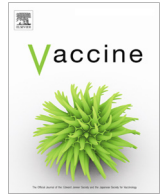


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## Review

# Vaccination of 50+ adults to promote healthy ageing in Europe: The way forward

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## ABSTRACT

The proportion of the population  $\geq 65$  years old is about 17% today and will be about 27% in 2050 worldwide. The problem, however, is not ageing in itself, it is individual disabilities associated with ageing. This manuscript summarizes the consensus points reached during a pan-European meeting on gaps and barriers in making vaccination of adults aged 50+ a reality and on further joint actions in Europe. The shift from childhood to life-long vaccination is essential to prevent disability, morbidity and mortality in the elderly and promote healthy ageing. This vaccination shift is a major challenge in the post-truth, media-based era in countries with dwindling resources for the provision of healthcare. The challenge can be met only by adopting an innovative approach designed to shift the mindset of decision-makers from treatment to prevention. A number of key actions are required and for these actions a European multidisciplinary network including health authorities, medical doctors with different specialties, sociologists, psychologists, pharmaceutical companies and Associations of patients appears mandatory.

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## 1. Introduction

The proportion of the population  $\geq 65$  years old is about 17% today and will be about 27% in 2050 worldwide, but in many European countries the percentage was already more than 20% in the year 2000 and will increase to more than 40% by 2040 [1]. This is a major social and economic burden to society, which will become increasingly difficult to manage in a situation with limited public resources [2].

The problem, however, is not ageing in itself, it is individual disabilities associated with ageing. An ageing society offers many opportunities. For example, older adults can continue to be productive and make a contribution to society not only by extending their working years, or by caregiving (e.g. looking after grandchildren), but also volunteering, social engagement and leading meaningful, independent lives - provided that they are healthy and free of disability [2]. Good health is essential for active ageing, which in turn is paramount to ageing individuals and societies. However, people want to live longer on condition that they are able to continue to lead an active life, and good health is essential for active ageing. Prevention of infectious disease through a rational use of vaccines can significantly contribute to the achievement of these goals.

More than 40 people representing different stakeholders (public health, research physicians, patients, regulators and manufacturers) in the area of vaccines and vaccination from 19 European Countries met in Milano, Italy, on December 2nd, 2016, to identify gaps and barriers in making vaccination of adults aged 50+ a reality and to agree upon further joint actions in Europe. The meeting was held under the auspices of World Association for Infectious Diseases and Immunological Disorders (WAIID) and Vaccine Study Group of the European Society of Clinical Microbiology and Infectious Diseases (EVASG) and supported by Vaccines Europe. Here below are the consensus points reached during this pan-European meeting.

## 2. The burden of disease due to influenza, shingles, pneumococcal pneumonia and meningitis

Every year **influenza** causes not only approximately 40,000 deaths in the EU (90% of which occur among persons aged  $\geq 65$  years). In addition, there are non-fatal cases with complications leading to hospitalizations (78 cases per 100,000 inhabitants every year) and, ultimately, permanent disability, particular in patients with cardiovascular disease [3].

Community-acquired pneumococcal **pneumonia** occurs in Europe in about 1 person every 1000 person-years. It is a common cause for hospitalizations with 73 cases per 100,000 inhabitants every year among the elderly, and can be fatal in about 12% of patients [4]. Risk factors for pneumonia are older age, having already had pneumonia in the past and underlying diseases. The latter are a key factor, since they increase the risk of contracting pneumonia by 3 to 8 times and they often worsen the severity and status of the underlying disease [4].

**Herpes zoster** is a disease caused by the reactivation of a latent chickenpox virus (varicella zoster virus) infection. The main risk factors for the reactivation are increasing age, waning immunity, immunosuppression from medications used to prevent rejection of transplanted organs (but 90% of cases occur in patients who do not have this condition) and underlying chronic diseases [5].

The incidence of zoster amounts to 3–4 cases per 1000 person years in Europe, but it is strongly age-dependent: at 50 years, the number of cases increases to 7–8 and at the age of 80 years to 10 cases [5]. The infection leads to malaise and a characteristic skin rash that evolves into vesicles, which ulcerate and heal within a month. In about 20% of cases the subjects suffer from complications, the most feared being post-herpetic neuralgia, a painful chronic condition refractory to analgesics that leads to disability [5]. In older people, there is a strong bidirectional link between herpes zoster and functional decline, which refers to a decrement in ability to perform activities of daily living [6].

With age, there is an increase of chronic diseases. According to an Italian general practitioner database, the proportion of people with at least one chronic disease already reaches 40% between the age of 50 and 54 years and increases up to 80% over the age of 65 years. Many subjects have a number of concomitant diseases, such as hypertension, obesity and diabetes [7]. Moreover, infectious diseases are also more difficult to manage in seniors with chronic diseases because of increased risks of drug interactions from polypharmacy and potential adverse effects of drugs on underlying diseases like diabetes [8]. Finally, diseases like influenza, pneumococcal diseases and shingles can increase the occurrence of some cardiovascular complications. Based on the calculation of cardiovascular risk, at least 70% of subjects aged 60–65 years already are candidates for the influenza vaccine [9].

For all these diseases, vaccination programs specifically planned to protect old people are implemented in some countries. However, coverage is frequently lower than desired and in certain cases suggested vaccines do not induce an adequate immune response in the target population due to immunosenescence. Lower antibody response due to defects of B cell response are common in the elderly. Moreover, age-related changes in antigen uptake, processing and presentation, as well functional defects of T cells have been evidenced. Generally, vaccines prepared to protect children are used without consideration of the risk of a poor response in the elderly. The best example at this regard is given by the influenza vaccines. For years, preparations with relatively poor immune stimulation in old people have been used although the increased risk of severe influenza for these individuals had been clearly shown for a long time. Only recently, preparations able to evoke adequate immune response in old people, such as including adjuvants or an increased amount of antigens have been licensed.

## 3. Childhood diseases are becoming diseases of the adults: A life-long approach to vaccination is required

Children are usually vaccinated against several vaccine-preventable diseases, including tetanus, diphtheria, pertussis, measles, mumps and rubella. This positively impacts the level of protection of other age groups via an indirect effect by preventing the infectious agent from spreading. Good examples of indirect protection are those related to the introduction of conjugate vaccines against pneumococcal [10] and *Haemophilus influenzae* type b infections [11] in younger children. Reductions in disease incidence among cohorts too old to have been vaccinated have been responsible for a relevant part of the total disease reduction attributable to these vaccines.

However, over time protection for tetanus, diphtheria and pertussis wanes and repeated booster doses are needed to maintain protection during adult age and in the elderly [12–14].

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