake. However, since vaccines and vaccination practices have changed over time, reviews including qualitative research would have added value. During the last decade, a shift has been observed in medicine, from cure to prevention. This has led to increasing attention for preventive measures such as vaccination. For example, the Dutch health council released a report on vaccination programs for all ages (Health Council The Netherlands, 2007). This shows that vaccinations are becoming more prominent in life. It is therefore important to act upon these developments and to stay updated on the beliefs and attitudes on vaccinations of the different target groups. At the same time, the role of the general practitioner becomes less prominent for the younger target groups and people gather their own information from for example the internet. This was shown during the pandemic influenza outbreak in 2009 in The Netherlands. The internet was used as an information source by 56% of the acceptors of H1N1 influenza vaccine and by 75% of decliners (Bults et al., 2011). This is another reason why it is important to be updated on the beliefs and attitudes concerning vaccination.

In order to update the literature reviews and, this study presents a complete and updated systematic overview of the factors related to vaccine uptake by the elderly in Western countries based on qualitative and quantitative data.

## Methods

### Search strategy

A systematic computerized search of the literature on vaccine acceptance by persons aged 50 years and older was performed by an information specialist (Appendix A). The databases used were Medline, from 1966 onwards, and Embase and SciSearch, both from 1981 onwards. The search yielded 1001 articles dating from 1966 through October 2012. Articles were removed if deemed irrelevant in light of title words (#6 in the search strategy) but then manually checked to ensure no relevant articles were missed. All checked articles were indeed irrelevant and therefore excluded.

### Study selection

Of the 1001 retrieved articles, a selection was made by applying the following inclusion criteria (Appendix B). The article:

- 1) reports qualitative or quantitative research with original data;
- 2) examines factors influencing vaccine uptake of persons of 50 years or older;
- 3) describes research on the general population of community-dwelling elderly;
- 4) is written in English.

Five double references were identified and removed. One article was unobtainable. For ten others, only the abstract was available. A manual search of reference lists yielded five more acceptable articles. In total, 60 were included (Table 1). Forty-one considered influenza vaccination, while the other 18 examined vaccination for other infectious diseases (pneumococcal pneumonia, herpes zoster, and pertussis (whooping cough)).

### Identifying themes

Themes, factors, and elements were extracted from an inventory of the determinants named in the literature. While themes, factors and elements were derived primarily from quantitative studies, qualitative studies either confirmed or added a perspective to a theme or factor. Factors from the different quantitative articles were included in the review if they were reported to be significantly associated with the vaccination uptake. For studies that only presented frequencies, the factors presented in the papers in the top three of the frequency rankings were included in the review. We extracted the different elements from the data of the retrieved studies and via an inductive process we identified factors and eventually created themes. The constructing of the themes followed therefore a bottom-up or data-driven approach to make sure every relevant factor would be included.

A theme consists of a bundle of factors that captures a specific subject related to accepting vaccination. The factors, in turn, consist of elements that represent the data in the identified articles. In order to serve as a label for a theme, a factor had to be mentioned in at least 10 articles. Also, consensus among the authors on the theme and its constituent factors was a requirement. The elements were classified by subject, not by the type of information (for example, belief or advice). Consequently, attitudes and beliefs will be presented throughout different themes.

## Results

As shown in Fig. 1, the factors found to influence an elderly person's willingness to be vaccinated comprise six themes: 1) attitudes and beliefs on vaccination in general; 2) perceived risk and severity; 3) vaccine characteristics; 4) advice and information; 5) general health-related behavior; and 6) accessibility and affordability. In some instances, these themes or factors are expressed by wording in quotation marks, denoting literal renditions of the elements found in the studies, such as certain statements.

### 1) Attitudes and beliefs on vaccination in general

Both positive and negative attitudes and beliefs were identified with regard to a particular vaccine or to vaccination in general. These constitute the first theme.

#### A. Positive attitudes and beliefs

The elderly made their decision to accept or refuse vaccination by weighing the perceived advantages and disadvantages (Evans and Watson, 2003; Zimmerman, 2003b; Nowalk et al., 2004; Cameron et al., 2009). In qualitative studies, vaccination was considered as a preventive strategy to improve their health (Daniels et al., 2004; Harris et al., 2006). An important predictor of accepting a vaccine in the future was agreement with the statement, "I would recommend everyone over 65 years of age to be immunized against flu" (Evans and Watson, 2003). Similar attitudes that positively influenced or predicted vaccine uptake were considering vaccination as wise, important or beneficial. Acceptance was also related to knowledge about the vaccine and a wish to try it (Hayes-Bautista et al., 1997; Ehresmann et al., 2001; Zimmerman, 2003b; Daniels et al., 2004). Other predictors were akin to protecting others (Carter et al., 1986; Skowronski et al., 2004; Daniels et al., 2004; Harris et al., 2006; Kwong et al., 2010) and living together with people who might be exposed (Nexoe et al., 1999; Burns et al., 2005). Some elderly persons wanted to

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